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**The Food Security Equation: What is the role of Gender and Social Amenities in this Paradigm? A Focus on rural households in Yala division, Siaya district, Kenya.**

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**Abstract:** Food security remains a key challenge to the development efforts of most poor nations. This study investigated the significance of gender (denoted by number of male, female and children in a household) and social amenities in the food security equation. Frequency of food-related illnesses in a household was used as proxy for food security situation, while the entitlement/food utilization side of the equation was represented by the number of male and female children in the household, main source of domestic water, distance to nearest health center, means of transport accessible, household sanitation and level of awareness on basic food preparation and handling methods. Both descriptive and econometric models were used for analysis of primary data from a random sample of 100 farm-households in Yala division, Siaya district of Kenya. This study was conducted in February 2004. Results of this study indicated that majority (74%) of the rural households were experiencing poor food utilization, and were thus generally food insecure. The study also revealed that gender and social amenities were significant in the food security equation. Specifically, there was high correlation between food-related illnesses and use of untapped water, more male children than females in a household, long distance to health centers, lack of quick means of transport, unsafe food disposal and poor food storage habits. In order to improve the food utilization and thereby security for the rural farm-households, the study recommends improvement in the provision of social amenities for both male and female household members equitably.

### **Introduction**

Most previous studies on food security have often concentrated on the ability to produce or purchase food as the major determinants of food security. The ability of a household to purchase food depends on resources available and how they are distributed among the household members. Equitable distribution of both education and income opportunities among male and female persons in the household is one way of uplifting the purchasing power, and hence the food security situation of the household. While using the number of male and female children as proxy for the gender variable, the present study fully adopted Kirstein *et. al* (2000)'s definition of gender as 'socially constructed power relations between men and women characterised by a set of arrangements of culturally variable attributes and roles that men and women play in their daily lives'. Gender bias in resource distribution only help to escalate the food insecurity problem in poor households where production levels are below the population growth rates. Per Pinstrup (1994) observed that the basic argument in most policy debates has been that for people to be food secure – that is, to have access at all times to the food required for a healthy and productive life – there must be both availability and access to food.

However, as observed by Kirsten *et. al* (2000) the food security equation is incomplete if no mention is made of the food utilization process once it is produced or purchased by a household or individual. Thus, a comprehensive understanding of food security must consider the FAO (1996)'s definition as 'A condition under which all people at all times have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life'. The food security situation can be visualized as an equation consisting of a supply side and an entitlement side, the two sides being linked via markets and price. Furthermore, *constraints to food utilization* are numerous and can lead to reversal of food security efforts – and these are the core problems of concern in the present study.

Hoddinot (1999) noted that food security is mainly affected by three goods; food consumption, or acquisition, at the household level, goods directly related to health care (e.g., medicines), and goods that affect the health environment. These three goods, together with knowledge and practice of good nutritional and health practices – called *care behaviors* – and the public health environment (for example, the availability of publicly provided water), affect illness and individual food intake, which, in turn, generates nutritional status or food utilization.

Haddad *et. al* (1998) concluded that food security initiatives should be better targeted towards areas with a poor health and sanitation if their objective is to improve preschooler nutrition status. Just as diet affects infection, infection affects food intake and the utilization of foods. Infection: (i) increases nutrient requirements because of increased nutrient loss during illness; (ii) reduces dietary intake through appetite suppression; and (iii) creates a metabolic response that both stimulates the immune response and suppresses body growth.

Per Pinstруп and Rajul (2002) observed that access to clean water and safe sanitation are critical for people's good health and good nutrition. *Contamination* of food and water are sources of much illness and death in developing countries. The most important water-associated health problem is *diarrhoea*, accounting for 3 to 5 million deaths per year, especially among children (Der Hoek, 2001). Availability of safe drinking water, combined with sanitary facilities for disposal of faeces and improved hygiene standards, could prevent diarrheal diseases to a great extent in developing countries. As noted by Van Damme (2001), diarrheal diseases impact children most severely, killing more than 2 million young children a year in the developing world. Many more are left underweight, stunted mentally and physically, vulnerable to other deadly diseases, and too debilitated to go to school. Policies and institutions are needed for improving sanitary conditions, storage, transport, processing, conservation of food, and other cost-effective ways to prevent food- and water-borne illnesses. Furthermore, productive resources (and supportive services especially *education*) must go not only to men, but also to women, for gender equality is an important contributor to food security. One important assumption made in this study was that the sample households had access to food either from their own production or through purchase. This study thus, focused on gender and social amenities as part of potential constraints to food utilization.

