Part 2.

# Deriving food security statistics at sub-national levels

# Gender analysis on food security statistics by specific population group in the Philippines' FIES 2003

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## ABSTRACT

The 2003 Philippine Family Income and Expenditure Survey (FIES) provides information on family food consumption, family income and family living expenditure levels and patterns; determines sources of income and income distribution, levels of living and spending patterns, and the degree of inequality among families; provides benchmark information to update weights in the estimation of consumer price indices (CPIs); and provides inputs for estimation of the country's poverty threshold and incidence. FIES 2003 required families to report the monetary values of food consumed and the corresponding food quantities. National Statistics Office (NSO) conducts an FIES every three years.

This study used the data file of the 2003 FIES as input to run the statistical processes of the Food Security Statistics Module (FSSM) developed by FAO. The study used complementary data on height and the age-sex structure of the population to update estimates of the minimum dietary energy requirement (MDER) for some specific population groupings. These data enhance the accuracy of food security indicators at sub-national levels.

This paper presents some of these statistics at national and sub-national levels. In particular, a gender and regional analysis provides insight into food deprivation and critical food poverty.

**Keywords:** food security statistics, gender and regional analysis

## BACKGROUND

Although many countries in the Asia-Pacific region have made great strides towards economic development, developing countries in the region still face considerable challenges to reduce poverty and food insecurity, improve human development, and meet Millennium Development Goal (MDG) and World Food Summit (WFS) targets. As a medium human-development country in the region, the Philippines ranked 84th out of 177 countries on the human development index (HDI) of 2005 (UNDP, 2006). The proportion of the Philippine population that is undernourished is estimated at 19 percent (FAO, 2006: Table 1). Gender equality issues also exist. In 2006, the Philippines was ranked 66th out of 136 countries on the gender-related development index (GDI)[5] (UNDP, 2006: Table 24).

Food production is one of the three pillars of food security. In the Philippines, food supplies for human consumption come mainly from agricultural production and trade. Tropical fruits, rice, maize, mushrooms and sugar cane are extremely significant in the Philippines. Coconut is widely grown in Mindanao regions, with Davao

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[5] GDI is a composite index that measures average achievement in the three basic dimensions captured in the HDI - a long and healthy life, knowledge, and a decent standard of living - adjusted to account for inequalities between men and women (UNDP, 2005).

reporting the highest share, at 17.2 percent of the country's total production in 2003. Coconut was reported as one of the principal trees in the Autonomous Region of Muslim Mindanao (ARMM), accounting for 7.9 percent of the country's production. In Western Visayas, 86.2 percent of the total area was planted with sugar cane. Data on livestock production showed chicken raising, hogs and goats as the primary activity in most farms in these regions, such as in Davao (with 5.4 million chickens), Western Visayas (with 480.1 thousand hogs) and Central Luzon (with 184.1 thousand goats). Fisheries accounted for 8.7 percent of total production, particularly commercial fishing in Calabarzon.

Recently, the gender dimension of agriculture's role in combating rural poverty and food insecurity has been receiving increased attention. Given the trends of increasing female headship and management of rural agricultural households, it is important to understand the gender dynamics of food security in developing countries in the Asia-Pacific region.

## OBJECTIVE, DATA AND METHODS

This paper analyses the gender dynamics relating to food insecurity based on food security statistics derived from the 2003 Family Income and Expenditure Survey (FIES). The analysis provides inputs for planning geared towards gender equality, equity and female empowerment within a framework of national development.

The FIES was conducted by national Statistics Office (NSO) and collected food data at two interval points each related to a six-month period: first in July 2003 and then in January 2004. This study made use of the FIES 2003 food data items from the 42094 families who were interviewed during the two visits. These sample families are representative at national level and for the 17 administrative regions.

FSSM converted food consumption in quantities into dietary energy consumption (DEC), using energy conversion factors for energy-yielding macronutrients (proteins, fats and carbohydrates); these energy conversion factors were extracted from the Association of South East Asian Nations (ASEAN) food composition table (FCT). FSSM also estimated inequality in access to food in energy terms owing to income, that is, the coefficient of variation (CV) of DEC due to income at national and sub-national levels. Using age and sex population structures from the January 2004 Labour Force Survey (LFS) and data on heights collected in the 2003 National Nutrition Survey (NNS), FSSM estimated MDER for different population groups.[6]

The data from the Philippine FIES were grouped into 17 regions, but FSSM requires a grouping of only eight regions. Hence, the original 17 regions were recoded as eight regional groupings, as follows: 1) National Capital Region; 2) Luzon 1 (Ilocos and Central Luzon); 3) Luzon 2 (Cordillera Administrative Region and Cagayan Valley); 4) Luzon 3 (Calabarzon, Mimaropa and Bicol); 5) Visayas (Western Visayas, Central Visayas and Eastern Visayas); 6) Mindanao 1 (Zambaonga Peninsula and ARMM); 7) Mindanao 2 (Northern Mindanao and Caraga); and 8) Mindanao 3 (Davao and Soccskargen).

## FOOD SECURITY STATISTICS RELATING TO GENDER

### Age and sex structure of the population

Figures 2.1 and Figure 2.2 show the age and sex population structures, respectively, for male and female-headed families. At national level, in male-headed families, the proportion of males among all age groups was higher than that of females.

In female-headed families, the proportion of male family members was lower than that of females in the 15 to 19 years age group and in 30 and above age groups.

[6] FIES 2003 and the January 2004 LFS used the same sample families. LFS contains demographic characteristics of each family member, while FIES contains demographic characteristics of family heads only.

Male life expectancy and labour migration are key factors in analysing male presence in the population structure. Life expectancy for Philippine women is 72.5 years; for men it is 67.2 years. The presence of elder males and females is common in the Philippines because of close family ties, with families tending to stay together despite old age. Thus, a family will normally have a grandparent included as a dependent.

