FOOD CONSUMPTION, NUTRITIONAL AND HEALTH STATUS AMONG FARMER HOUSEHOLDS IN SUBANG, WEST JAVA, INDONESIA

Nani Sufiani Suhanda[1]*, Leily Amalia[2], Khairunisa[2], and Dadang Sukandar[2]

[1] Center for Management of Agricultural Human Resources Development, Ministry of Agriculture, Bogor, West Java, Indonesia.
[2] Department of Community Nutrition, Faculty of Human Ecology, Bogor Agricultural University, Bogor, West Java, Indonesia; Telp: 0251-8621258; Facs: 0251-8622276
* Correspondence Address : Center for Management of Agricultural Human Resources Development, Ministry of Agriculture, Bogor, West Java, Indonesia; Email: sufi149@yahoo.co.id

ABSTRACT

The objectives of this study were : 1) to analyze the consumption of various types of foods (meat, milk, fish, fruit, and others) and the methods of getting the foods among farmer households, 2) To analyze the nutritional status (fathers, mothers and children) among farmer households, and 3) To analyze the health status (fathers, mothers and children) among farmer households. This research was of a retrospective and cross sectional design. This research was conducted in Subang Farming Regency, West Java. There are two types of population (farmer households), namely, those of horticultural region and those of rice field region. The sample size at each location was 261 households, so the total sample was 522 households. The results of this research show that in general the frequency and quantity of food consumed by the non poor households are relatively better than those of the poor households. Further, as the centers of agricultural production, both regions (rice and horticulture) will produce certain foods in abundance and will affect the patterns of food consumption among the local community and households. Children's nutritional status is in general of good category (based on W/A and H/A). Husband's and wives' nutritional status is normal. The length of upper respiratory tract infection on wives and children is quite low (<4 days), but among the husbands (non poor households) is quite high (8 days) in the last two weeks. The duration of diarrhea is also low, i.e. only 0-0.2 days in the last two weeks.

***Key words**: Farmer, food consumption, nutritional and health status*

INTRODUCTION

Farmer households are those in which the family members mainly work as farmers and commonly live in rural areas. According to Wolf (1985), a farmer is the person who grows crops in rural areas, not in a closed space (e.g. green house) in the urban areas. Farmers, according to BPS (1993), are a group of people conducting activities to obtain agricultural products that are partly or wholly sold to gain profit. These activities include farming/plantation, growing fish in ponds, and raising livestock.

Indonesian farmers are a picture of backward, underdeveloped, disadvantaged and powerless condition. Indonesia with its fertile lands has very few business/entrepreneur-oriented farmers. Most of them are farm laborers and small farmers, who are unattended and marginalized. They do not have a bargaining power to change their fate for a more prosperous life. They are in a paradox life: they are living on a vast fertile land with high quality of soil, but still have a poor life and never escape from the viscous circle of poverty.

As mentioned in World Development Report (2008) that three of every four poor people in developing countries live in rural areas and most depend on agriculture for their livelihoods. According to the report of World Bank in Sylva and Bysouth (1992), most poor people live in rural areas and live on or by farming. Most of them are small farmers, marginal farmers, and farm laborers.

Food consumption and health are the factors that directly affect the nutritional status of a person. The status is influenced by the amount and quality of food consumed. Also, unhealthy condition as a result of infectious diseases can cause disorders in the absorption of nutrients. Harper, Driskel, and Deaton (1985), state that poverty is an important cause of malnutrition. Other factors include the lack of nutritional knowledge or capacity in using such knowledge in daily life.

The objectives of this research were to: to analyze the consumption of various types of

foods (meat, milk, fish, fruit, and others) and the methods of getting the foods among farmer households, to analyze the nutritional status (fathers, mothers and children) among farmer households, and to analyze the health status (fathers, mothers and children) among farmer households.

METHOD

Research Design and Time

This research was of a retrospective and cross sectional design. The research lasted for 12 months, starting from preparation to writing a final research report.

Sampling

This research was conducted in Subang Farming Regency, West Java. There are two types of population (farmer households), namely, those of horticultural region and those of rice field region. Sampling from each population was done through a stratified random sampling technique with a proportional allocation. Welfare category set by BKKBN was used for stratification. The sample size at each location was 261 households, so the total sample was 522 households.

Data Collection

Data collected includes: data on social aspects, data on food consumption (food frequency and a 24 hour recall), data on health (morbidity), and anthropometric data. The secondary data is the information related to the value of minimum physical needs. The data was collected by using questionnaires.

Data Processing and Analysis

The preparation before the data entry involved coding variables and creating files structure. The file structure was arranged by using Microsoft Excel. After the data in the file was edited, the next steps were generating variables, merging sheets, sorting and merging files as needed so that the data was ready for an analysis.

RESULT

Food Consumption

Food consumption is closely related to the socio-economic condition and the accessibility of a region to food sources. A household with a good economic status will be able to and have opportunity to consume food of better quality and quality than those with a low economic status.

Consumption of Cereals and Tubers

In general both poor and non poor people will try to meet the need for foods as the source of energy, particularly major foods, to make their bodies full or not hungry and able to do activities normally. This has made the quantity and frequency of the food consumption is relatively the same in both households (poor and non poor). The rice consumption in the poor and non poor households is 18.9 and 19.6 times a week respectively, or 2.7 and 2.8 times a day. In terms of regions, the people of the rice region consume rice 19.6 times/week, while those of the horticulture area eat rice 18.9 times a week, or respectively 2.8 and 2.6 times a day. This is the normal frequency of consumption for the people of Indonesia in general. Quantitatively, the rice consumption in both economic groups is relatively the same, i.e. on average 400 g/day.