### **Description of the Study Area**

Yala division is one of the seven divisions in the Siaya district of Nyanza Province, Western Kenya. It is generally considered the one with the highest agricultural potential among the seven divisions mainly due to its favorable climate. The division is administratively divided into 4 locations namely; Township, East Gem, Central Gem and North Gem. The division covers an area of 214km<sup>2</sup> out of which 170km<sup>2</sup> is arable land. The 1999 census of 85,000 persons in Yala division constitutes 21,000 farm families. The study area is located between latitude 0<sup>0</sup> – 26<sup>0</sup> South to 0<sup>0</sup> – 18<sup>0</sup> North from longitude 34<sup>0</sup> East to 34<sup>0</sup> – 33<sup>0</sup> East in the Western part of the Republic of Kenya. The altitude ranges from 1140m on the shores of Lake Victoria to 1400m above sea level in the North and East. The district enjoys modified equatorial climate with strong influence from local relief and the expansive Lake Victoria. The district experiences a bimodal type of rainfall. Long rains fall between March and June, while short rains occur between August and November. Siaya district has the lowest monthly mean household income (US\$ 41) of all the 44 districts in Kenya on which data is available and a high absolute poverty level of 58% (Institute of Economic Affairs, 2002). According to the 5-year District Development plan of 1996, the district has no large-scale farms. All agricultural production is done on smallholdings ranging from 0.1ha in Yala (study site) to 10-12ha in Bondo (formerly a division within Siaya district). Large areas of cultivated land are under traditional crops such as local maize landraces, sorghum, finger millet and sweet potatoes. Given the vast agricultural potential of Yala division, it was assumed in this study that most farm-households included in the sample had sufficient access to food through production or purchase.

### **Study objectives**

The main objective of this study was to determine how gender and various forms of social amenities affect household food security. The following specific objectives were pursued:

- i) To find out the frequency of food-related illnesses in farm-households

- ii) To determine how the frequency of food-related illnesses depend on number of male and female children in the household, water sources, proximity to health services, means of transport, household sanitation, awareness level and food preservation and storage patterns.

**Hypotheses tested**

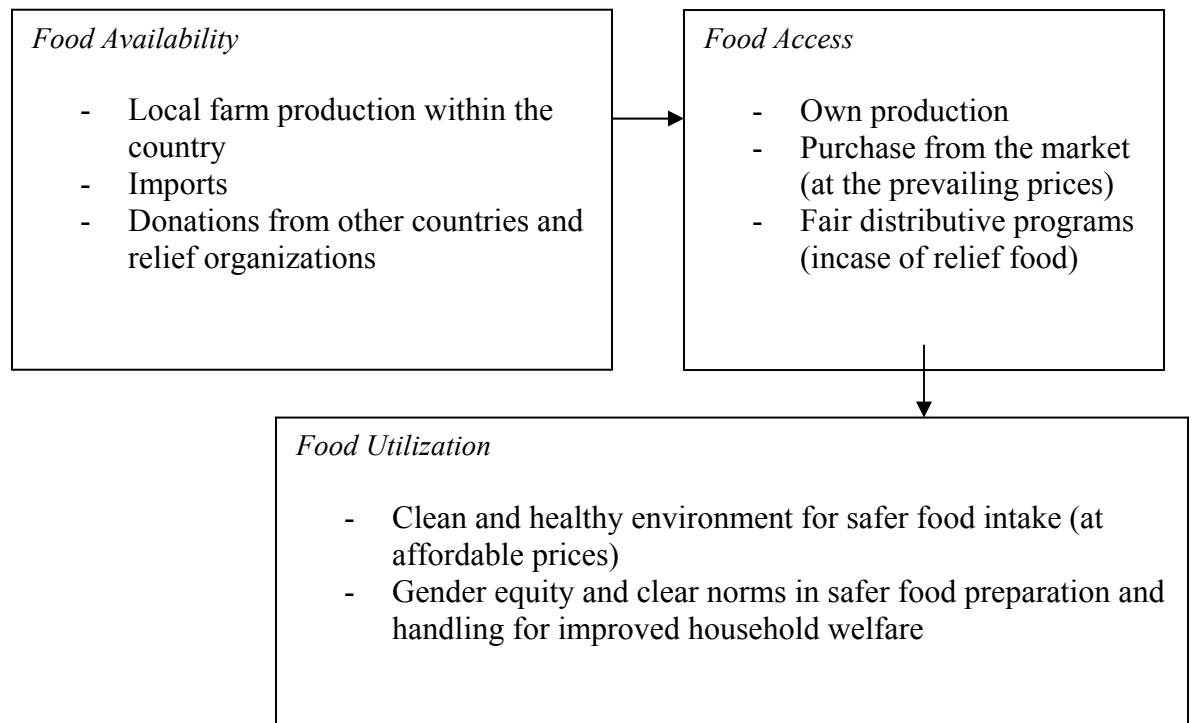
- i) That gender and social amenities do not jointly determine frequency of food-related illnesses in a household; and
- ii) That gender alone is insignificant in the food security equation.