FIGURE 2.1.
**Age and sex population structure in male-headed families**

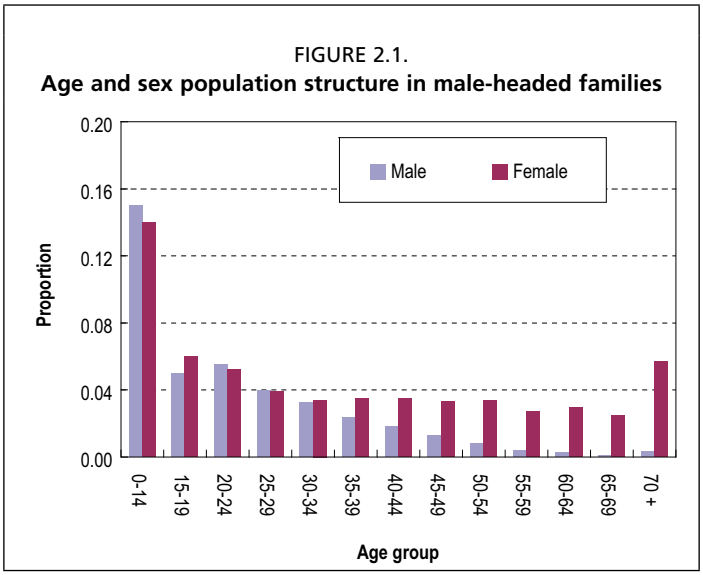



FIGURE 2.2.
**Age and sex population structure in female-headed families**

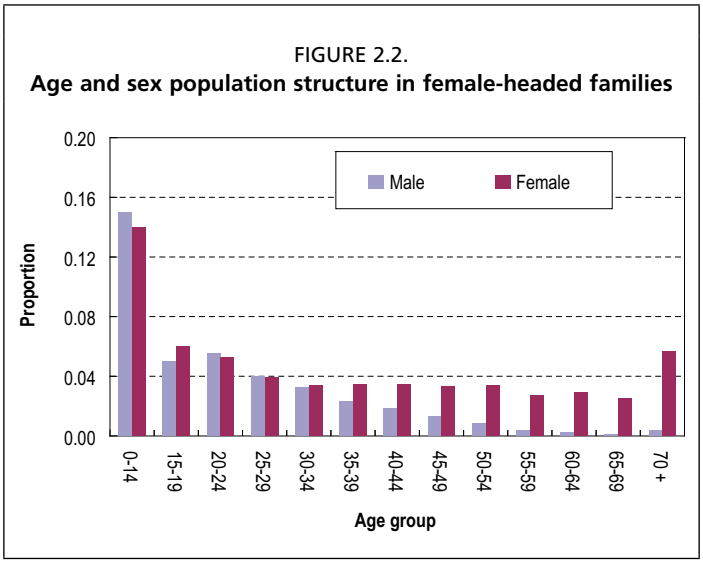
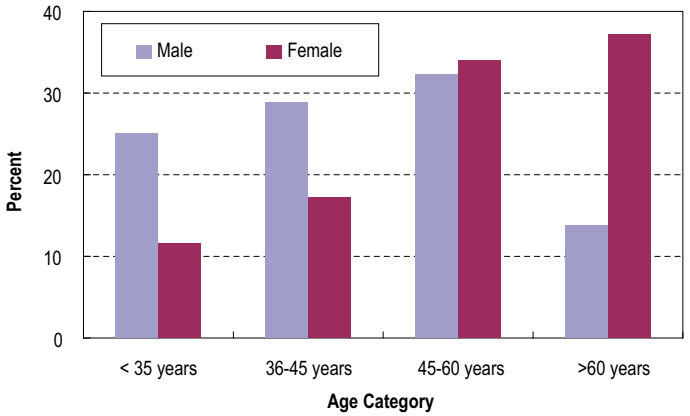



Figure 2.3 shows the percentages of male and female headed families for the total number of families, by age group of head.

Female family heads in the 60 and over age group comprised the largest share - at 37 percent - of female-headed families. This is in contrast to male family heads of the same age group, who accounted for only 14 percent of the total. Male family heads aged 45 to 60 years reported the largest share - at 32 percent - of male-headed families.

FIGURE 2.3.
**Shares of male and female headed families as total number of families, by age group of head**




## Hunger and poverty

***Food deprivation:*** Food deprivation, meaning failure to consume enough food to meet MDER, is linked to amounts of food consumed and the inequality in access to food mediated by income, within the population. In 2003, 38 percent of Philippine people were food-deprived (Figure 2.4).

At national level, food deprivation proportions were higher in male than in female- headed families, at 40 versus 27 percent. The prevalence was also higher for families headed by a male aged 35 to 44 years; with more than five family members; with the head working in agricultural activities; and with the head with no-schooling (no education grade).

FIGURE 2.4.
**Prevalence of food deprivation in various population groups**

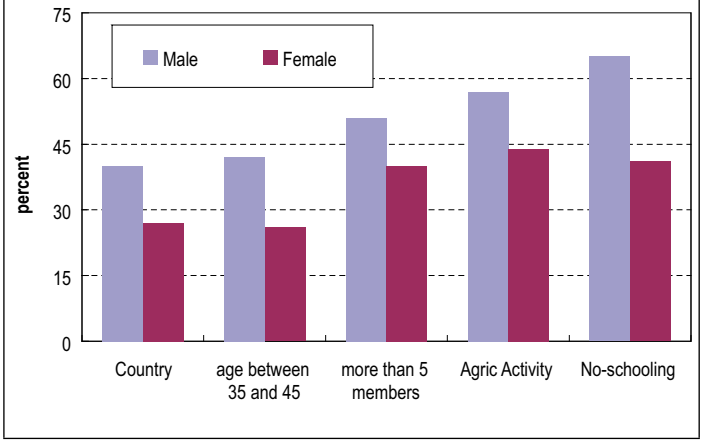
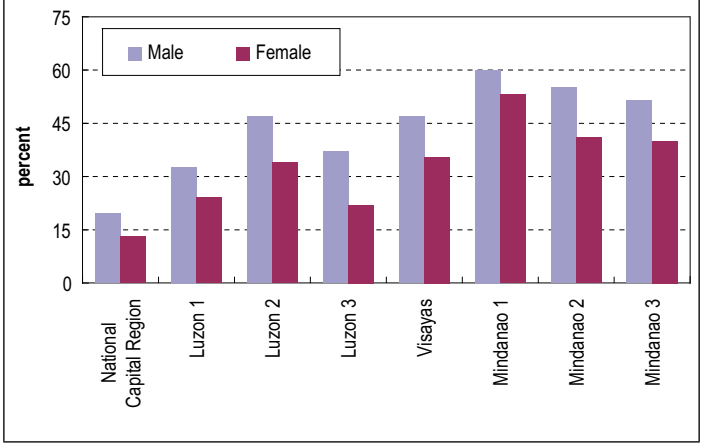



Figure 2.5 shows food deprivation at regional level. Food deprivation was high in all Mindanao regions, for both male and female-headed families, and ranged from 40 to 60 percent. Gender-wise, Luzon 3 reported the widest gap in food deprivation, with male-headed food deprivation 15 percent higher than female.

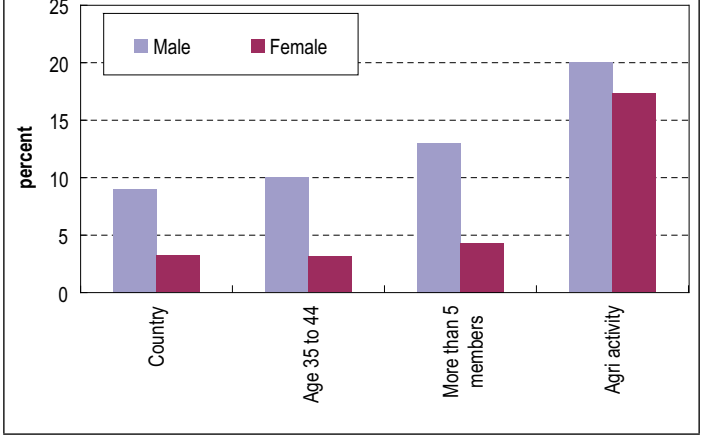
FIGURE 2.5.
**Prevalence of food deprivation by region**




***Critical food poverty:*** The prevalence of critical food poverty refers to the proportion of the population whose income is lower than the cost of a food basket providing balanced MDER. Critical food poverty was higher in male than female-headed families, at nine compared with three percent. In particular, critical food poverty was higher in families headed by a young male, with more than five members, or with a family head working in agriculture activities or with no completed school (Figure 2.6).

The costs of the balanced-MDER were 12.43 and 11.86 pesos/1000 kcal, respectively, for female and male-headed families. Although female-headed families reported higher food costs, male-headed families still have higher food deprivation (Figure 2.4). The food deprivation gap between male and female headed families was 13 percent.

