

## The Transformation of Family's Socio-Economic to the Diversity of Agribusiness-based Food Consumption Pattern

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**ABSTRACT:** Food quality determinants are the diversity (diversification) of food type, nutrition balance, and food safety. It is believed that the nutrient imbalances due to the lack of food consumption diversity will have an impact on the emergence of nutritional problems, both less or excessive nutrition. Diversification of food consumption is intended as consumption of various types of food that can meet the nutritional adequacy. Food consumption is said to be varied when it contains food sources of energy, a source of builders and sources of regulated substances in a balanced manner. So that food is a basic need as a right for every human being and one of the determinants of the human resources quality. The objectives of this study were to (a) analyse the proportion of energy contribution from rice to the total of energy consumption, (b) to analyse the contribution of energy and protein consumption from various food groups, and (c) to analyse the relationship between the socio-economic aspects of the family to the diversity of food consumption (PPH score). This research was conducted in Magetan Regency, One of the important components is based on the consideration that the region has implemented the consumption of food diversity. To see the effect of socio-economic aspect on the diversity of food consumption this research used Regression Test,  $Y_1 = \beta_0 + \beta_{1-n}x_{1-n} + \varepsilon$ , where  $Y_1$  = Food consumption diversity (PPH score),  $X_1$  = Family income per month (IDR/ month),  $X_2$  = Food expenses (IDR/month)  $X_3$  = Mother's education level (year),  $X_4$  = Father's education level (year),  $X_5$  = number of family member (person)  $X_6$  = Nutrition knowledge (score),  $\varepsilon$  = Error,  $\beta_0$  = Intercept,  $\beta_{1-n}$  = Regression coefficient. Based on the ANOVA results between regions with PPH scores, it can be concluded that the regional differences did not affect the diversity of food consumption of the society. Although, on average, it appeared that in rural areas was less diverse in food consumption than in suburban and urban areas. The education level and income factors were the keys that determine the level of food diversity consumed. The implication was that any efforts to improve the diversity of food consumption should also seek to improve income and education level. If these two factors have been well conducted, but the availability of food was disturbed then it would be meaningless. It could be said that the aspect of food availability was also a key factor in relation to the diversity of food consumption.

**KEYWORD:** Transformation, Consumption Pattern, Food.

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### I. INTRODUCTION

The determining factors of food quality are food variation (diversification), balance nutrition and safe to consume. Be noticed that the imbalance nutrition caused by less variety of food will lead to nutritional problem, either malnutrition or over nutrition

If those problems and conditions are left the way they are, they will impact on the declining quality of human resources. Various data show that malnutrition in children as a result of low food consumption will impact on physical growth, mental and intellectual. As an illustration, protein energy deficiency caused by malnutrition and infections have impact on declining IQ up to 5-10 points (UNICEF, 1997). Indonesia is estimated losing 330 million IQ points due to malnutrition. Other impacts of malnutrition is declining productivity to approximately 20-30% (Indonesian ministry of Health, 2005). The conditions have an impact on lower attainment in human development index (human development index = HDI) compared to other countries in the world. The research of UNDP (2004) stated that Indonesian HDI was on 111th out of 174 countries that were assessed.

Magetan regency has quite high food diversity. There are several important commodities, which advocate the food system security, are more abundant here. Planting carbohydrate source plants: rice, corn, cassava and yams. Planting a protein source plants: soy, peanuts and beans. Food crops can be found all over the

subdistricts (27 subdistrict). Several subdistricts, which are included in the scope (there are four subdistricts), have relatively smaller areas compared to other subdistrict (Magetanregency BPS, 2005)

Until recently, information about (a) the energy dependence comes from rice, (b) contributions energy consumption and protein of various groups of food, and (c) the corelation between socioeconomic aspects and family's consumption of food diversity, are limited.

The purposes of this research were to 1) analyze the energy proportion contributed by rice to the total energy consumption, 2) analyze the contribution of energy and protein consumption from various groups of comestible, and 3) analyze the corelation between family's socio-economic aspects and consumption of diverse food (Expected Food Pattern score /PPH score)

The result of this research will provide information about: 1) energy dependency rate of rice, 2) energy and protein contributions of various groups of food, 3) the influence of family socio-economy aspect toward consumption of food diversity, as well as 4) as a reference for preparation and implementation of comestible variation program in different areas while keeping each regions' peculiarity.