If both regions compared, the cereal consumption (frequency and quantity) in the rice region is relatively higher than that of the horticultural area. The rice consumption is bigger in the rice region (410 g/day) than in the horticultural area (384 g/day). Such amount of consumption gives a contribution of respectively 1640 kcal/day and 1540 kcal/day, or around 80% of daily energy requirement of the body.

Besides for sale, in the rice region, the rice is party stored as reserve for the daily consumption. This has made the rice consumption in the rice region is higher than that of the horticulture region where the people commonly have to buy it.

The frequency in the consumption of corn, cassava, and tubers is relatively the same: corns and cassava are each consumed between 1.3-2.5 times/week, while sweet potato is 0.6-0.8 times/week, meaning that corns, cassava, and sweet potato are not eaten every day. This is understandable because the three cereals, although they are the source of carbohydrate like rice, tend to become alternative foods, not the main foods as the source of energy for the community of Subang and the people of Indonesia in general.

Table 1. Frequency and Amount of Cereals and Roots Consumption

Kind of Food	Economic Status				Region			
	Poor		Non poor		Rice		Horticulture	
	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
Frequency of Consumption (times/week)								
Rice	18.9	3.5	19.6	3.5	19.6	2.8	18.2	3.5
Corn	1.7	2.8	2.5	3.2	2.7	3.5	1.2	2.2
Cassava	1.4	1.7	1.3	1.6	0.7	1.7	2.2	1.8
Sweet potato	0.6	1.1	0.8	1.5	0.7	1.4	0.4	1.1
Amount of Consumption (g/week)								
Rice	2776.9	865.3	2806.8	960.6	2871.3	1011.2	2688.5	773.1
Corn	0.9	2.0	1.6	3.0	1.7	3.1	0.5	0.9
Cassava	18.2	23.6	15.3	19.2	8.6	17.1	26.0	23.4
Sweet potato	1.2	2.4	1.9	3.1	1.9	3.1	0.9	2.0

In terms of quantity, cassava is consumed in greater quantity than corns and sweet potatoes, i.e. 18.2 g/week in the poor households and 15.3 g/week in non poor households. Further, based on the regions, in the horticultural region the cassava consumption appears to be greater (26 g/week) than in the rice region (8.6 g/week). Cassava is particularly from self-farming (grown by the farmers themselves). Many farmers in the horticultural area (33.3%) have cassava crops, whereas there are 3.5% in the rice region.

Consumption of Animal Food

Animal foods mostly consumed by the non poor groups are in order as follows: milk, eggs (from layer chicken), and salted fish, with the consumption of respectively 25.6, 25.4 and 20.5 g/cap/week; whereas the opposite order is the case in the poor households, namely, salted fish, eggs, and milk with the consumption of respectively 23.9, 18.7, and 16.5 g/cap/week.

It can be seen from Table 2 that the consumption of animal food, except for salted fish, is lower in the poor households than in the non poor households. Thus, salted fish is more frequently consumed as the source of protein in the poor households. The low price of salted fish is the main reason for the poor to consume instead of meat or eggs. Among the non poor households the most frequently consumed animal foods are chicken meat, salted fish, fresh-water fish, with the average frequency of respectively 6.4, 5.2, and 3.6 times per week, whereas the animal foods most often consumed among the poor households are salted fish, chicken, and fresh-water fish, with the average frequency of respectively 5.5, 3.2 and 2.5 times/week.

The frequency and quantity of animal protein consumed in the rice region are higher than in the horticultural region. Both regions are not the producer of animal food, so their consumption level depends on the ability of each group of the population in buying and getting access to the food. Although there are more households in the horticultural area who have poultry than those of the rice region, the poultry are raised particularly for sale rather than consumption.

Further, the economic capacity (income) of the rice farmer households is higher (Rp 461,494) than that of horticulture households (Rp 351,484), so the former group get better access to or can buy animal foods that are more expensive than plant food.

Table 2 below shows that meat (cow/goat) is the most rarely consumed animal food, less than once per week, or more precisely on average twice/year among the poor households and five times/year among the non poor households; and 4.7 time/year among the households in the rice region and 2.6 times/year among horticulture households. Typical of poor households in general, red meat is consumed during the two Islamic Holy days (*Idul Fitri and Idul Adha*). With such a low frequency, the amount of meat consumed is also low, below 1 g/week.

Consumption of Bean Families (Legumes)

Table 3 indicates that the consumption of beans in both groups of households is relatively similar. The nice taste of beans remains the choice of non poor households although their consumption of animal food is quite high in frequency and quantity. This means that in terms of food variety, the food consumption among the non poor households is better than that of the poor group. In this way, the nutrient requirement for the non poor households is satisfied more sufficiently than that of the poor households.