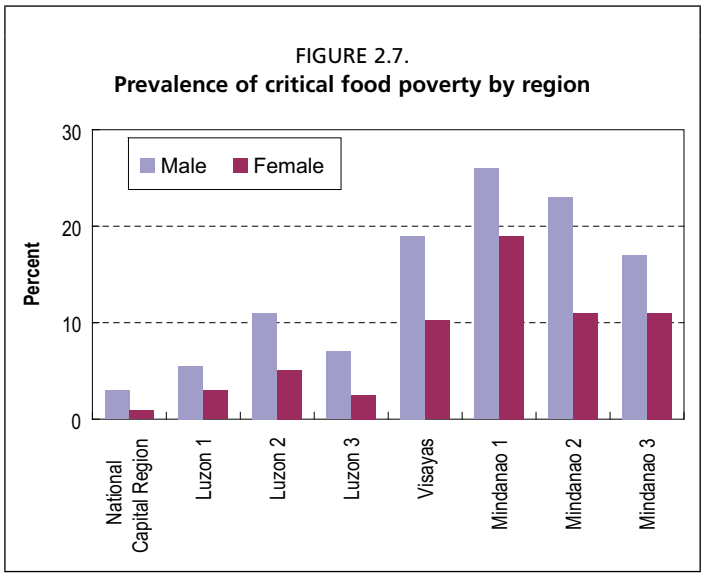
FIGURE 2.6.
**Prevalence of critical food poverty in various population groups**




Critical food poverty by age of family head showed that families headed by a young male were more critically food-poor than those headed by a young female. At national level, male-headed families were more critically food-poor than female-headed families.

Critical food poverty was higher for male than female-headed families in all regions (Figure 2.7). The highest critical food poverty was reported in Mindanao 1 (Zambaoanga Peninsula and ARMM).

FIGURE 2.7.
**Prevalence of critical food poverty by region**

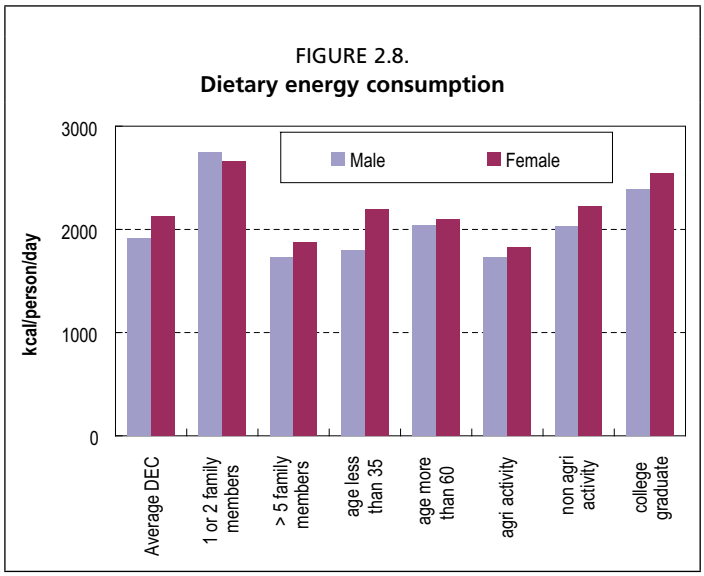



## Food consumption and expenditures

***Dietary energy consumption:*** Female-headed families consumed more food than male-headed ones (Figure 2.8). In particular, female-headed families had higher DEC than male-headed families of large size,[7] working in non-agricultural activities or with the highest level of education. In male-headed families, it could be expected that small families consume more food owing to the sex composition as compared with female-headed families.

The analysis of food consumed by age of family head revealed that families headed by a female of less than 35 years consumed more food than families headed by a male in the same age group. Female-headed families spent more on food and had higher dietary energy prices than male-headed families.

FIGURE 2.8.
**Dietary energy consumption**



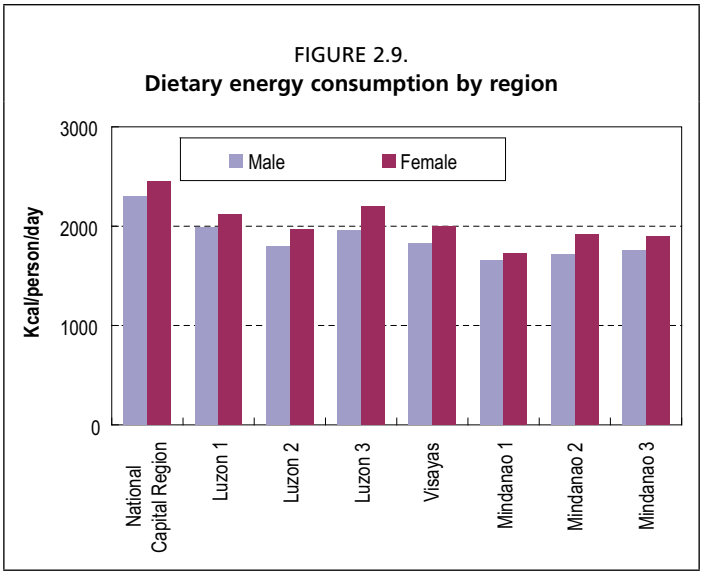

The higher prevalence of food deprivation among male-headed families was therefore mainly linked to low food consumption. Analysis of food consumed, by

[7] The average number of members in small families headed by a female was 1.7, while for families headed by a male it was 1.9. This explains the higher DEC for female-headed families with one or two family members.

economic activity of family head, revealed that both female and male-headed families working in agricultural sectors had lower food consumption than families working in non-agricultural sectors.

At regional level, male-headed families consumed less food in all regions (Figure 2.9). Food consumption was particularly low in Mindanao regions, where food deprivation rates were critically high.

FIGURE 2.9.
**Dietary energy consumption by region**




***Share of food consumption by food source:*** Figures 2.10 and 2.11 show that both female and male-headed families purchased a high proportion of the food they consumed. However, families headed by a male unskilled worker had higher consumption of purchased food[8] than female-headed families.

Families headed by a young and low-educated female whose economic activity was non-agricultural consumed slightly more food from purchases than male-headed families. Food consumption from other sources (including own production) was slightly higher for male-headed families, particularly when the family head was a farmer or fisherman, probably because these categories produce the food they consume.

FIGURE 2.10.
**Shares of DEC from purchases**

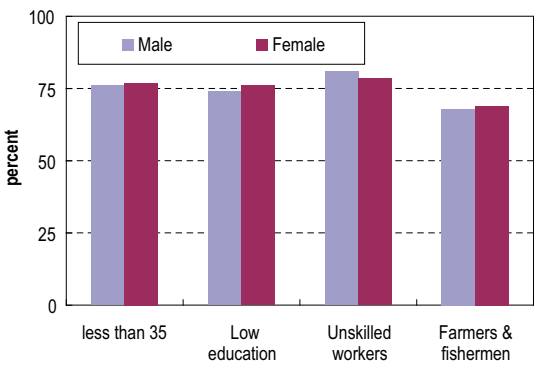
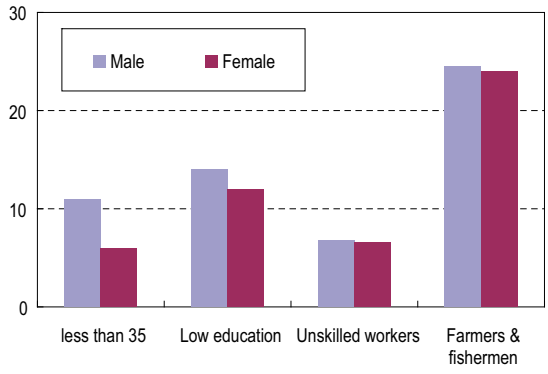



FIGURE 2.11.
**Shares of DEC from other sources, including own production**



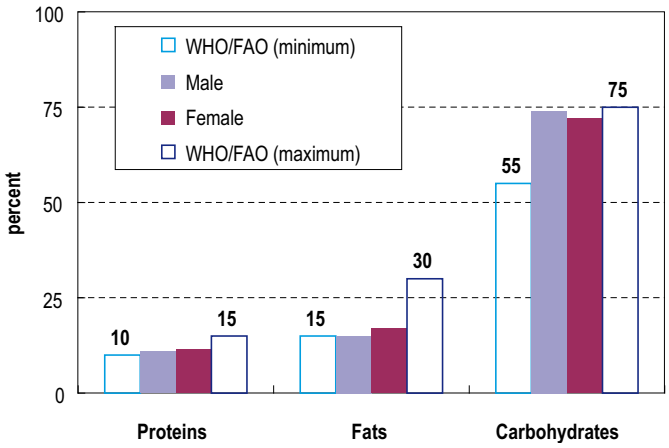

[8] A data limitation in this report was that food from own production could not be estimated separately, as it was recorded as purchases (*Food insecurity assessment based on food consumption statistics derived from the 2003 Philippines family income and expenditure survey. Summary preliminary report*).