**Methodology**

**Conceptual framework**

This study considered food security as a desired situation that could only be attained through provision of three main elements in a well defined order: availability of food, access to food and proper utilization of the available and accessible food. Food availability can be ensured through production, imports and donations. For the available food to be accessible, households and individuals must have the power or right to own, share or use food from their own production, those who do not produce their own food must have income to enable them to purchase food from the market at the prevailing prices, while there must be fair distributive programs to allow adequate access to food by those people who cannot produce or purchase food. In ideal cases, food must be available so that it can be accessed.

The third important step in the food security situation is the food utilization process. Households and individuals must be guaranteed cleaner and healthier environments that are conducive to proper food intake, so that the available and accessible food can contribute to their food security positively. Social facilities needed for this include clean water, adequate medical and education services. The intervention point for the present study is therefore an assessment of the contribution of social amenities and gender variables towards food utilization and hence food security at the household level. As illustrated in figure (i) below, food utilization is a very important step towards the attainment of food security. In figure (i) below, the food security equation is illustrated through a framework in which price is an essential link between food available in the market and its accessibility to households and individuals. Price also links households and individuals to better social services such as clean water required for healthy food utilization.



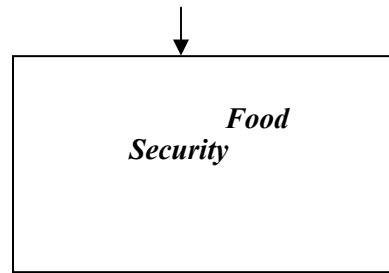


Figure i: A conceptual framework of the core elements in the attainment of food security

## Survey design

This paper is based on primary data, which was obtained through a household survey using semi-structured questionnaires and in-person interviews. A total sample of 100 respondents composed of 43 male persons and 57 female persons was interviewed. This sample represented 100 households since only one respondent was interviewed from each of the households. The sample was randomly drawn from a sampling frame of male and female maize farmers in Yala division's farming inventory. To ensure sample representativeness, 25 respondents were selected from each of the four administrative locations in the division. In order to ensure accuracy of the information provided, only persons legally defined as adults in Kenya, thus those above 18 years old were considered as respondents. The survey covered food-related illnesses that had occurred two months prior to February 2004. The survey also covered food security indicators such as the number of male and female children in the households, main source of water, distance and means of transport to the nearest health center, disposal of food wastes, methods of food preservation and storage, and household's awareness on basic food preparation. The two-month time frame was chosen to provide respondents with ease in recalling relevant information since they don't keep records of their food utilization habits.

## Analytical framework

The survey data was entered and analyzed through descriptive statistics such as percentages and a multiple linear regression model using the Statistical Package for Social Scientists (SPSS) software version 11.0. The regression model was fitted as shown in equation (1) below:

$$F_x = \alpha_0 + \alpha_1 M_c + \alpha_2 F_c + \alpha_3 W_s + \alpha_4 D_h + \alpha_5 W_d + \alpha_6 T_r + \alpha_7 H_e + \alpha_8 F_p + e_t \text{ -----(1)}$$

Where  $F_x$  = frequency (as measured by number of times suffered by any household member in two months) of food-related illnesses in a household, especially diarrhea, vomiting and constipation.  $\alpha_0$  = constant term,  $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6, \alpha_7$  and  $\alpha_8$  are the marginal effects of the respective independent variables on  $F_x$ .

$M_c$  = number of male children in the household.

$F_c$  = number of female children in the household.

$W_s$  = main source of water accessible to the household (1 = tap or borehole, 0 = untapped water for example river, wells and springs).