## **RESEARCH METHOD**

The research was conducted in Magetan district, namely Sukomorosubdistrictin Sukomoto village (sub urban area), Kentangan village (rural area) and Magetansubdistrict in Kebonagung village (urban area). The location was chosen purposively; it means that location was determined by the objective of the research (Arikunto 2002; Sugiyono 2007).The location was chosen since Sukomorosubdistrict is the winner of food security contest in 2007. An important component is that the region has conducted a diverse food consumption.

## **SAMPLING TECHNIQUE**

Sampling used purposive sample method (Arikunto 2002; Sugiyono 2007). It means that sampel was chosen based on purpose of this research.Sampling stages were as follow: 1) familiescollection in the area of study. Data collection was conducted by government officers assisted by the personnel of POSYANDU (Integrated SevicePost), 2) Next, the data was classified based on education level; primary school (SD), junior high school (SMP), senior high school ( SLTA) and colleges (PT), 3 ) Then, from the data, it can be determined random samples at each strata, 3 ) based on the data, 90 people are chosen as samples.

## **TYPES AND SOURCES OF DATA**

The type of collected data consists of primary data and secondary data. Primary data included the family's economy status, family members, husband and wife's education, non-formal education/ trainings/ courses, training on food nutrition and health (if possible), husband and wife's age, food consumption, knowledge about nutrition and food, attitude toward nutrition and food.

Collected secondary data was covering: general state of research area (economy facilities, health, education and kind of occupation), and any program related to the consumption of diversify food in the relevant area.

The type, collection technique and measurement of data are presented in appendix 1.The food consumption rate was collected with recall method, then it was converted into nutrients form using a Composition of Comestiblestuffs (DKBM). Primary data were also collected through direct interviews with respondents using structural questionnaire (appendix 2).

Secondary data was obtained from documents, reports , proxies of related institution in accordance with type of data needed .

## **DATA ANALYSIS**

Analysis technique used in this research was ANOVA test and Regression test which were operated through SPSS 21 programme. Some data, which were processed as an analysis guideline, are as follow:

- a. Decided the mean of the characteristics of family's socio-economic, the maximum and minimum score were grouped, then made procentage and presented them in a table.
- b. Consumption Data was processed in order to uncover:
  - 1) The consumption rate of energy and protein was declared as a ratio of adequate energy and protein consumption written in procentage.it's mathematically calculated as follows: the rate of energy or protein consumption =  $TKGi = (KGi : AKGi) \times 100\%$  KGi = energy or protein consumption; AKGi = number of energy or protein adequacy
  - 2) The reliance rate on rice is interpreted as proportion of energy contributions of rice to the total energy consumption, which was expressed in percent. And the consumption of food diversity.Mathematically is calculated as follow:

$$TKB = (KEB : KEP) \times 100\%$$

$$TKB = \text{Rice dependancy rate}$$

KEB = Energy consumption of rice  
 KEP = Total of energy consumption

Next, decided the mean, maximum and minimum score. Then grouped it, present it in the table and figures. Afterward, ANOVA test was implemented to see if there were any significant differences, it is then followed by advanced difference test (LSD).

- 3) Knowledge about nutrition and food, attitude toward food selection, decide the mean, group the maximum and minimum score, then presented in table.
- 4) To identify the effects of socio-economic aspects on the consumption of diversity food, regression was used:

$$Y_1 = \beta_0 + \beta_{1-n}X_{1-n} + \varepsilon$$

Y1 = Consumption of diversified comestible (PPH score)  
 X1 = Monthly income (IDR/month)  
 X2 = Comestible Expenses (IDR/bulan)  
 X3 = Mother's Education (years)  
 X4 = Father's Education (years)  
 X5 = Family Members (persons)  
 X6 = Nutrition Knowledge (score)  
 ε = Mistake / Error  
 β0 = Intercept  
 β1-n = Coefficient Regression

## II. RESULT AND DISCUSSION

### Rice contribution energy proportion to the total energy consumption

The result showed that the higher the group income, the less the rice consumption would be. It indicated that there was a declining energy source derived from rice. In other words, it can be defined that the higher the group income, the more variant the consumed energy source is (table 21). The correlation between income rate and energy dependency rate of rice showed a similar trend in urban area and sub urban area as well as rural area.