The analysis of female and male-headed families' food consumption by food source for different population categories showed a common pattern: the most vulnerable groups purchase a higher share of the food they consume, so are the most affected by price variations. In addition, for both types of families, a large share of the food consumed was received as gifts from other sources.

***Diet diversity:*** The quality of diet was the same for female and male-headed families. It was balanced in energy from proteins and carbohydrates (in both cases within the recommended ranges, 10-15 and 55-75 percent, respectively). Percentage share of energy from fats in the diet was within the recommended range in female-headed families (15-30 percent), but not in male-headed families (at less than 15 percent), as shown in Figure 2.12.

Rice and cereals are a significant source of dietary energy, and carbohydrate consumption provides 64 percent of total energy from food. Of total protein consumption, 12 percent was from fish.

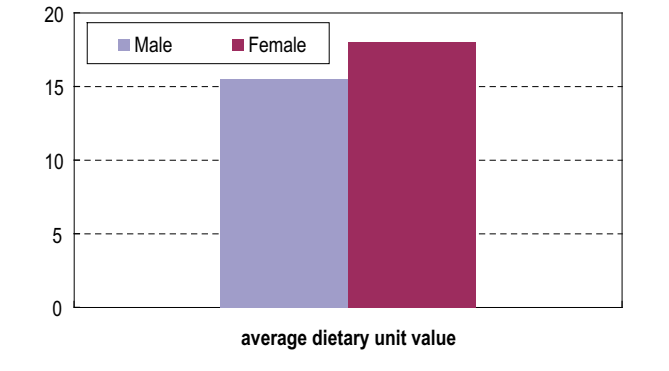
FIGURE 2.12.
**Shares of DEC from proteins, fats and carbohydrates**




***Dietary unit energy cost:*** On average, female-headed families had higher dietary energy unit values than male-headed families (Figure 2.13).

The differences in MDER costs between female and male-headed families may reflect that female-headed families acquired nutritionally better food or more expensive food items.

FIGURE 2.13.
**Average dietary unit cost (pesos/1 000 kcal)**



Food may cost more because of acquisition mechanisms such as credit or frequent purchases of small quantities, which increase food costs. Poor families are most likely to ask for credit from suppliers for small quantities of food for consumption, so prices that are already high are made even higher through the use of credit.

***Share of food in total consumption:*** Female-headed families spent on average a larger share of their total consumption on food than male-headed families. In particular, female-headed families spent more on food when the family was small, or when the family head was working in non-agricultural activities or had the highest level of education. However, analysis of total consumption of food by age of family head revealed that young female-headed families consumed more food than young male-headed families, but senior male-headed families consumed more than female-headed families in the same category. This indicates that families headed by a senior female had less money for buying goods other than food. However, among families with little money, those headed by a female were in a better position to buy any kind of goods, including food, than those headed by a male.

***Inequality in access to food:*** The CV for food DEC was 29.4 percent for both female and male-headed families. This indicates equality in access to food between men and women.

## CONCLUSION AND REMARKS

At national level, the data analysis showed a high food deprivation for male-headed compared with female-headed families. This was the case even when female and male-headed families had the same CV and MDER. This means that female-headed families acquire more food for consumption than male-headed families.

This pattern was confirmed by the findings on critical food poverty, for which male-headed families had rates three times higher than female-headed families. A lower income (or proxy total consumption expenditure) of 62.47 pesos/person/day in male-headed families, compared with 91.36 pesos/person/day in female-headed families, may explain the condition of male-headed families; male family heads may be the only source of income for larger families.

At regional level, it was observed that regions with high food deprivation and critical food poverty were rural regions where the main activity was agriculture. This was not the case in urban regions such as national Capital Region. It would be useful to analyse gender dynamics according to whether the region is urban or rural as this could provide important details for food insecurity analysis.

For female-headed families, food is a major investment, with women being more knowledgeable about this than men. However, male-headed families do not have the possibility of investing in either food or durable goods because they are more critically food-poor and food-deprived than female-headed families. This might be the result of gender inequalities in the roles and tasks related to food. Mechanisms such as micro-credit could improve financial status and increase community cohesion, with positive effects on reducing food deprivation and critical food poverty, especially in disadvantaged groups and areas where agriculture is the major activity.

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# Sub-national estimates of food security statistics in Lao PDR's LECS III

**Samaychanh Boupha**[9]

## ABSTRACT

The Lao Expenditure and Consumption Survey (LECS) is the largest and most important survey that national Statistics Centre (NSC) has undertaken. LECS III (for 2002/2003) was conducted over a period of 12 months from March 2002 to February 2003 as part of a regular five-year programme. Compared with previous surveys, LECS III contained some additional modules to improve food poverty monitoring, and collected data from a sample of 8100 households nationwide, with appropriate urban, rural and provincial coverage. Data on expenditure and consumption were collected for a whole month based on daily recording of all transactions in diaries. Food data were available for more than 150 food items, and included food expenditures for purchases and own production, as well as food consumed away from home. Household food consumption from own production was also collected, and quantities and monetary values estimated. The Food Security Statistics Module (FSSM) for comprehensive food consumption analysis was applied to LECS III food consumption data to derive statistics for analysis of the food situation in the country at national and sub-national levels.

This paper presents some of the statistics for national-level and different sub-national population groups.

**Key words**: food security indicators, sub-national

## INTRODUCTION

The Lao People's Democratic Republic (Lao PDR) has a population of 5.6 million, of which 65 percent are concentrated along the Mekong River and in lowland areas. Lao PDR is one of the least developed countries in the East Asia region, with estimated yearly per capita income of US$606 in 2006. More than three-quarters of the people of Lao PDR live on less than US$2 a day, and the country's social indicators are among the most alarming in the region. Lao PDR is geographically situated in the centre of Indo-China, with 87 percent of its total land area being mountainous elevations over 500 m high, typically characterized by steep terrain and narrow river valleys with low agricultural potential, which slows down the country's overall economic performance.

Since launching the transition from central planning to a market economy almost two decades ago, Lao PDR has shown robust growth. Its annual per capita growth rate of 4.1 percent from 1988 to 2004 was 1.2 percentage points higher than the average for the group of low-income economies. A rise in per capita output of more than 80 percent came about via a shift in the composition of gross domestic product (GDP) from the primary to the secondary sector. Industrial growth averaged 11.9 percent from 1987 to 2004, compared with only 4.3 percent growth in agriculture. Over the same period, agriculture declined from 63 to 46 percent of GDP, while industry expanded from 11 to 27 percent. The relative decline of agricultural value-added brought a shift from on to off-farm work. The share of farmers among the employed labour force dropped from 82 percent in 1992/1993 to 67 percent in 2002/2003. This adjustment raised the living standards of families, as non-farm workers are about twice as productive as farm workers. The output share

[9] Director General, National Statistics Centre, Lao PDR.

of rice declined from more than four-fifths in 1995 to just two-thirds in 2004. The contribution of rice would have fallen even more without steady increases in yields, which rose from 2.3 percent in 1990 to 3.3 in 2002/2003. While overall agricultural growth remained roughly constant, at six percent, expansion between 1997/1998 and 2002/2003 was more focused on crop production, which grew by 5.2 percent compared with only 2.5 percent from 1992/1993 to 1997/1998. The second five-year period saw sharp increases in the output of not only rice, but also vegetables, beans and sugar cane, leading to more diversified crop production.