$D_h$  = distance to the nearest health center (in km).

$W_d$  = waste food material disposal method (1 = burn, bury or use as manure, 0 = throw away for example to dogs, pigs and cats)

$T_r$  = means of transport to the nearest health center (1 = bicycle or vehicle, 0 = walk).

$H_e$  = number of household members with basic formal education on standard food preparation procedures like good cooking, timing of meals, and balanced diet mix. Basic formal education was defined as any training at any level of schooling or workshops and seminars on food preparation and handling.

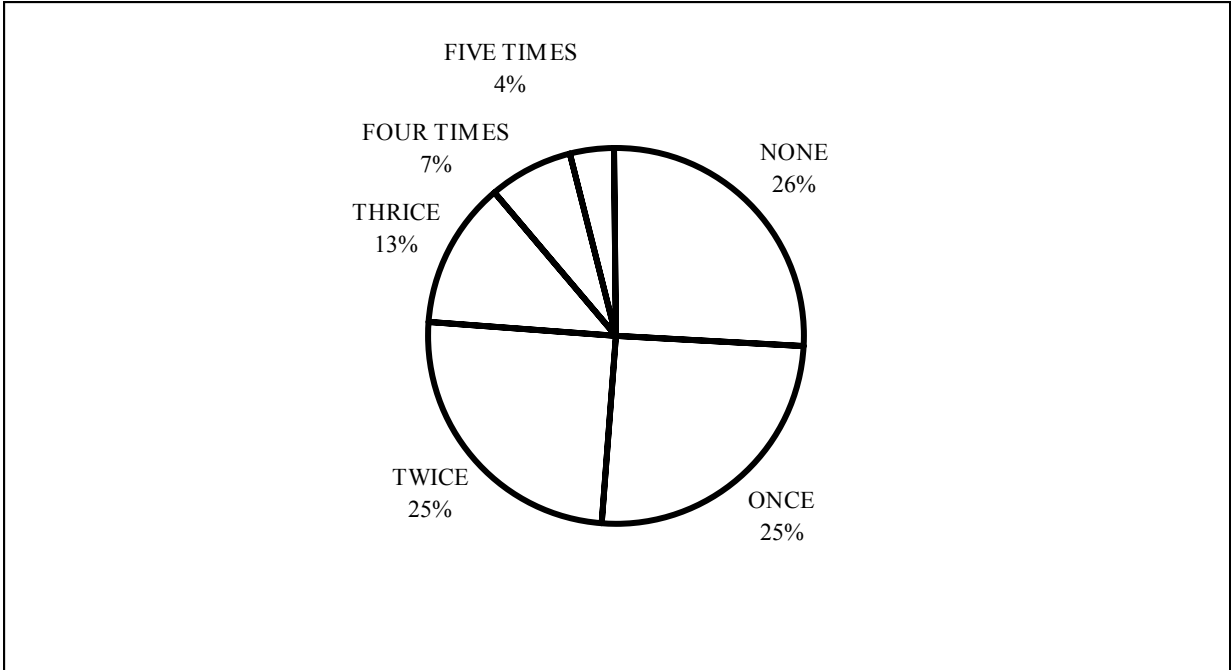
$F_p$  = food preservation and storage method (1 = smoke, cover, keep in cupboard or refrigerator, 0 = leave open in the kitchen).

$e_t$  = error term representing the effects of all omitted variables.

