The Relationship among Maternal, Household, Socio Economic Characteristics and Household Food Security in Aceh – Indonesia

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Abstract
The objective of the study is to investigate the Relationship between Maternal, Household, and Socio-Economic Characteristics on Household Food Security in Aceh-Indonesia. The data used are cross-section data, secondary data from the Economic Census of Indonesia in 2016 (BPS, 2016), from 23 districts / cities. The central message of the present empirical analysis is that relatively simple indicators perform well in locating food security. The analysis proves that mother’s age has a significant effect on average calorie intake at the household level. This may be due to the fact that mother’s age plays an important role in the provision of proper food to her family. Higher-aged mothers can understand better about the food quality and requirement for the family as compared to low-aged mother. Environmental factors like access to safe water and better sanitation facilities within housing premises indirectly enhance the absorptive capacity of available food intake. Thus environmental factors could play an important role in food security through calorie intake, irrespective of economic status of the household. This analysis further strengthens the earlier findings that higher food intake availability alone may not lead to improved health outcome, unless measures are taken to improve access to safe water and sanitation. Contribution of dependency ratio in per capita calorie intake also appeared to be significant in this study. This shows that high dependency ratio reduces the per capita calorie intake due to a larger share in food items among a household.

Keywords: maternal characteristics, household characteristics, socio-economic characteristics, household food security, Aceh.

Introduction
The benchmark of a region able to achieve food security is not only seen from the food availability factor, but also by access and absorption of food in the area. This is in accordance with the concept of food security from various institutions of the world such as: (1) USAID: Conditions where everyone at all times has physical and economic access to obtain their consumption needs for healthy and productive living. (2) FAO: Situation where all households have access both physically and economically to obtain food for all members of their family. (3) Mercy Corps: A state where everyone at all times has physical, social, and economic access to food sufficiency, is safe, and nutritious for nutritional needs according to his taste for productive and healthy living.
Food security has not been achieved when food availability is met. Food security will be achieved when access to adequate food and food absorption can take place properly. This condition has not been achieved in many districts in Indonesia. The availability of adequate food and even excess is not accompanied by adequate food access. This resulted in the absorption of food that is not maximal so that many districts in Indonesia who have not been able to achieve food security despite having reached a food surplus. The phenomenon of food-induced food surplus districts limited this study to the assessment of food surplus districts only.

An analysis of national trends in food consumption and the nutritional status of people in developing countries over the past two decades suggest that, while there has been some improvement in achieving greater household food security, this has not resulted in comparable reductions in child malnutrition (ACC/SCN, 1999). According to data compiled by the United Nations Administrative Committee on Coordination – Sub-Committee on Nutrition, the number of households that are food insecure decreased globally by about 200 million between the periods 1974-1976 and 1988-1990. At the same time, however, the number of malnourished children actually increased by 16 million (UNICEF, 1998). Earlier empirical research at the household level suggests that, as income and food availability increase, hunger may decrease, but not necessarily malnutrition. One reason for persistent malnutrition may lie in the complex interaction between food supply and illness, which is influenced by the overall health environment. This is often called the “leaking bucket effect”, where an improvement in access to the foods that are important for good nutritional status may be offset by poor access to non-food inputs, such as quality health care facilities and services, education, sanitation, and clean water or ineffective mechanisms for delivering these services. If this is so, greater emphasis should be placed on improving access to these nonfood inputs in order to achieve the 2020 vision (Pinstrup-Anderson, 2000).

Food security is a function of many factors that empower individuals to access nutritionally adequate and safe food in appropriate ways, including employment, education and community variables (Riley and Moock, 1995). Economic security in particular is cited as a major determinant and outcome of individual health and nutritional status, and its maintenance is an important precursor to permanent food security. Economic security itself is a complex outcome related to steady, adequate income, family stability, affordable expenditures and access to a social safety net in times of need. In formulating policy directed at maintaining and enhancing domestic food security, it is also critical to consider economic security as a prerequisite of this condition (Kramer-LeBlanc and McMurray, 1998). The nutritional status of an individual is influenced not only by food, but also by non-food factors, such as clean water, sanitation, and health care. The effect of all these factors must be considered in efforts to rid the world of malnutrition. Food security will result in good nutrition only if non-food factors are effectively dealt with (UNICEF, 1998). This paper considers the main features of determinants of food security, in particular household economy assessment, and looks at what conclusions can realistically be drawn from an analysis in the case of Aceh.