The economic performance of Lao PDR was measured by the three Laos Expenditure and Consumption Surveys (LECS) conducted by National Statistics Centre (NSC) in 1992/1993, 1997/1998 and 2002/2003. Although the population expanded by one million people between 1992/1993 and 2002/2003, analysis of the results from the LECS shows an overall improvement in living standards. The absolute number of poor declined from about 2.0 million to 1.8 million. The impact of poverty reduction shifted during the late 1990s, from valleys to hilltops and from the poor to the very poor. Poverty is lower in cities than in villages, in localities with roads than in those without, and in non-priority districts than in priority districts. In particular, in the 47 priority districts, the poor in 2002/2003 were still more than double the non-poor. Exposure to food price variability has also decreased, as the share of food in total consumption declined from 64 percent in 1992/1993 to 61 percent in 1997/1998 and 55 percent in 2002/2003.

The three surveys together proved a very good tool for monitoring poverty, so the analysis of food consumption data derived from the surveys provides more key information on the overall situation of the country in terms of food security, at national level and for sub-national population groups. This exercise was conducted using the food consumption data from the 2002/2003 LECS III; some of the main results are presented in this paper.

## LECS III

LECS III covers the whole of Lao PDR. The statistical unit is the household, and the survey covers economic transactions of households to estimate household income, consumption and production, as well as a number of social indicators. LECS III was undertaken from 1 March 2002 to 28 February 2003 (12 months). NSC conducts LECS every five years.

LECS is a multi-purpose survey designed with an emphasis on particular issues. The 1992/1993 LECS was combined with a large module of social indicators from the Lao Social Indicator Survey (LSIS). The 1997/1998 and 2002/2003 LECS focused on the economic activities of households. The objectives of LECS are to provide macro estimates for national accounts, the consumption structure (weighing system) for the consumer price index (CPI), estimates of labour force, and statistics on access to nutrition and income distribution.

## The LECS sample design

The LECS III sample was made up of 8100 households from 540 villages - 15 households from each - enumerated over the 12 months of the survey. The sample was selected using the NSC village list as a sampling frame. A two-stage sampling scheme was used. In the first stage, a sample of villages was selected by probability proportional to size (PPS) sampling. The villages were first divided by province, then into urban and rural areas, and finally into rural villages with access to roads and those without. The sample of villages in each province was allocated a survey month randomly, so that each survey month had approximately the same number of sample villages. In the second stage, a systematic sample of 15 households was selected in each sample village.

## Reliability of data

LECS is a sample survey, and as such is subject to sampling errors. Sampling errors in LECS III have been calculated for some important variables and are included in tables in the form of 95 percent confidence intervals ("margin of error"). All confidence intervals are in absolute figures. Data quality is also dependent on measurement, data entry and coding errors. Although efforts to detect data errors were made, there may still be some left, but they will not influence the results more than marginally. When judging quality, it must be kept in mind that the survey touches on concepts of household economy that are difficult to assess, not immediately clear, and therefore subject to different interpretations.

Questions in the village questionnaire are answered by village chiefs. His or her knowledge of the situation in the village may be more or less accurate, and can affect the results. For example, she/he may report data that tend to make the situation look better, such as by seeming to comply better with planning goals than is really the case or, worse, if he/she believes that this could benefit the village. The information in the household module is given by the households themselves, so it is up-to-date and mirrors the actual situation. The head count is based on information given by the village chief, and some data concerning households may not be up-to-date.

## ANALYSIS OF FOOD SECURITY FROM LECS III

The estimated number of households in Lao PDR was 867000, and the average household size was 6.1, with a margin of error of ± 0.1.

Although the household size was significantly lower in LECS III compared with LECS II, its estimates seem to be more in line with those from the 1995 Census and the population head counts conducted in 2000 and 2003. Isolated households in northern regions were generally larger in size than urban households in the south.

TABLE 3.1
**Average household size by type of area, 2002/2003**

| | Urban | Rural with access to road | Rural without access to road | Total |
|---|---|---|---|---|
| Lao PDR | 5.8 | 6.0 | 6.6 | 6.1 |
| North | 5.8 | 6.0 | 7.0 | 6.2 |
| Centre | 5.8 | 6.1 | 6.4 | 6.0 |
| South | 5.6 | 6.0 | 6.1 | 5.9 |

## Magnitude of food deprivation

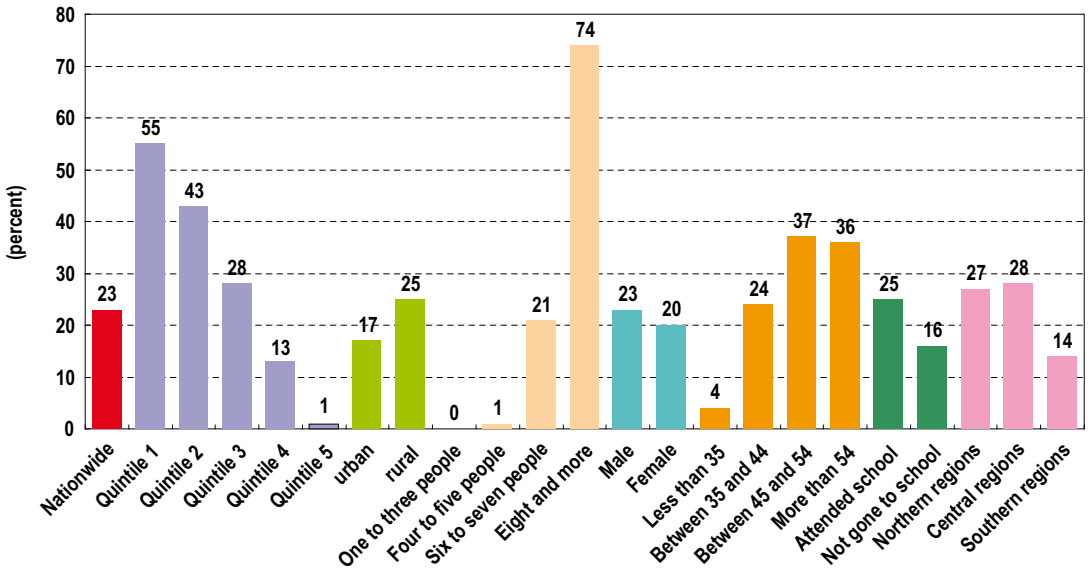
The prevalence of food deprivation,[10] as defined by Millennium Development Goal (MDG) indicator 1.9 on hunger reduction, was measured at national and sub-national levels. At national level, an average of almost one person out of four was food deprived in 2002/2003.

This high level of food deprivation did not reflect the overall situation of food insecurity at sub-national levels, as 17 percent of the population in urban areas was undernourished, compared with 25 percent in rural areas; 55 percent of the population with the lowest income was food insecure. The problem of access to food seems to intensify as the head of the household gets older or the size of the

[10] The prevalence of food deprivation depends mainly on three components:1) amount of dietary energy contained in food consumed; 2) inequality in access to food, mediated mainly by income; and 3) minimum dietary energy consumption (DEC) for a low acceptable body-weight for attained height and for performing sedentary physical activity, by age group and sex. The weighted overall minimum dietary energy requirement (MDER) of 1638 kcal per person per day was used as the cut-off point of the distribution function of DEC for estimating the prevalence of food deprivation.

household increases. One person out of two in households of six people and more was at risk of suffering from food deprivation.