Table 2. Frequency and Amount of Animal Food Consumption

Kind of Food	Economic Status				Region			
	Poor		Non Poor		Rice		Horticulture	
	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
Frequency of Consumption (times/week)								
Chicken	3.2	4.5	6.4	6.3	5.3	6.3	3.2	4
Beef/Goat	0.04	0.08	0.1	0.2	0.09	0.4	0.05	0.09
Sea fish	0.2	0.4	0.5	0.9	0.4	0.8	0.3	0.6
Ikan pindang	1.7	1.2	1.9	1.4	1.8	1.4	1.5	1.1
Ikan tawar	2.5	2.9	3.6	4.1	3.1	5.4	1.9	2.6
Salted fish	5.5	4.2	5.2	4.7	4.8	4.6	6.1	3.9
Chicken egg	2.5	2.0	3.0	2.2	2.0	1.8	2.9	2.3
Salty Egg	0.2	0.4	0.5	0.9	0.4	0.8	0.1	0.3
Milk	1	2.1	1.4	3	1	2.7	1	2.2
Amount of Consumption (g/week)								
Chicken	5.4	7.6	10.2	9.6	8.5	9.9	5.4	6.7
Beef/Goat	0.1	0.3	0.1	0.4	0.1	0.4	0.1	0.2
Sea fish	0.3	0.7	0.8	1.6	0.7	1.4	0.3	0.5
Ikan pindang	5.5	4.4	6.8	6.8	6.3	5.7	5.6	4.8
Ikan tawar	1.4	2.4	2.6	3.3	2.1	3.2	1.5	2.2
Salted fish	23.9	19.0	20.5	18.6	21.1	22.7	24.5	14.0
Chicken egg	18.7	17.0	25.4	19.2	17.1	14.9	24.6	19.9
Salty Egg	1.1	3.4	1.3	3.2	1.5	4.5	0.9	1.5
Milk	16.5	46.2	25.6	57.1	17.8	50.4	21.0	49.8

Table 3. Frequency and Amount of Legumes Consumption

Kind of Food	Economic Status				Region			
	Poor		Non Poor		Rice		Horticulture	
	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
Frequency of Consumption (times/week)								
Tofu	2.7	1.8	3.2	2	2.8	2	2.7	1.8
Tempeh	2.6	1.8	3	2	2.8	1.9	2.4	1.8
Oncom	0.7	1.0	1.0	1.4	1.1	1.4	0.4	0.6
Peanut	0.9	1.3	1.2	2.2	1.4	2.1	0.3	0.5
Mungbean	1.1	1.1	1	1.2	0.5	0.8	1.6	1.1
Amount of Consumption (g/week)								
Tofu	10.4	8.4	15.0	12.3	12.6	10.9	11.2	9.1
Tempeh	13.2	9.9	16.8	13.3	16.2	12.8	12.5	9.1
'Oncom'	0.6	1.0	1.0	1.6	1.1	1.5	0.3	0.5
Peanut	0.5	1.0	1.0	1.9	1.1	1.8	0.2	0.5
Mungbean	4.2	5.3	4.5	5.4	2.6	4.6	6.0	5.4

The types of food derived from beans mostly consumed are tempeh and tofu. Based on the frequency, the consumption of tempeh and tofu does not appear to be much different between the groups, that is, on average 2.4-3 times/week. However, as for the quantity, the consumption of both foods is greater in the non poor households and those in the rice region. Such high consumption in the rice region is because the households have higher income than those in the horticulture.

Consumption of Vegetables

From Table 4 and Table 5 it appears that there are a variety of leave vegetables and fruit vegetables consumed with the frequency of 0.4-4.6 times/week. Of all types of vegetables, tomato is most frequently consumed, i.e. more than 4 times a week among both poor and non poor households also in both regions (rice and horticulture). The leave vegetables mostly consumed is cassava leaves.

As inferior and cheap stuff, the consumption of leave vegetables is relatively the same between the poor and non poor households. However, this is not the case of fruit vegetables, which are commonly more expensive than leave vegetables. The frequency and amount of fruit vegetables consumed by non poor population are higher than of the poor

population. As the production center of vegetables and fruit, the people in the horticultural region consume vegetables in higher frequency and amount than those in the rice region. This is the opposite condition of the consumption in animal food and beans. Leave vegetables are generally inexpensive, so they become the choice in the menu among the poor households.

Consumption of Fruit

Table 6 indicates that the frequency of each fruit is relatively low. The most frequently consumed fruit is banana. This fruit grows at all time, not seasonal, and so easily available. It grows well in the horticultural area. Although the horticultural area is the center of vegetables and fruit, the consumption of vegetables and fruit among the households is not significantly higher than that of the households in the rice region (Table 6) because in both regions vegetables and fruit are abundant.

Consumption of Snacks and Other Food

It can be seen from Table 7 that the types of snacks most frequently consumed are *bakwan* and fried banana, among both poor and non poor households with the average consumption of 3-4 times and 2-3 times per week in the amount of 24 mg and 21 mg per week respectively. This is also true in both regions (rice and horticulture); *bakwan* and fried banana are the most frequently eaten snacks, i.e. 3 and 2 times per week respectively.