As stated by Srinita (2015), Aceh Province specially to manifest sustainable food security. Agricultural sector is economic backbone of Aceh Province community. It is key of food security stabilization. It means food availability in sufficient quantity and quality; it is distributed with achievable price and may be consumed by community in order to implement daily activities throughout the day safely. By such definition food security will suffice is not only for global, national regional levels but also to households level at farmer's specially. Food diversification is any capability of farmers at Aceh Province in producing some food verities. By questioner it may be observed that most of produced food varieties are various grains. Hence, majority of
farmers in this area is various grains cultivation at paddy fields and subsequently, they plant fruits and vegetables. The better is the food diversification, the more increasing food security of farmer’s households at Aceh Province. Agricultural sector is economic backbone of Aceh Province community. It is key of food security stabilization. It means food availability in sufficient quantity and quality; it is distributed with achievable price and may be consumed by community in order to implement daily activities throughout the day safely.

The objectives of the study are to: investigate the Relationship between Maternal, Household, and Socio-Economic Characteristics on Household Food Security in Aceh-Indonesia. Household food security in this study reflect from calorie intake per capita as dependent variable for the present analysis, while the independent variables are split into maternal characteristics, household characteristics and socio-economic variables. Mother’s age and mother’s education are included as maternal characteristics to capture phenotype (visible characteristics of individual produced by interaction of genes and environment) and genotype (individual’s genetic composition) endowments. Maternal education is included as a proxy for maternal endowments and, in part, to represent better management of health inputs. Mother’s age is included to account for the fact that very young mothers tend to have smaller experience than their high counterparts. Household’s structured characteristics include household size, type of house, dependency ratio and room per capita. Socio-economic variables include the availability of safe drinking water and sanitation facility within the household premises, and type of urban.


**Literature Review**

Food security is a multidimensional phenomenon covering climate, disaster, civil unrest, and social norms along with food production, access and absorption. So the determinants of food security are different at different levels of application, i.e. global, national, regional, household and individual level. From the literature review, the conceptual background for determinants of food security may be built. A number of studies have analyzed the food security at national level in Indonesia. Mahmood and Shaikh (1991) examined the causes of lower nutritional level and poverty in Indonesia. The factors identified were lower purchasing power of money, larger household size, low education, large number of dependents in the household, etc. Ahmed and Siddiqui (1995) examined the food security situation in Pakistan and concluded that continuous high growth rate of population, changing pattern of income distribution and greater level of urbanization have influenced the demand for food. At the same time, sharp rise in cost of irrigation, heavy debt burden, the lack of technology and mismanagement in distributional system have contributed to a slower growth of food production. Sharkey, et al, (2011) have focused on Northern
areas to study the relationship between food security and income using household level data. The estimates of nutrients demand indicated disagreement on the role of income in determining the demand for nutrients.

**Research Method**

The research was conducted in Aceh Province, Indonesia. The data used are cross-section data, secondary data from the Economic Census of Indonesia in 2016 (BPS, 2016), from 23 districts / cities. There is no single indicator that best measures household food security. One common indicator is calorie adequacy (Payne, 1990). This measure captures food sufficiency in terms of quantity but does not address the quality of the diet or issues of vulnerability or sustainable access. Two different measures could be also used to capture the quantity and quality of household food availability as dependent variable. The first is per capita calories intake per day. The second measure, the price per 1,000 calories per person each day (kcal/aeu/day), will capture the quality and economies of scale associated with household food availability. Per capita calories intake is used for the present study as a dependent variable because household food availability is a function of food prices, expenditures, household demographics, and household tastes and preferences. Household consumption will be captured through linear indicators of the number of people in specified age and sex groups. The mother’s age and education will be also included, since they may influence expenditure patterns and dietary preferences.