FIGURE 3.1.
**Food deprivation in Lao PDR**




## Depth of food deprivation

Nationwide, the average daily consumption for food-deprived people was about 1401 kcal. It would thus require an additional 237 kcal per day for the food-deprived population to reach the MDER of 1638 kcal needed to maintain a healthy life and perform a minimum level of physical activity; and an additional 452 kcal would be needed to reach the average DEC of 2090 kcal.

These deficits were at national level, but the intensity of food deprivation differed and widened within different groups of the population. For instance, the difference in average food consumption by food-deprived people in rural and urban areas was 102 kcal per person per day, but it would require an additional 866 kcal for the food-deprived population of urban areas to reach the average 2350 kcal DEC of urban areas, and less than 618 kcal for rural food-deprived people to reach the average 2000 kcal consumed in rural areas. Another interesting result is that rural areas' average DEC of 2000 kcal/person/day was equal to the average energy required, while the average DEC of urban areas, at 2350 kcal/person/day, was well above the average energy requirement of 2152 kcal.

## Food consumption

A household in Lao PDR consumed goods and services with an average value of about 1.1 million kip per month. Half of this was devoted to food products, with a daily expenditure per person of about 2960 kip. The more vulnerable households in the lowest income group of the population spent on average less than a third as much on food than households in the highest income group. In terms of DEC, this represents a daily consumption of 2090 kcal per person. Food consumption patterns go in the opposite direction to food deprivation, and differed not only according to income level of the household but also area of residence, size of the household, region, and age or gender of the head of the household. The size and income level

were the two determinant variables with the greatest impact on the dietary energy of food consumed. Thus, a person from a low-income household of more than eight members consumed at least 500 kcal less than national average and about 2000 kcal less than a person from a household with fewer than three members.

As more than 75 percent of the population were engaged in subsistence farming, 45 percent of the monetary value of food consumed came from own production. Again this share varies widely among population sub-groups, and was higher for low-income households in rural areas or regions in the North (at more than 60 percent) than for households in urban areas and with high income, which purchased more than 73 percent of the food they consumed. In terms of dietary energy, the pattern was the same, but the magnitude was exacerbated. At national level, 61 percent of dietary energy came from own production. This reflected the fact that on average own-produced food was high-energy food of low cost. An important feature was that 75 percent of the monetary value of the food acquired by households in the lowest income group came from their own production, and this share increased to 84 percent when looking at food consumption in dietary energy terms. These results have two implications: 1) the lowest income group of the population is highly dependent on own production, and any change in this may have a major impact on food security; and 2) the nutrient consumption pattern is unbalanced, with more than 75 percent of energy coming from carbohydrates and less than 15 percent from fats. In contrast, 62 percent of the DEC of the highest income group came from purchases, nine percent from food consumed away from home and 28 percent from own production.

## Diet composition

Providing 73 percent of the total calories consumed in Lao PDR, carbohydrates represented the largest energy source in the diet, followed by protein and, to a lesser extent, fats. Consumption of fats was too low, and should be much higher to meet the WHO/FAO guidelines for a balanced diet; consumption of rice contributed more than 75 percent of total consumption of cereals, which is higher than the guidelines because there are other products providing carbohydrates.

In general, people from urban areas consumed more carbohydrates and fats than people in rural areas. However, when looking at the contribution of each group of food products to total DEC, it appears that cereals and meat products together contributed 88 percent (75 and 13 percent, respectively) of the DEC of households in rural areas, while this share fell to 74 percent in urban areas (65 and eight percent, respectively). Meat contributed only eight percent of the diet of urban households; prepared food and food away from home represented 11 percent. The contributions of other foods were the same in the two areas.

The pattern of diet composition differs widely among regions. Households from southern regions consumed about 400 kcal/person/day more than households in northern regions, with a higher share of proteins (19 versus 14 percent) and a lower share of carbohydrates (69 versus 74 percent). This higher share of proteins in southern regions can be explained by the fact that most livestock is raised in this part of the country, so 53 percent of the total protein consumed was from animal products (meat, fish, eggs and dairy) in rural areas, while 56 percent was from vegetable products in urban areas.

## Inequality in income and food consumption

The Gini coefficient, the coefficient of variation (CV) and the dispersion ratios are among the various indicators used to measure inequality of income or of access to food.

Inequality in access to food refers to data in both DEC and monetary value. Inequality in access to food, as given by the CV, was quite high, with almost no

significant differences between urban and rural areas, even though food deprivation in these areas differed widely (at 17 versus 25 percent). Among the young population, inequality in access to food was lower and DEC higher than in households with older heads. This can be attributed to the fact that 55 percent of the food acquired by households whose head was more than 54 years of age was purchased, while 57 percent of the food consumed by young households was from own production; hence these households are less vulnerable to market price fluctuations than those with older heads. Inequality in access to food in monetary terms was higher than that in dietary energy terms, as it took food price effects into account.

In Lao PDR, total expenditure was used as a proxy for income. Income inequality was higher than food consumption inequality because the range of variation of incomes among households was higher than that for food consumption. Households were constrained by biological requirements, and variations due to income were linked to demand elasticity only. At national level, the income of the last quintile was more than five times that of the first quintile, but at sub-national levels, the trends were different, as income disparities within urban households were much higher than those within rural households.

The analysis of inequality in terms of CV or Gini coefficient gives the same pattern. Based on LECS III, the Gini coefficient of income was 37.4, which corroborates the general findings according to which the Gini of income in Lao PDR was about 35 percent.[11]

Demand elasticity with respect to income is also a good indicator of inequality in access to food, as it measures the variations in food demand due to changes in income. Changes in food demand are more significant when the income of low-income households increases than when that of high-income households increases. This is mainly owing to the greater value of the Engel ratio (share of food in total consumption) of poor households compared with rich ones. In Lao PDR, a one percent increase in income leads to a 2.4 percent increase in food expenditure for households with low income, while it has a marginal impact of 0.4 percent on the food expenditures of households with high income.

## CONCLUSIONS

On average, a household in Lao PDR consumes goods and services of a value of 1.1 million kip per month. Food products make up more than half of total consumption. The consumption pattern changes with changing income and relative prices. With an increase in income, people spend less on food compared with non-food items and, as a result, food consumption as a share of total consumption decreases.

Food in 2002/2003 made up 55 percent of overall consumption, compared with 61 percent in 1997/1998 and 64 percent in 1992/1993. Housing was a larger part of total consumption, at 13 percent compared with seven percent in 1992/1993 and 1997/1998; to some extent this reflects an effect of the different measurement methods of imputed rent used. There are statistically significant increases in the shares of consumption for education, personal care and "others". There are also significant decreases in the shares of consumption of own-produced food, household utensils, household operations and recreation. The share of transport costs increased from seven to 11 percent in 1992/1993 and 1997/1998, respectively, to 12 percent in 2002/2003; the change between 1997/1998 and 2002/2003 was not significant, however. Other changes were not significant. There was also a shift from own production consumption to consumption from purchases. The share of food from own production was 53 percent in 2002/2003, compared with 56 and 59 percent in 1997/1998 and 1992/1993, respectively.

[11] UNDP's 2006 human development report gives 34.6 percent as the Gini coefficient of Lao PDR, based on the 2002 survey.

At national level, 23 percent of the population was suffering from food deprivation. The situation being more dramatic in the northern and central regions than in the south, and in low-income households whose energy consumption (87 percent) depended on the food they produced. On average, daily consumption per person was 2100 kcal, with an important share attributed to the consumption of carbohydrates, mainly rice.