Table 4. Frequency and Amount of Leafy Vegetable Consumption

Kind of Food	Economic Status				Region			
	Poor		Non Poor		Rice		Horticulture	
	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
Frequency of Consumption (times/week)								
Spinach	0.9	0.9	1.0	1.1	1.0	1.0	0.8	1.0
Kangkoong	1.1	1.1	1	1.1	1.4	1.3	0.8	0.8
Mustard green	0.7	1.0	0.7	1.1	0.6	0.9	0.7	1.1
Cassava leaves	1.4	1.5	1.4	1.5	1.1	1.3	1.6	1.6
Papaya leaves	0.8	1.3	0.8	1.1	0.5	0.9	1.1	1.4
'Melinjo' leaves	0.9	1.0	0.9	1.1	0.8	1.1	1.0	1.0
'Kecapi' leaves	1.4	1.2	1.5	1.2	1.5	1.4	1.2	0.9
Amount of Consumption (g/week)								
Spinach	1.6	2.3	2.1	3.0	2.1	2.8	1.4	2.1
Kangkoong	6.3	7.4	6.6	7.2	8.3	8.5	4.5	5.2
Mustard green	0.5	0.9	0.7	1.2	0.7	1.1	0.5	0.8
Cassava leaves	7.6	9.6	7.1	8.5	6.7	9.3	8.3	9.2
Papaya leaves	0.5	0.8	0.5	0.9	0.4	0.9	0.6	0.7
'Melinjo' leaves	0.7	1.1	0.6	0.9	0.5	0.9	0.8	1.2
'Kecapi' leaves	6.0	6.8	8.3	9.8	8.4	9.8	5.1	4.9

Table 5. Frequency and Amount of Fruity Vegetable Consumption

Kind of Food	Economic Status				Region			
	Poor		Non Poor		Rice		Rice	
	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
Frequency of Consumption (times/week)								
Carrot	1.4	1.2	1.5	1.1	1.1	1	1.8	1.2
Cabbage	1.4	1.2	1.4	1.3	0.9	1.1	1.8	1.2
Squash	1.1	1	1.2	1.2	1.1	1.2	1.2	1
Tomato	4.6	3.3	5.1	3	5	3.7	4.2	2.6
Cucumber	2.6	2.1	3.2	2.5	3.3	2.4	1.9	1.8
Jackfruit	2.6	5.0	3.4	6.1	3.6	6.5	1.6	3.7
Papaya	0.4	0.7	0.4	0.7	0.4	0.9	0.3	0.6
Eggplant	0.8	0.9	0.9	0.9	1.0	1.1	0.6	0.7
Amount of Consumption (g/week)								
Carrot	5.1	4.7	5.5	4.9	4.0	4.0	6.5	5.2
Cabbage	4.3	5.2	4.5	6.1	3.4	5.4	5.3	5.4
Squash	7.8	9.4	10.6	11.7	9.5	10.9	7.9	9.5
Tomato	18.9	15.3	24.5	16.3	23.5	17.4	17.8	13.5
Cucumber	29.0	24.9	37.2	27.7	39.9	27.7	23.3	21.5
Jackfruit	0.5	1.5	1.0	3.1	1.1	2.9	0.3	0.7
Papaya	1.0	3.0	1.1	3.0	1.1	3.0	1.0	2.9
Eggplant	1.1	2.1	1.3	1.5	1.5	2.5	0.8	1.1

Table 6. Frequency and Amount of Fruit Consumption

Group and Kind of Food	Economic Status				Region			
	Poor		Non Poor		Rice		Horticulture	
	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
Frequency of Consumption (times/week)								
Guava	0.3	0.6	0.3	0.6	0.3	0.6	0.3	0.6
Papaya	0.8	0.8	0.9	1.0	0.8	1.0	0.8	0.8
Mango	0.1	0.1	0.2	0.7	0.1	0.5	0.1	0.3
Pineapple	0.3	0.7	0.3	0.6	0.1	0.4	0.5	0.8
Banana	2.0	1.7	2.4	2.3	2.0	2.0	2.1	1.8
Jackfruit	0.0	0.1	0.1	0.2	0.1	0.2	0.0	0.1
Rambutan	0.1	0.1	0.1	0.3	0.1	0.2	0.1	0.2
Orange	1.4	1.4	1.6	1.6	1.2	1.4	1.5	1.5
Apple	0.3	0.5	0.4	0.8	0.2	0.5	0.4	0.7
Amount of Consumption (g/week)								
Guava	0.9	2.1	1.0	1.9	0.8	1.7	1.1	2.2
Papaya	3.3	4.3	3.7	5.0	3.6	5.3	3.3	3.6
Mango	0.0	0.1	0.1	0.3	0.0	0.2	0.0	0.2
Pineapple	1.3	2.7	1.0	1.9	0.7	2.0	1.7	2.8
Banana	20.0	18.6	29.3	29.3	23.5	26.0	22.4	19.5
Jackfruit	0.0	0.1	0.1	0.2	0.0	0.1	0.0	0.2
Rambutan	0.0	0.1	0.1	0.2	0.0	0.2	0.0	0.1
Orange	10.2	11.7	15.1	15.5	11.4	13.4	12.1	13.1
Apple	0.9	2.0	1.5	2.9	0.7	1.9	1.5	2.6

Quantitatively, meatball (tapioca with a little minced meat) is the highest in its consumption in both poor and non poor households also in both regions (rice and horticulture), with the average amount of 35-36 mg/ week. The greater weight of meatball per serving (or portion) compared to that of *bakwan* per portion has made meatball as the snack food most consumed quantitatively, whereas the most frequently consumed is *bakwan* (Table 7).