**Tabel 1.** Average Proportion of Energy Contribution from Rice Based on Income Rates

Income Rates	Everage Rice Consumption				
	n	Mean	StandardDeviation	Minimum	Maximum
<150,000	23	53.64	13.50	30.69	82.61
150,000-300,000	41	51.28	13.44	25.42	81.53
>300,000	26	44.89	11.17	11.97	61.59
Total	90	50.04	13.16	11.97	82.61

In general, the average level of rice dependancy (energy contributions of rice to total energy) in the research areas covered 50 %. If the data is grouped based on income level, the information is as follow, the average level of energy dependency of rice at income group of IDR 150,000, is 53.64 %, and the income group of IDR 150,000-300,000 is 51.28 % while the lowest percentage is experienced by the group income of IDR 300,000 with 44.04 %.

The declining energy contribution of rice on the group with higher income is caused of the more diverse food they consumed (table 24). The more variant food consumed, it will result in declining domination of certain food. In this case, there is a decline in energy contribution derived from rice.

Based on the location, it can be concluded that energy dependency rate of rice in urban area is lower than the rural area. The average level of energy dependency of rice in urban area is 48.35 %, and in the rural area is 55.13 % while in sub urban area is 46.63 % (table 22).

**Tabel 2.** Energy Dependency Rate of Rice Based on the Area

Area	Energy Depedency Rate of Rice (%)				
	n	Mean	StandardDeviation	Minimum	Maximum
Sub Urban	30	46.63	10.64	25.42	68.57
Rural	30	55.13	15.36	29.38	82.61

Urban	30	48.35	11.83	11.97	75.92
Total	90	50.04	13.16	11.97	82.61

The analysis above showed that rice was a considerable energy contributor. This condition has an effect on high protein contributions from rice to the total protein, although rice is not a protein. It happens because rice contains of 7 - 8 protein per 100 g.

### Energy and Protein Consumption Contributed from Diverse Comestibles

Grains contributed the largest energy and protein compared to other groups of food. The contribution of proteins from the group of grains were 44.43% and 5 5.5 % AKG (Adequate Nutrition Score) of energy. The magnitude of the grains consumption was approximately 6% higher compared to the standard % AKG arrangement which expected food pattern of grains was 50 %.

This figure was relatively constant since 2005. In 2005 the contribution of cereal grains toward energy was 57.1 % AKG. It means that in the last three years, the role of cereal grains remains dominant in people's food pattern.

**Tabel 3.** Average Energy and Protein Contribution of Diverse Food Group

No	Comestible Group	Protein Contribution (%)	Energy (Kcal)
1	Grains	44.43	55.5
2	Yams	1.31	3.01
3	Meat	20.34	6.61
4	Oil and Fat	0.10	14.93
5	Oily Fruit/Seed	0.30	0.86
6	Nuts	24.67	8.42
7	Sugar	0.22	3.03
8	Vegetable and Fruit	8.61	7.05
9	Others	0.01	0.28
	Total	100	100

The second largest energy contributor other than grains was oil and fat amounted 14.93%, followed by nuts and meat with energy contribution of 8.42 % and 6.61%. It is because a gram of fat contributes 9 kcal energy, while carbohydrate and protein in 1 gram only give 4 kcal.

Yams group as carbohydrate source has relatively small contribution to people's energy, it is 3.01 %. The low contribution to the total energy indicated food preference of the community over yams was low. The low preference of yams was due to public interest which regarded yams as inferior food. The other possibility was a bias of government policies which always prioritise rice over yams group. For a very long time, there is a vast belief that regarded rice as more superior comestible than yams.