LECS III was designed mainly to provide estimates of national totals for national accounts. Consequently, as a data source for food security analysis it has some shortcomings:

- The survey measures expenditures on food and consumption of own-produced food. The consumption of own-produced food relates to day-to-day consumption over the survey month. The expenditures relate to day-to-day food purchases, which are not necessarily consumed that day or even that month. If a household buys a sack of rice to be consumed over the following two months, the expenditure on rice will be high during the first month and zero during the second. Depending on whether the household is surveyed during the first or second month, it will either have high rice expenditure or no rice expenditure at all. So, when considering the way expenditures are measured, measurement errors will occur if expenditures are treated as consumption.
- Each household is surveyed for one month, and the sample of households is evenly spread over a 12-month period. This means that there will be apparent changes in consumption among households, which are really due to seasonal variation. This seasonal variation obscures the real inter-household variation that is meant to be measured.
- It is not possible to present reliable estimates for smaller geographical areas and socio-economic groups. The LECS sample is fairly large in terms of households, but the effects of clustering make the effective sample size substantially less than 8000 households, making it difficult to break down the results into smaller "mode-of-living" groups.

The following are some recommendations for improving data quality for food security statistics:

- The number of units of quantity measurement should be reduced and limited to the standard kilogram, gram and litre. Standard units, including local units, should be converted directly into grams or millilitres during the data entry process. Either unit values at the local market level should be used to convert specific local units of measurement into grams, or investigations could be conducted in local markets to obtain the exact gram equivalent of local units.
- The ASEAN food composition table was supplemented by the FAO and United States Department of Agriculture (USDA) tables to build the food composition table for Lao PDR. Additional work to revise this table for future use should be carried out, in consultancy with experts from the health and nutrition service.
- Food items should be specified more exactly than the broad categories currently used, such as beef, other meat, hunted or trapped animals, and cultivated fish. This would make it easier to find corresponding nutrient values, as the broad food commodity groups have a major impact on the nutrient values of the food items they refer to.
- With additional information on heights of the population, minimum energy requirements at national sub-national levels could derive better indicators for food deprivation and critical food poverty.
- Better estimates could be obtained if questionnaires were designed to account for food stocks from own consumption.

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# Food insecurity indicators derived from the 2002/03 Mozambican Household Survey*

**Domingos Diogo, Camilo Amade, António Paulo, Osvaldo Comé**[12]

## ABSTRACT

At national level, 29 percent of the Mozambican population was food deprived in 2002-2003, consuming less than the minimum energy requirements, based on the Mozambican Household Survey data using the FAO methodology for measuring the prevalence of undernourishment. At sub-national levels, the highest prevalence of food deprivation occurred in Maputo Province and Gaza, with around 55 percent of the total population being food deprived; the lowest prevalence was found in the Sofala and the Manica provinces, at around 26 percent. The urban population showed higher prevalence of food deprivation (52 percent) than the rural population (23 percent). The main factors determining food deprivation were low income, large household size, female-headed households and household heads working in the industry and services sectors. The levels of food deprivation for those population groups are higher than that at national level. On average, each Mozambican had a daily food consumption of around 1990 kcal of which 70 percent was from carbohydrates, 19 percent from fats and 11 percent from proteins. This paper analyses the food insecurity situation in Mozambique using the food consumption data of the 2002-03 Mozambican integrated household income and expenditure survey (Inquérito aos Agregados Familiares - IAF).

**Key words:** food deprivation, sub-national

## INTRODUCTION

Various indicators on food deprivation and poverty together with a large range of food security statistics were derived at national and sub-national levels. This food security information is very useful in defining the profile of food insecure populations and their location for more focused policy interventions in the fight against hunger. However, these statistics should be used with caution given the limitations (see section II) of the available food data in the IAF 2002/03, whose primary objectives were other than the food security analysis. Some recommendations are also provided to enhance the collection of food consumption data in future household surveys and to establish more reliable, consistent and comparable food security indicators useful for policy formulation on issues related to food security and poverty alleviation.

## THE SURVEY

The 2002/03 IAF was conducted by national Institute of Statistics of Mozambique between July 2002 and June, 2003. The survey was designed to produce estimates on household expenditure, income and social characteristics of households at national, provincial and residential area (rural and urban) levels.

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* Paper presented at the XX th Session of African Commission on Agricultural Statistics (AFCAS) in Algiers, Algeria. December 2007.

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***Sampling design:*** The sample was built based on the 1997 population census. Households were selected in three stages: sample primary units, enumeration areas and households. The sample size was 8727 households, of which 4020 were in urban areas and 4707 in rural areas. A total of 8700 households responded to the survey representing a 99.7 percent response rate.

***Survey design:*** The survey used four questionnaires:

- **the community questionnaire** (Questionario Comunitario), which recorded general characteristics of rural communities and market prices for selected products;
- **the general household characteristics questionnaire** (Caracteristicas Gerais do Agregado Familiar)
- **the daily household expenses questionnaire** (Despesas Diarias), which recorded seven days of household purchases, household consumption of own production, and gifts in kind received by the household; and
- **the monthly household expenses and income questionnaire** (Despesas e Receitas), which recorded the inventory of durable goods owned by the household, number and value of durable goods purchased in the last 12 months, education expenditure in the last 12 months, household purchases in the last 30 days, income and revenue in the last 30 days by household member and transfers received and paid in the last 30 days by household member.

***Period of data collection:*** Household data was collected through three visits. On the first visit, the enumerator collected data from the general household characteristics questionnaire and part of the daily household expenses questionnaire. On the second visit (three days after the first), the daily household expenses and the monthly and annual household expenses were collected. On the third visit, (three days after the second), the income and the daily household expenses of the last three days were collected.

***Limitations of the survey food consumption data***:

- As the objective of the survey was for different purposes, the collected data referred to food acquisition instead of food consumption which will affect the overall results.
- Some excessively high and low values of food quantities were reported, particularly those food items coming from own production, which probably referred to quantity produced instead of consumed. These quantity values had to be re-estimated using their corresponding reported monetary value and the food items average dietary unit value at regional level.
- Mozambique does not have a food composition table and the nutrients values were obtained from the Portuguese and Africa reference food composition tables. In spite of having a very precise list of food items, the IAF 2002/03 contains a few broad groups of food items for which it was difficult to find precise corresponding nutrient values
- Finally, total expenditures were used as a proxy of income as no reliable data were available for this variable. The use of this series as a proxy of income distribution may affect overall results on food and critical food poverty.

## MAIN FINDINGS

### Magnitude of food deprivation

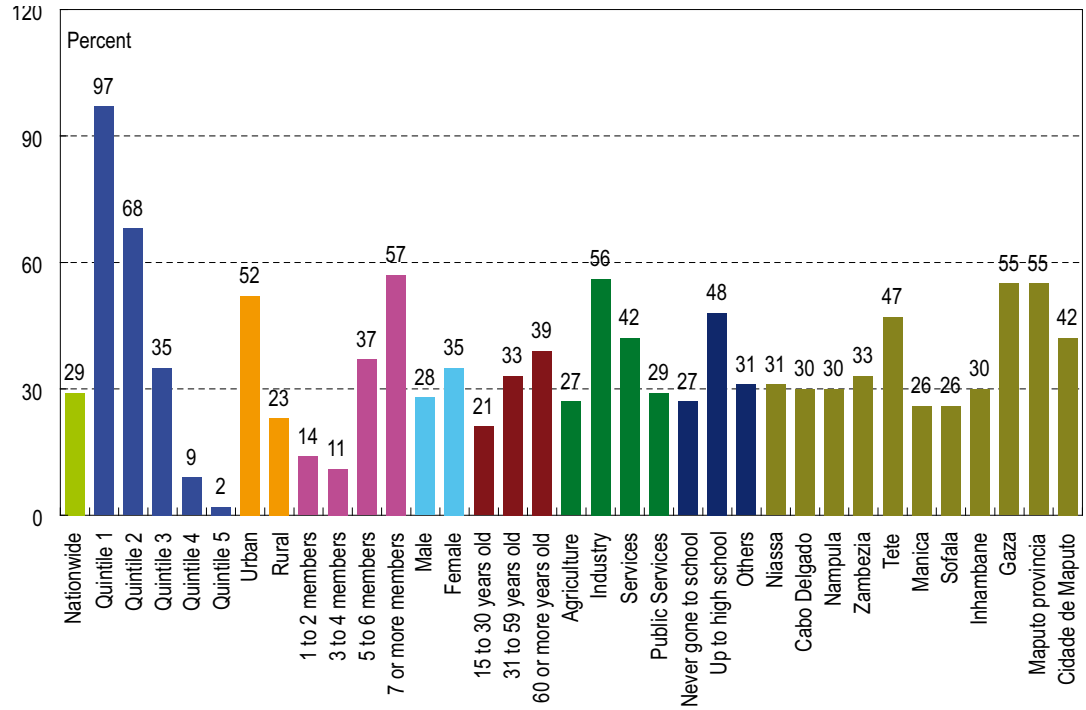
**Methodology of measuring food deprivation**