Like other foods, the frequency and the quantity of snacks consumed among the non poor households is higher than that of the poor households. Based on the regions, the dominant snack food is fried banana, which is more frequently consumed in the horticultural area than in the rice region because in the first region the banana production is abundant, and so it is mostly processed and consumed as fried bananas.

The frequency and quantity of the consumption of other foods (sugar, tea, coffee, sauce, crackers, *vetsin* or MSG, and ketchup) are relatively the same in both categories of households (poor and non poor house holds). The most frequently consumed in the category of other foods is *vetsin (*food flavor containing monosodium glutamate*)*, that is 7 times per week, or consumed daily by every people. In quantity, coffee and sugar are consumed the most in all groups of households. Coffee is consumed in greater amount by the poor groups than by the non poor group, i.e. respectively 20.1 g and 15.2 g/week, whereas sugar is greater in the amount of consumption for the non poor groups (12.2 g/week) than for the poor households (11.1g/week).

Tea and coffee are consumed in higher frequency and greater amount among the households in the horticultural region than in the rice region. This is probably because of the cool air in the horticultural region as a result its high altitude that makes the people there like to drink coffee and sugar to warm their bodies.

Nutrients Intake

Table 8 indicates that the non poor group has a greater nutrients intake than the poor population. The nutrients intake cannot be separated from food consumption. This can be seen from the frequency and quantity (in grams) of consumption in some groups of food such as animal food, cereals, bean, fruit, and snacks, which indicate that the non poor groups have higher consumption than the poor population (Table 1 - Table 7).

Unlike the tendency in the frequency and quantity of food consumed, the energy and nutrient consumption is in general higher in the horticultural area than in the rice area. This is probably caused by the effect of the consumption of salted fish, eggs, milk, pineapples and fried bananas, which is much higher in the horticultural area than the consumption in the rice area.

Table 7. Frequency and Amount of Snacks and Other Food Consumption

Group and Kind of Food	Economic Status				Region			
	Poor		Non Poor		Rice		Horticulture	
	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
Frequency of Consumption (times/week)								
Snack								
Meatball	1.5	1.5	1.7	1.7	1.5	1.6	1.5	1.5
Siomay	0.5	1.1	0.6	1.1	0.6	1.2	0.5	1.0
Fried banana	2.3	2.2	2.5	2.4	1.9	2.2	2.7	2.4
Chicken noodle	0.3	0.6	0.4	0.8	0.3	0.6	0.2	0.7
Bakwan	3.3	2.5	3.5	2.4	3.2	2.6	3.3	2.4
Fried tofu	1.4	1.9	1.6	2.1	1.5	2.0	1.3	1.9
Fried tempeh	1.4	1.9	1.6	2.0	1.5	1.9	1.3	1.9
Other Food								
Sugar	6.5	2.8	6.5	3.4	6.2	3.9	6.8	1.5
Tea	3.4	3.3	3	3.2	2.4	3.2	4.4	3
Coffee	3.5	5.2	3.5	5	2.3	4.1	4.8	5.7
Sauce	0.6	1.3	0.6	1.4	0.4	1.1	0.7	1.5
Chip	4.5	2.7	4.8	2.7	4.6	3	4.5	2.6
MSG	7.0	2.4	7.2	3.3	7.2	3.6	6.7	1.4
Soy-sauce	2.1	2.5	2.1	2.3	2.1	2.7	2.1	2.1
Amount of Consumption (g/minggu)								
Snack								
Meatball	34.3	24.1	37.2	24.9	34.1	25.3	36.3	23.5
Siomay	1.9	3.7	2.2	3.7	2.4	4.0	1.7	3.2
Fried banana	19.7	20.1	21.7	19.8	17.2	19.8	23.5	19.8
Chicken noodle	0.9	2.3	1.7	3.4	1.4	2.9	0.9	2.5
Bakwan	21.7	21.5	25.8	22.2	22.9	22.2	23.0	21.4
Fried tofu	5.4	7.7	7.3	9.6	6.8	8.8	5.2	7.9
Fried tempeh	5.5	8.2	7.6	10.2	7.0	9.5	5.3	8.2
Other Food								
Sugar	10.5	7.5	12.2	9.9	11.0	10.0	11.1	6.4
Tea	2.1	2.7	2.0	3.3	1.6	3.0	2.5	2.8
Coffee	22.4	48.6	15.2	30.9	15.4	43.6	24.9	43.7
Sauce	0.2	0.5	0.3	0.7	0.2	0.5	0.3	0.7
Chip	5.4	5.7	6.5	7.0	6.5	7.2	5.1	4.9
MSG	2.6	1.9	3.2	3.2	3.0	3.0	2.5	1.5
Soy-sauce	3.5	3.8	4.0	4.2	3.3	3.9	3.9	3.9

Table 8. Nutrient Intake of Population per Capita per Day by Economic Status and Agricultural Region

Nutrient Intake	Economic Status				Region			
	Poor		Non Poor		Rice		Horticulture	
	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
Energy (Kcal)	1 649	486	1 920	652	1 680	559	1 790	552
Protein (gram)	37	14	47	21	40	19	40	16
Calsium (mg)	329	703	369	634	264	340	420	896
Phosphor (mg)	581	579	697	619	601	528	634	654
Iron (mg)	9	5	12	7	10	7	10	5
Vitamin A	302	431	510	1 971	331	1 572	406	515
Vitamin C (mg)	35	52	41	65	30	50	44	62
Vitamin K (mg)	65	8	67	7	66	7	64	8

Recommended Dietary Allowances (RDA)

Based on the number and age of population, it appears that the RDA is higher in the non poor people than that of the poor population (Table 9). This can happen because the average age of a number of non poor people (husband 49.3 year; wife 43.3 year) is higher than the average age of the poor people (husband 49.0 year; wife 42.4 year) or in other words the number of children among the poor

population (3.7 person) is higher than that of non poor population (3.3 person). In general, the higher the age of a person, the greater the need and the RDA will be for the person. In terms of regions, the RDA is relatively the same in both region (rice and horticulture). This means that the population structure in both regions is relatively similar.