**Results and Discussion**

Initial stages of data analysis are to test assumptions. Normality assumptions are not met, indicating the need for logarithmic transformation for research data. Non-heteroscedasticity assumptions are not met, indicating the need for Weighted Least Square (WLS) as an alternative to Ordinary Least Square (OLS). Regression analysis results is in the next section using transformation data (especially for variables X1, X2), and parameter estimation techniques using WLS.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Coefficient</th>
<th>t-statistics</th>
<th>Sig-t</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>6.550</td>
<td>2.620</td>
<td>0.009</td>
<td></td>
</tr>
<tr>
<td>Maternal Characteristics</td>
<td></td>
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<tr>
<td>X1: Mother's Age (logarithm)</td>
<td>0.537</td>
<td>2.982</td>
<td>0.003</td>
<td>*</td>
</tr>
<tr>
<td>X2: Mother's Education (logarithm)</td>
<td>-0.535</td>
<td>-2.973</td>
<td>0.003</td>
<td>*</td>
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<tr>
<td>Household Characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X3: household Size (logarithm)</td>
<td>0.495</td>
<td>2.748</td>
<td>0.006</td>
<td>*</td>
</tr>
<tr>
<td>X4: Type of House</td>
<td>-0.377</td>
<td>-2.092</td>
<td>0.036</td>
<td>*</td>
</tr>
<tr>
<td>X5: Dependency Ratio (logarithm)</td>
<td>-0.331</td>
<td>-1.840</td>
<td>0.066</td>
<td>**</td>
</tr>
<tr>
<td>X6: Room per Capita (logarithm)</td>
<td>0.424</td>
<td>2.357</td>
<td>0.018</td>
<td>*</td>
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<tr>
<td>Socio-Economic Characteristics</td>
<td></td>
<td></td>
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<tr>
<td>X7: Safe Drinking Water (logarithm)</td>
<td>0.467</td>
<td>2.593</td>
<td>0.010</td>
<td>*</td>
</tr>
<tr>
<td>X8: Sanitation Facility</td>
<td>-0.547</td>
<td>-3.040</td>
<td>0.002</td>
<td>*</td>
</tr>
<tr>
<td>X9: Urban (1: urban, 0: otherwise)</td>
<td>0.351</td>
<td>1.951</td>
<td>0.051</td>
<td>**</td>
</tr>
<tr>
<td>Dependent Variable</td>
<td></td>
<td></td>
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<tr>
<td>Y: Household Food Security</td>
<td></td>
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<tr>
<td>(Calorie intake per capita, logarithm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig-F</td>
<td>0.001</td>
<td></td>
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<tr>
<td>R-square</td>
<td>0.773</td>
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</tbody>
</table>

Note: *Significant at 5% level, **Significant at 10% level

The result of the empirical analysis, as shown in Table 1, indicate that mother’s age has a positive and significant influence on per capita calorie intake at the household level, because mother’s age enhances experience regarding provision of proper and
required food for the family, since mother understands better about the requirements of food with respect to family’s age, gender and workload. However, the solitary impact of maternal education appeared to have a declining impact on average calorie intake within the sampled households, though the magnitude of the impact is negligible. The average availability of housing has a significant and positive but indirect impact on the level of household food security, because such impact as indicated by per capita room may capture the households’ standard of living. It may also indicate the ability of the households to afford required food for the family which may be deemed necessary for the family nutritional requirements.

A series of socio-demographic factors that may influence household food insecurity has been included in the regression analysis. Income is one of the primary causal factors used to explain household food security. Household income is a good predictor of household calorie adequacy. Average calorie availability appears to be higher in relatively high-income families. Present evidence shows that household income has a strong and significant impact on household per capita calorie intake. This result may suggest that better-off households choose a more expensive calorie-food or may be able to afford more food for their family. Health outcomes are functions of both food intake and non-food inputs such as environmental hygiene, personal hygiene and access to safe water and quality of sanitation facilities. The coefficient of access to safe water shows positive and significant impact on per capita calorie intake. Safe drinking water plays an important, but indirect role, for good nutrition and then for health. Because calorie intake affects nutrition and nutritional effects to health, availability of safe drinking water enables households to consume hygienic food through enhancing the food absorptive capacity due to a relatively more hygienic environment.