The second largest contribution of protein aside from grains is nuts. Nuts contribution to the total protein is 24.67 %. Consumption of nuts generally tends to increase in accordance to the increase of income. The research showed that the income group of IDR 150,000,- has contributed 25.93 % of total protein, then it increased to 26.47 % in the group income of IDR 150,000- IDR 300,000. On this group income, a surfeit has seemingly occurred so that in the upper group income of > IDR 300,000, the contribution of energy from nuts has decreased to 20.72 %.

The declining contribution of protein from nuts is caused by increasing meat consumption of the income group. On the group income of > IDR 300,000,- meat consumption distributed 28 % energy. This contribution figure was greater than the meat consumption on the group income of IDR 150,000, it was 15.26 %. Next, at the group income of IDR 150,000 - IDR 300,000, - the meat consumption was 17.84 %. On the other hand, there was a declining trend of grains protein contribution in line with income enhancement.

Among protein source from nuts, tempe and tofu were highly desired. The role of tempe and tofu is very significant in consumption pattern of the inhabitant compared to other type of nuts. Aside from the taste that is popular among the society, tempe and tofu are sources of protein which price is relative cheaper than protein source from meat.

Tempe and tofu domination as a source of proteins from nuts are expected pertaining to the availability of the material. It can be seen from the number of tempe and tofu producer as well as the availability of tempe and tofu in the local market and vegetable peddler. This phenomenon providing justification that the availability of local food determines food preference rate

Regarding to meat protein source, the research showed that among different kind of meat protein source, egg is the largest source of protein. Eggs has a moderately high preference in the various income group. This condition put eggs as the largest protein contributor compared to other meat sources such as beef, chicken, fish and also milk. It concluded that the high consumption of egg, among other meat resource groups, was

closely related on how easy people get access to buy the eggs either physically or economically. It means that from the availability aspects, eggs are relatively more attainable at markets and even are stored at homes. Moreover, from the price aspect, eggs are relatively cheaper than other meat as source of protein.

Then the contribution of protein of beef was relatively small among other meat sources. The decreasing meat consumption was related to the price. It means that the price of beef became an obstacle for low income group to buy beef.

In general, the contribution of protein from meat was 20.34 % of the total protein consumption. The research showed that > 20 % meat protein contribution was apparent in the income group of > IDR 300,000,-

**Diverse Comestible Consumption Rate**

The research revealed that the average PPH score was still 71.73 from the ideal of 100 (table 24). As well as if seen from food groups, all PPH score for every group in the reseachareas was still under the ideal score. The ideal PPH score for grains 25.0; yams 2.5; meat sources 24.0; oil and fat 5.0; fruit/oily seed 1.0; nuts 10.0; sugar 0.5; vegetable and fruit 30.0 and others 0.0.

**Tabel 4.** Average PPH Score Compared to Ideal PPH score in the Reasearh Areas

No	Comestible Group	PPH Score	PPH Ideal Score
1	Grains	21.97	25
2	Yams	0.92	2.5
3	Meat	10.44	24.0
4	Oil and Fat	4.20	5.0
5	Fruit/ Oily Seed	0.30	1.0
6	Nuts	8.02	10.0
7	Sugar	1.12	2.0
8	Vegetable and Fruit	24.78	30.0
9	Others	0.00	0.0
	Total	71.73	100

The PPH score of the research is lower compared to the PPH score of East Java in 2007 which is 82.08. The same thing applied to PPH score of each food group, however vegetable score was higher which was 24.78 compared to 21.76.

The lower PPH score in the research areas compared to PPH score in East Java in 2005, is allegedly because the prices of food were increasing as an impact of the rising fuel prices, as outlined above. This is in accordance with the result of the research which shows the higher income groups the higher PPH score become (figure. 5).

The ANOVA results showed that there was a very significant difference in the PPH scores among the income group strata at the level of  $\alpha$  1% (Appendix 8). Furthermore, different test with LSD showed that the average PPH score between income strata group < IDR 150,000, with strata IDR 150,000-Rp300.000 there was no difference (Table 25). However, between the two strata group with the income strata group > IDR 300,000 there was a significant difference in the 5% level. The average PPH score in the income strata group < IDR 300,000 was still lower than 70 with the PPH score score ranging from 41 to 91. Then in the income strata group > IDR 300,000 PPH score reached 82.33 with minimum score of PPH 64. 28 and a maximum score of 95.44. If a correlation analysis of per-capita income level with PPH score showed a very positive positive correlation at the level of  $\alpha$  1% with  $r = 0.474$ .