Nutritional Adequacy Level

Like the frequency and quantity of food consumption mentioned earlier, the adequacy level of all nutrients per capita per day is better in the non poor households than in the poor households. Based on the regions, the nutritional adequacy level is higher in the horticultural area than in the rice region (Table 10). With the assumption that the structure of age and gender types is relatively the same among population in both (rice and horticulture) regions (as reflected in the relatively similar RDA in Table 9), then such difference in the nutritional adequacy level is caused by the condition that the quantity of food and nutrient consumption is higher in the horticultural area than in the rice region (See Table 1 – Table 7).

The average level of nutritional deficiency in all groups of households is in the moderate category, that is, within the range of 70%-90%. However, the level of protein adequacy among the non poor groups is good (94%), while that of the poor group based on the agricultural group is moderate on average (ranged 70%-90%).

Distribution of Households based on the Categories of Nutritional Adequacy Level

Based on the categories of nutritional adequacy level, poor households are in general of deficit category, that is, below 70% for all types of nutrients (protein, vitamin A, folic acid, vitamin C, calcium, phosphor, iron) and energy. However, non poor households are mostly distributed in a better category of nutritional adequacy level (Table 11-Table 13).

Table 9. Recommended Dietary Allowance per Capita per Day

Nutrient Intake	Economic Status				Region			
	Poor		Non Poor		Poor		Non Poor	
	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
Energy (K Kal)	2 228	148	2 255	138	2 253	152	2 221	138
Protein (gram)	49	4	50	4	50	4	49	4
Vitamin A (µg)	565	39	573	35	569	37	566	39
Vitamin D	7	1	6	1	6	1	7	1
Vitamin E	9	1	9	1	S	1	9	1
Vitamin K (mg)	65	8	67	7	66	7	64	8
Thiamin (mg)	1	0	1	0	1	0	1	0
Riboflavin (mg)	1	0	1	0	1	0	1	0
Niacin (mg)	10	1	10	1	10	1	10	1
Vitamin B12 (mg)	1	0	1	0	1	0	1	0
Folic Acid (mg)	142	16	147	14	146	15	142	16
Piridoxin (mg)	2	0	2	0	2	0	2	0
Vitamin C (mg)	58	3	58	2	58	2	58	3
Calsium (mg)	585	75	599	87	581	80	599	78
Phosphor (mg)	472	76	488	87	475	85	480	75
Iron (mg)	16	2	16	2	17	3	16	2
Zinc (mg)	15	1	15	1	15	1	15	1
Iodine (mg)	144	7	145	7	145	7	144	7
Selenium (mg)	56	6	58	6	57	6	56	6

Table 10. Nutrient Adequacy Level Per Capita Per Day (%)

Nutrient	Economic Status				Region			
	Poor		Non Poor		Rice		Horticulture	
	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
Energy	74	23	85	29	75	26	81	25
Protein	74	29	94	39	80	36	82	31
Calsium	58	131	64	116	47	61	74	167
Phosphor	127	128	149	139	131	117	136	146
Iron	54	34	73	44	59	42	62	35
Vitamin A	54	79	88	329	57	263	72	93
Vitamin C	61	91	71	113	52	86	76	109

Table 11. Distribution of Household by Adequacy Level of Energy and Protein

Adequacy Level Category (%)	Economic Status		Region	
	Poor	Non Poor	Rice	Horticulture
Energy				
<70	47.5	30.7	46.7	37.6
70-89	31.7	33.1	32.6	31.8
90-110	13.8	20.5	12.3	19.5
111-130	4.5	7.8	5.0	6.1
>130	2.5	7.8	3.5	5.0
Protein				
<70	50.3	22.9	42.2	41.0
70-89	26.4	34.9	29.9	28.4
90-110	11.8	17.5	14.2	13.0
111-130	6.7	12.1	6.5	10.3
>130	4.8	12.7	7.3	7.3

Table 12. Distribution of Household by Mineral Adequacy Level Category

Adequacy Level Category (%)	Economic Status		Region	
	Poor	Non Poor	Rice	Horticulture
Calsium				
<70	86.5	78.9	86.6	81.6
70-89	3.4	7.8	4.6	5.0
90-110	2.8	3.0	2.3	3.5
111-130	0.8	2.4	1.5	1.2
>130	6.5	7.8	5.0	8.8
Phospor				
<70	30.3	14.5	22.2	28.4
70-89	15.7	12.7	13.4	16.1
90-110	12.6	19.9	18.0	11.9
111-130	9.8	13.3	11.9	10.0
>130	31.5	39.8	34.5	33.7
Iron				
<70	77.3	58.4	77.4	65.1
70-89	11.8	19.3	10.3	18.0
90-110	5.9	10.2	6.5	8.1
111-130	1.7	5.4	2.7	3.1
>130	3.4	6.6	3.1	5.8