Similarly, the study shows that unavailability of facility for the removal of human wastage within household premises has a negative and significant impact on calorie intake. The reasons may be that poor sanitation or contaminated water could lead to acute diarrhea, or the body may not be able to absorb the food ingested; and in the state of illness the body utilizes a greater amount of energy simply to fight the infection so that relatively little may be left over to maintain the organs in good health. Furthermore, illness may cause anorexia so that a person may not be able to eat food even if it is available. For all reasons, higher food intake availability may not lead to improved health outcomes unless measures are taken to improve access to safe water and sanitation. The coefficient of independent house appears to be positive but insignificant.

Dependency ratio is also an important contributor towards the household average calorie intake. In the present analysis the coefficient of dependency ratio indicates strong and negative effect on per capita calorie intake within the sampled households. It is clear that high dependency ratio reduces the household per capita calorie intake because there are many persons in the household to share a plate of food. Also because a dependent person’s contribution in earnings is zero and they do not participate in any economic activity for their family, but their share is fixed in household consumptions. So this situation may deteriorate the household food security through per capita calorie intake. Per capita calorie intake situation is also satisfied in urban areas. However, results show that per calorie intake is relatively better in Urban than other Rural.

**Conclusions**

The central message of the present empirical analysis is that relatively simple indicators perform well in locating food security. The analysis proves that mother’s age has a significant effect on average calorie intake at the household level. This may be due to the fact that mother’s age plays an important role in the provision of
proper food to her family. Higher-aged mothers can understand better about the food quality and requirement for the family as compared to low-aged mother. This study highlighted the critical role of household income in achieving adequate average calorie intake within the household. This supports the idea that household income is the most important determinant of per capita calorie intake, because higher income level groups can purchase more appropriately required nutritious food compared to low-income groups. A low-income group has low opportunities to acquire required and nutritious food. Environmental factors like access to safe water and better sanitation facilities within housing premises indirectly enhance the absorptive capacity of available food intake.

Thus environmental factors could play an important role in food security through calorie intake, irrespective of economic status of the household. This analysis further strengthens the earlier findings that higher food intake availability alone may not lead to improved health outcome, unless measures are taken to improve access to safe water and sanitation. Contribution of dependency ratio in per capita calorie intake also appeared to be significant in this study. This shows that high dependency ratio reduces the per capita calorie intake due to a larger share in food items among a household. Such a situation may further deteriorate the household food security through worsening per capita calorie intake.

Household food security strategies and primary causes for food insecurity and poor nutrition deserve more attention. In short, a stronger focus on food security and nutrition as an important outcome of investment projects should ultimately lead to a new generation of projects that would address the central conditions for bringing about improved food security and nutritional well-being in a holistic and integrated way, based on: (a) more gender-sensitive participatory analysis and evaluation of project interventions from a household food security and nutrition perspective and more targeted interventions to women, (b) ; the integration of health and sanitation activities and analyses through inter-agency collaboration; and a supportive, enabling legal, socio-economic, institutional and policy environment. Programme and project activities would, thus, need to be analyzed more sharply in view of their ultimate impact on household food security and individuals. Household food security and nutritional well-being require well-designed policies, programmes and actions beyond the household and community level.

This study demonstrates that household food insecurity is linked to serious health, psychosocial, and academic problems that can, individually or interactively, impact on normal growth and development. In conclusion, our analysis indicates that, to improve household food and nutrition security, policymakers should be aware of, and minimize trade-offs in household access to food and non-food inputs. Food programs are likely to have a large impact only when public investment in reducing illnesses is a high priority. Effective nutrition security programs require multi-sectoral approaches and should take full account of social, economic, cultural, and ecological constraints at the local level. Policies and programs should reflect a particular concern for population groups often excluded from social investment programs. In planning these social investment programs, the synergistic effects of multiple food and non-food interventions on vulnerable population groups should be exploited. Long-term sustainability of social investments (in health and sanitary infrastructure and safe water supplies) should be assured by investing in the local and community-based capacity for self-determination and self-help.

References