## Results and Discussion

### Descriptive analyses results

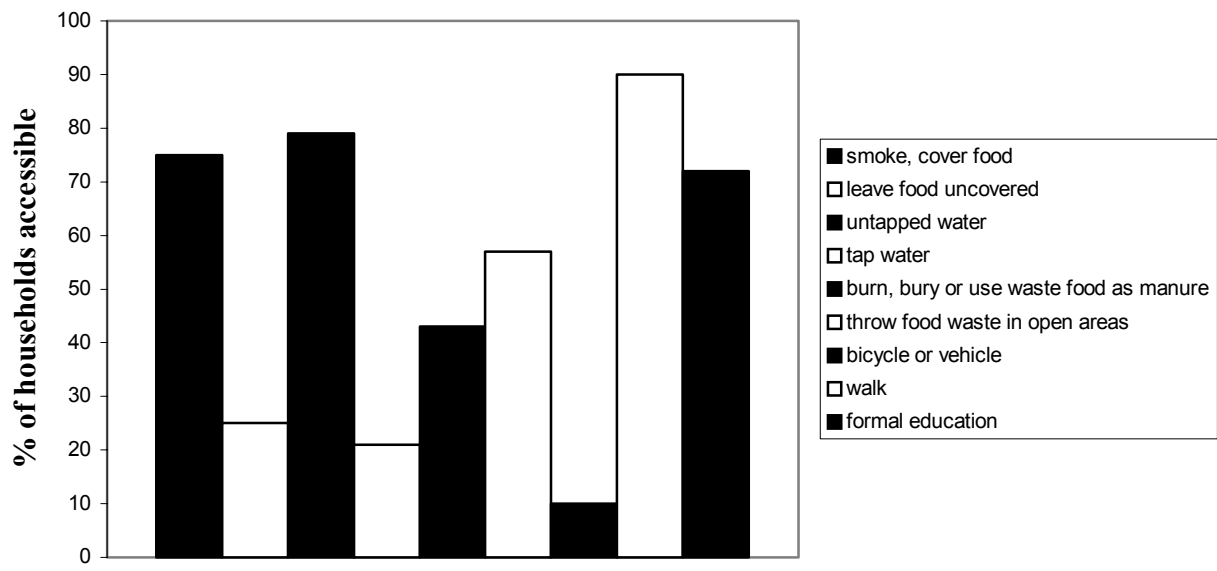
As shown in figure (ii) below, some 26% of the households had not experienced any food-related illness for a period of two months prior to this study. The results further revealed that 25% of the households had suffered once, some other 25% were affected twice, 13% thrice, 7% four times and 4% of them had been affected by such illnesses five times within a period of two months prior to this study.



**Figure ii: Frequency of food related illnesses in households of Yala division, Kenya in 2004**

**Source:** Authors' survey in Yala Division, 2004.

In terms of household access to various social amenities necessary for proper food utilization, the results in figure (iii) below indicate that majority of the households (75%) had at least one of the following safe ways of food preservation and storage; smoke, cover, keep in refrigerator or cupboard. However, 25% of the households simply left their food items open in the kitchen without any safe preservation method. Most households (72%) had obtained basic formal education on food preparation either from schools or seminars organized by Community Based Organizations (CBOs) and other development agencies in Yala division.



**Fig iii: Type of social amenity**

Figure i: Access to social amenities that are useful in food utilization by households in Yala division, Kenya in 2004.

The vertical bars in figure (iii) above from left to right represent each of the listed types of social amenities in the order in which they are listed from top to bottom of the legend.

**Source:** Authors' survey in Yala Division, 2004.

The food utilization process in the area seems to be further constrained by the main source of water used and waste disposal mechanism. According to Webb and Iskandarani (1998), water security can be defined as access by all individuals at all times to sufficient safe water for a healthy and productive life. Unlike the definition of household food security, the concept of safe water requires more than one standard – clinical safety, cultural and taste requirements for potable water, minimum pollutant standards for ecological and agricultural uses, and lesser standards for industrial and waste management. The current survey observed that 79% of the households mainly used untapped water from rivers, wells and springs, while only 21% were accessible to tap or borehole water. A possible solution to the observed water problem could be derived by comparison of the current study with previous studies. Fogel's research (1997) in particular, underscores the fact that making water clean (not just available), encouraging appropriate consumption (not just access), and ensuring appropriate disposal after usage are distinct elements in both human and economic growth.

Moreover, usage relates not only to consumption as an input, but also to consumption as an outcome of various social, economic and environmental interactions. These interactions are manifest in a negative sense wherever water security is compromised by: a) inadequate quality, b) inadequate knowledge (about use), and/or c) insufficient time to improve use (high opportunity costs). For disposal of waste food materials, this study noted that more than half of the households (57%) simply threw away such refuse in the open to dogs, cats or pigs, while the remaining smaller proportion of households had safer ways of waste disposal; burn, burry or use as manure. Unsafe waste disposal could be a potential contributor to high diarrhea incidences since it directly attracts disease carriers like flies.

Most of the rural households (90%) in Yala division had no access to quick means of transport (bicycle or vehicle) to their nearest health centers. This scenario, in an area where the distance to the nearest health center ranges from 0.5 km to 5 km with an average distance of 3 km, points to a serious need for policy interventions that would provide health services much closer to the majority of the population, since the



distance itself and the hilly terrain in Yala division makes it extremely difficult for patients to reach health centers faster.