Table 13. Distribution of Household by Vitamin Adequacy Level Category

Adequacy Level Category (%)	Economic Status		Region	
	Poor	Non Poor	Rice	Horticulture
Vitamin A				
<70	76.1	66.3	81.2	64.8
70-89	7.9	10.2	6.9	10.3
90-110	4.8	6.0	3.8	6.5
111-130	3.4	6.6	3.1	5.8
>130	7.9	10.8	5.0	12.6
Vitamin C				
<70	75.3	74.1	81.6	68.2
70-89	6.2	9.0	6.9	7.3
90-110	5.1	2.4	2.3	6.1
111-130	2.5	4.2	1.9	4.2
>130	11.0	10.2	7.3	14.2

The many poor households experiencing protein deficiency are worth of attention. As the human physical building substance, protein has the role in the development of children's intelligence, which will influence their working productivity during adulthood.

The distribution of respondents with the level of mineral adequacy (calcium and phosphor) in the deficit category (<70%) for all groups is of great concern, i.e. over 70%. It is very essential to pay attention to such condition because calcium has the role in the bone development, which will prevent a person from osteoporosis.

It is also the case of iron which has a great role in oxygen circulation in the body. A body with iron deficiency will easily get weak and tired, which can reduce working productivity of adults and learning effectiveness of school children. Iron of good bioavailability

(iron in the form of ferro) is mostly contained in animal food. As Table 2 indicates, the consumption of beef/goat meat is very low among the population, i.e. on average 3-7 g/year, and the consumption of animal food on the whole is on average 10-14 g/cap/day. Such amount is very low compared to the ideal requirement based on the national eating pattern of animal food at 90 g/cap/day.

The distribution of households with deficiency in vitamin A and vitamin C is worrying, i.e. >60% for all groups. This also happens in the horticultural area as the producer of fruit and vegetables which are the source of various vitamins. Despite the abundant production, the population cannot meet their nutrient requirement adequately without the awareness of the importance of consuming fruit and vegetables.

Nutritional and Health Status

Nutritional status of children

Based on the indicators of weight for age (Z score of W/A), height for age (Z score of H/A), and weight for height (Z score of W/H), the nutritional status of children among the respondents is of a good category, i.e. with the Z score between -2 and +2 (WHO, 1998). However, the nutritional status of children among non poor households is better than that of children in poor households (Table 14). This is closely related to the consumption and adequacy level of nutrients, particularly energy, which is better in non poor population than in poor population.

The anthropometric indicators of weight and height are mainly based on the status of energy and protein sufficiency. It appears from Table 14 that the nutritional status of children in the rice region is better than that of children in the horticultural area. This is in line with the consumption of cereals as the source of energy that is higher among the households in the rice area than that of the households in the horticultural region (Table 14).

Households commonly have children with a good nutritional status (W/A), distributed in over 90% of households. With the indicators of H/A and W/H, the good nutritional status is only distributed to around 70% of households (both poor and non poor) in both regions (rice and horticulture) (Table 15).

Further, according to Z-score of H/A, there are quite a lot of children (around 20%) with a low nutritional status (Z-score <-2) in all groups of households. This condition is worth of attention because it means that children have suffered from a lack of nutrients for a long period of time, i.e. during pregnancy and childhood.

Table 14. Nutritional Status of Children based on W/A, H/A, and W/H

Anthrophometric	Economic Status				Region			
	Poor		Non Poor		Rice		Horticulture	
	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
Minimum Z-score								
- Min Z- **score** W/A	-0.8	1.0	-0.6	1.1	-0.6	1.1	-1.0	0.9
- Min Z- **score** H/A	-1.7	1.5	-1.3	1.5	-1.3	1.6	-1.8	1.4
- Min Z- **score** W/H	0.0	1.7	0.1	1.8	0.2	1.8	-0.1	1.7
Mean Z-Score								
- Mean Z- **score** W/A	-0.6	1.0	-0.5	1.1	-0.4	1.2	-0.7	0.9
- Mean Z- **score** H/A	-1.3	1.5	-1.0	1.5	-1.0	1.5	-1.3	1.4
- Mean Z- **score** W/H	0.6	1.6	0.4	1.8	0.5	1.7	0.5	1.6

Table 15. Distribution of Household based on Category of Mean Z-score W/A, H/A, W/H of Children (%)

BMI	Economic Status		Region	
	Poor	Non Poor	Rice	Horticulture
Mean Z- score W/A				
<-2	4.1	5.6	2.7	6.0
-2 s.d 2	94.3	91.0	93.3	93.5
>+2	1.6	3.4	4.0	0.5
Mean Z- score H/A				
<-2	29.4	19.1	23.3	29.4
-2 s.d 2	69.0	77.5	73.3	69.6
>+2	1.6	3.4	3.3	1.1
Mean Z- score W/H				
<-2	5.0	9.2	5.6	6.5
-2 s.d 2	78.9	73.6	77.1	77.8
>+2	16.1	17.2	17.4	15.7

When the groups are compared, the distribution of households with a good nutritional status is larger in the non poor households than in the poor households, and based on the regions, the households with good nutritional status are greater in number in the rice region than in the horticultural area.