**Tabel 5.** Analysis Result of Income Defference Test (LSD) With PPH Score

(I) Income Group	(J) IncomeGroup	PPH Score		
		Mean	Std. Error	Sig.
<150,000	150,000-300,000	-2.3290	3.0981	0.4542
	>300,000	-16.4003*	3.4041	0.0000
150,000-300,000	>300,000	-14.0712*	2.9814	0.0000

The results of the above analysis provided a very strong sense that the acceleration of food consumption diversity can only be done well if people have enough income. This means that the success in accelerating the diversity of food consumption will be determined by the success rate in terms of family income improvement. Although there were other factors that also affected the diversity of food consumption.

If PPH scores are grouped by region, the results showed sub-urban PPH scores of 73.99, urban areas 72.75 and rural areas 68.44 (Table 26). These values based on the ANOVA results show no significant differences between regions at the 5% level (Appendix 9).

**Table 6.** Average PPH Score Based On Areas Average PPH Score by Area

Area	n	PPH Score			
		Mean	Standard Deviation	Minimum	Maximum
Urban	30	72.75	11.50	52.67	95.14
Sub Urban	30	73.99	14.80	47.22	95.44
Rural	30	68.44	14.14	41.63	92.53
Total	90	71.73	13.61	41.63	95.44

Based on ANOVA results between regions with PPH scores it can be concluded that, area differences did not affect the people's food consumption diversity. Although, on average, it appeared that in rural areas it was less diverse in food consumption than in sub-urban and urban areas.

**Relationship Between Socio-Economic Aspects to the Diversity of Food Consumption (PPH Score)**

The Result of multiple regression test with stepwise method as on attachment 10 on page 70 there are 2 variables included; head of family's education and income. Other variables included nutritional knowledge, nutritional attitudes, wife's education level, family size and percentage of food expenses. The results showed that the factors that affected the diversity of food consumption (PPH score) were the per capita income and head of family's education with the following line equation:

$$Y = 52.711 + 1.298 X1 + 0.00003 X2$$

Where :

- Y = PPH Score
- X1 = Head of family's education
- X2 = Average Income
- R = 0.542

The above results can be explained as follow, education will affect on the level of knowledge and also attitudes that will ultimately affect the decision-making within the family. Second, education will generally affect the income level. The level of income will affect the ability of purchasing power. High purchasing power will provide more choices in determining the variety of food and nutrition to be consumed. Therefore, high income level accompanied by good attitude and knowledge on food and nutrition will positively affect the diversity of food consumed.

Considering the above information, it can be justified that education and income are the keys in determining the rate of diverse food consumption. The implications are any attempt to improve diverse food consumption must be followed by improving their income as well as their education. If those two factors have been improved but the food availability is still disturbed, it will be meaningless. It means that the food availability is also the key factor in corelation to the diversity of food consumption

**III. CONCLUSION**

Rice has significant role in energy contribution compared to other food groups, such as yams. Average rice contribution is 50% AKG while yams contribute only 3.0% AKG. Grains distribute the largest energy and protein compared to other food. Protein and Energy contribution of grains respectively are 44 % and 56% AKG. Protein and energy contribution from other food are as follows: for meat, the protein is 20.3% and the energy is 6.6% AKG; For nuts, the protein is 24.7% and the energy is 8.4% AKG; For yams, the protein is 1.3% and the energy 3.0% AKG; While vegetable and fruit consist of 8.6% protein and energy of 7.1% AKG.

Meanwhile, the corelation between the head of the family's education and income rate are 2 variables that influence the domination of expected comestibles pattern score. The head of the family's education will have a positive effect on the raise of PPH score, if it is controlled by income variable. When the education level goes up to 1 year, the PPH score will increase up to 1.298. The average score for income group of <IDR 300,000 is between 41 to 91. While PPH score for group income of >IDR 300,000 is between 64.28 to 95.44.

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