### **Econometric results**

The results in table (i) below indicate that 29.4% of the total variation in the frequency of food-related illnesses in Yala division was explained by the fitted OLS model. The low explanatory power of the specified model ( $R^2 = 29.4\%$ ) might have resulted from lack of accurate indicators of measurement for the independent variables used in the model. For example, proxy variables were used to measure the gender variable in this study. Also, possible omission of many other variables that could have explained the variations in frequency of food-related illnesses could have led to the low coefficient of determination in the estimated model. For instance, the mode of transport was omitted from the estimated model since it was correlated with the distance to the nearest health center. Thus, households who lived closer to health centers preferred to walk even when they had access to bicycles or vehicles.

Nevertheless, the magnitude of the measure of goodness of fit is statistically plausible, given the many random factors such as inability by respondents to recall past information that underlie cross-section data. Also, the statistical significance of the computed F-ratio ( $F = 2.737$ ) at 99.91% confidence level in this study further shows that gender and social amenities were jointly significant in explaining variations in the frequency of food-related illnesses. This finding led to rejection of the first hypothesis of this study and hence the conclusion made here is that all the variables specified in this model jointly determine frequency of food-related illnesses in a household. Further inferences can be made from the coefficients of the individual independent variables obtained in this study. First, there was a higher positive correlation between number of male children in a household and frequency of food-related illnesses, than was the case for number of female children. Perhaps, this follows from the usual assumption that female children in most African societies are most of the time preoccupied with household hygiene than their male counterparts – and this outcome led to rejection of the second hypothesis that gender is insignificant in the food security equation. Also, the results in table (i) below indicate that ceteris paribus, the frequency of food-related illnesses was higher in the households that had untapped water sources, unsafe disposal of waste food materials, poor storage of food items, and long distances to nearest health centers.

The only finding contrary to apriori expectations in this study was that suggesting that there was a positive correlation between education on proper food handling and frequency of food-related illnesses. This finding seems to suggest that either formal education is not necessary for food preparation in rural households, or that rural households only use informal/traditional knowledge on food preparation and handling. But, in most cases it is expected that access to formal education in addition to traditional knowledge would contribute to significant reduction in the frequency of food-related illnesses. The anomaly observed in this study might have been due to measurement errors and lack of information to respondents on the type of formal education that would be directly relevant in food preparation and handling for healthy livelihoods especially in the rural areas.

**Table (i): OLS regression determinants of the frequency of food-related illnesses in households of Yala division in Kenya, 2004**

Variable	Coefficient	t-ratio
Water source (1 = tap, 0 = untapped source)	-0.076	-1.910**
Distance to health center (Km)	0.242	2.510*
Waste food disposal method (1 = burn, bury or use waste food as manure, 0 = throw away in open areas to dogs, cats or pigs)	-0.190	-1.944**
Number of household members with basic education	0.201	1.897**
Food preservation and storage method (1 = cover, smoke, 0 = leave open)	-0.181	-1.809**
Number of male children	0.070	1.799**
Number of female children	0.034	1.771**

\*p<0.05, \*\*p<0.1, N =100, R<sup>2</sup> = 29.4%, F = 2.737 (p<0.01)

Source: Authors' survey in Yala Division, 2004.

### Conclusions and Policy Recommendations

#### Conclusions

Results of this study confirmed Hoddinot (1999)'s assertion that the drive to household food security is far from being attained if the utilization process is unattended to. In particular, the results of this study showed that most of the households in Yala division had experienced food-related illnesses and were therefore food insecure, despite their assumed ability to access food from their own production activities or purchases. Also, the results of this study indicated that the most binding constraints to food utilization among households in Yala division were water quality, household sanitation, awareness levels and accessibility to health facilities equitably for both male and female persons.

#### Policy recommendations

- i) Encourage all households to adopt cheap and safe ways of food preservation and storage such as smoking of fish;
- ii) Since most households are already accessible to water from rivers, springs and wells, the sufficient condition for enhanced food security with this regard is to provide cheap materials for water purification;
- iii) Strengthen campaigns on proper waste food disposal methods;
- iv) Joint action by all stakeholders in the health sector to ensure provision of critical medical services closer to the rural farm-households;
- v) Step up public awareness on hygienic food preparation among males and females in rural farm-families; and
- vi) There is need for further research on measurement indicators for estimating the effect of formal education on food utilization process.

#### Acknowledgements

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