Nutritional status of husbands and wives

Like the nutritional status of children, the nutritional status of husbands and wives is on average of a good category, i.e. with the body mass index (BMI) of 18.5 – 25.0. It appears from Table 16 that the nutritional status of husbands and wives in the non poor households is better than that of those in the poor households, that is, respectively 22.1 vs 20.9 kg/m^2 and 24 vs 23.2 kg/m^2. However, the nutritional status of husbands and wives based on the region (rice and horticulture) is relatively not different.

The distribution of households with the husbands of good nutritional status is quite high and almost the same in all groups of households, namely, over 70% of the households. The percentage of husbands with the thin category or underweight (BMI< 18.5) and overweight (BMI>25) is relatively low – below 20%. However, the households with underweight husbands are found a lot more in the poor households (Table 17).

Unlike the nutritional status of husbands, wives' nutritional status is a lot in the category of overweight (BMI>25), i.e. more than 30% (except in the horticultural area reaching 27.5%). Wives with normal/good nutritional status vary from 50-60% in all groups of households. Wives with underweight status are quite a few or around 10%.

Such tendency may be due to the lack of activities among mothers – they are commonly housewives who do not often have too many activities outside the house which require more energy. If related to the consumption of food and nutrients, the level of nutritional sufficiency among mothers is also relatively low. There are quite a lot of households with the level of nutritional adequacy below 70% (Table 9-12).

Health Status

In general, the health condition among the family members of the respondents is quite good (Table 18). The period of infections of upper respiratory track infection (URTI) and diarrhea suffered by mothers and children is relatively short, less than 3 days. The case requiring attention is the length of upper respiratory infection on husbands in the non poor households which lasts up to 8 days and longer than that of poor group. This is probably related to the habit of smoking. A higher income makes it possible for them to buy cigarettes and smoke a lot more and thus affecting the health of respiratory tract.

Table 16. Anthropometric and Nutritional Status of Husbands and Wives

Anthropometric	Economic Status				Region			
	Poor		Non Poor		Rice		Horticulture	
	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
Weight, Height, and BMI of Husbands								
- W (kg)	54.3	7.8	57.9	9.9	56.7	9.3	54	7.8
- H (m)	160.6	6.8	162.2	6.6	162.5	6.5	159.5	6.7
- BMI (kg/m^2)	20.9	2.9	22.1	3.3	21.3	3.1	21.3	3
Weight, Height, and BMI of Wives								
- W (kg)	52.9	12.2	55.1	10.5	55.8	13.3	51.2	9.1
- H (m)	150.7	5.5	151.7	5.8	152.5	5.7	149.4	5.1
- BMI (kg/m^2)	23.2	4.7	24	4.2	23.9	5.4	23	3.5

Table 17. Distribution of Households by Nutritional Status of Husbands and Wives

Anthropometric	Economic Status		Region	
	Poor (%)	Non Poor (%)	Rice (%)	Horticulture (%)
BMI of Husbands				
<18.5	16.9	11.2	15.9	14.2
18.5-25	74.3	72.7	72.6	74.9
>25	8.9	16.2	11.5	10.9
BMI of Wives				
<18.5	11.1	7.3	9.6	10.1
18.5-25	58.4	55.2	52.3	62.4
>25	30.6	37.6	38.1	27.5

Table 18. Health Condition based on Length of Sickness

Deseases	Poor		Non Poor		Rice		Horticulture	
	Mean	%	Mean	%	Mean	%	Mean	%
URTI (days)								
Husband	2.6	21.1	8	84.8	5.6	67.6	3	24.5
Wife	1.7	7.1	2.9	18.3	2.4	14.8	1.8	7.8
Child	3.2	21.8	1.1	5.1	2.2	12.0	3	22.8
Diarrhea (days)								
Husband	0.1	1	0	0.5	0.1	1.1	0.1	0.5
Wife	0.1	0.8	0	0.4	0.1	0.1	0	0.2
Child	0.1	0.8	0.2	1.0	0.1	0.8	0.1	0.9

Meanwhile the upper respiratory tract infection on the children among the poor group is longer that of the children in the non poor households. Based on the types of regions, the upper respiratory tract infection on husbands and wives in the rice area is longer than the same infection in the horticultural region. On the other hand, the length of diarrhea on husbands, wives, and children is relatively not much different based on both the economic status and regions (Table 18).

CONCLUSION

In general the frequency and quantity of food consumed by the non poor households are relatively better than those of the poor households. Further, as the centers of agricultural production, both regions (rice and horticulture) will produce certain foods in abundance and will affect the patterns of food consumption among the local community and households.

The adequacy level of energy, protein, vitamin A, vitamin B, and phosphor is on average over 70%. The adequacy level of iron and calcium is still below 70%, particularly among the poor households and rice farmer households. Children's nutritional status is in general of good category (based on W/A and H/A). Husband's nutritional status is normal although there are between 10-17% who are in the status of underweight. Wives' nutritional status is in general also normal. However, there are 30-40% wives in the category of overweight, thus needing attention. The length of upper respiratory tract infection on wives and children is quite low (<4 days), but among the husbands (non poor households) is quite high (8 days) in the last two weeks. The duration of diarrhea is also low, i.e. only 0-0.2 days in the last two weeks.

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