The FAO's measure of the prevalence of undernourishment is an indicator of food deprivation and is based on the distribution of household food consumption, expressed in terms of dietary energy. It compares dietary energy consumption (DEC) with energy requirements and is the proportion of population consuming below a minimum energy requirement level (MDER). Thus the prevalence of food deprivation depends on three components: the amount of dietary energy consumed (DEC); the inequality in access to food mediated mainly by the income measure known as coefficient of variation (CV) and the minimum dietary energy requirement (MDER) which refers to the lowest acceptable weight-for-height and light activity level of adults using the age-sex structure of the population.

The magnitude of hunger as measured by the prevalence of food deprivation showed that in 2002/03, about 29 percent of the total population in Mozambique was undernourished. Levels of food deprivation were not the same for sub-national population groups (urban and rural areas as well as provinces) as shown in Figure 4.1.

High levels of food deprivation were observed among people of the lowest income quintile, among households comprising more than seven members, and among households with heads who were more than 30 years old. In addition, Gaza and Maputo provinces had the highest prevalence of food deprivation (55 percent). Figure 4.1 also shows that food deprivation was higher in female headed households, and in urban areas (52 percent) rather than rural areas (23 percent).

FIGURE 4.1.
**Proportion of food deprivation in total population**

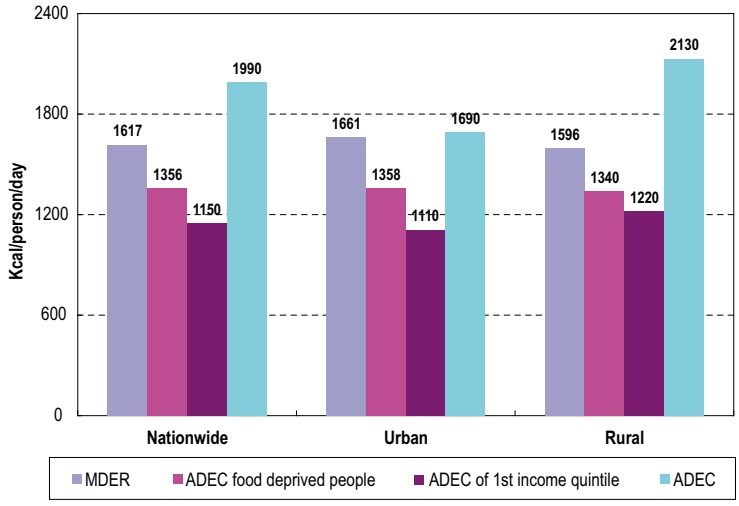


## Depth of hunger

At national level, the average Mozambican had a daily energy consumption of 1990 Kcal while those of the food-deprived population, an average of 1356 kcal. Thus, the depth of hunger at national level, which measures the gap of the consumption of the food deprived population to the minimum energy requirement (MDER) of 1617 Kcal was 261 Kcal (Figure 4.2).

In rural areas, the average dietary energy consumed was significantly higher than in urban areas, (2130 versus 1690 Kcal). However, the average dietary energy consumption differed marginally, 1340 kcal for rural areas as against 1358 kcal for urban areas. The depth of hunger was higher in urban areas (303 Kcal with respect to urban MDER of 1661 Kcal) than in rural areas (2567 Kcal with respect to rural MDER of 1596 Kcal). However, both depths of hunger were considered high. Of great concern is the high energy gap in all groups of households in the lowest income quintile, with averages of energy consumption falling short of their respective MDER - for example, at national level by 467 Kcal, in urban areas by 551 Kcal and in rural areas by 376 Kcal. These energy shortages of households in the lowest income quintile were even higher than the depth of hunger at national level as well as in urban and rural areas. Energy consumption in the lowest income households in urban areas was lower than in the lowest income households in rural areas.

FIGURE 4.2.
**Depth and intensity of hunger in urban and rural areas of Mozambique**



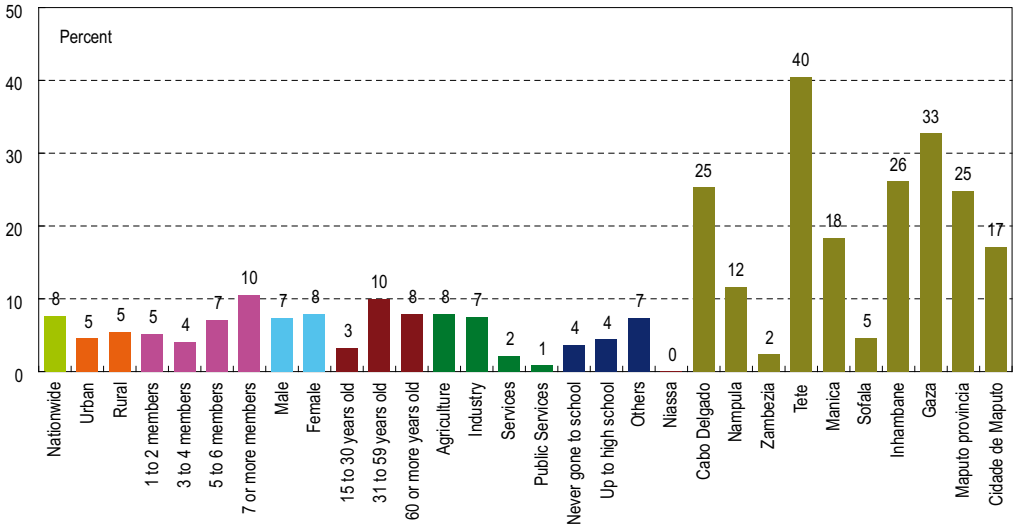

## Critical food poverty

The prevalence of Critical Food Poverty (CFP) is the proportion of the population whose daily income is lower than the cost of a macronutrient-balanced food basket equivalent to the minimum dietary energy requirement (MDER). The MDER cost is valued using macro-nutrient unit costs from food consumed by households in the first income quintile. The macronutrient-balanced food basket provides 12.5, 22.5 and 65 percent energy from proteins, fats and carbohydrates respectively.

Nationwide the critical prevalence of food hunger was 7.7 percent. With respect to urban and rural areas it was 4.6 percent and 5.4 percent respectively (Figure 4.3).

The levels of Critical food poverty showed much variations among the sub-national level population groupings. The provinces of Niassa, Zambézia and Sofala had lower critical food poverty than national average. In terms of household characteristics, the lowest critical food poverty level was observed in households with three to four members, households with young heads of the age group 15 to 30 years and with the household head engaged in public services.

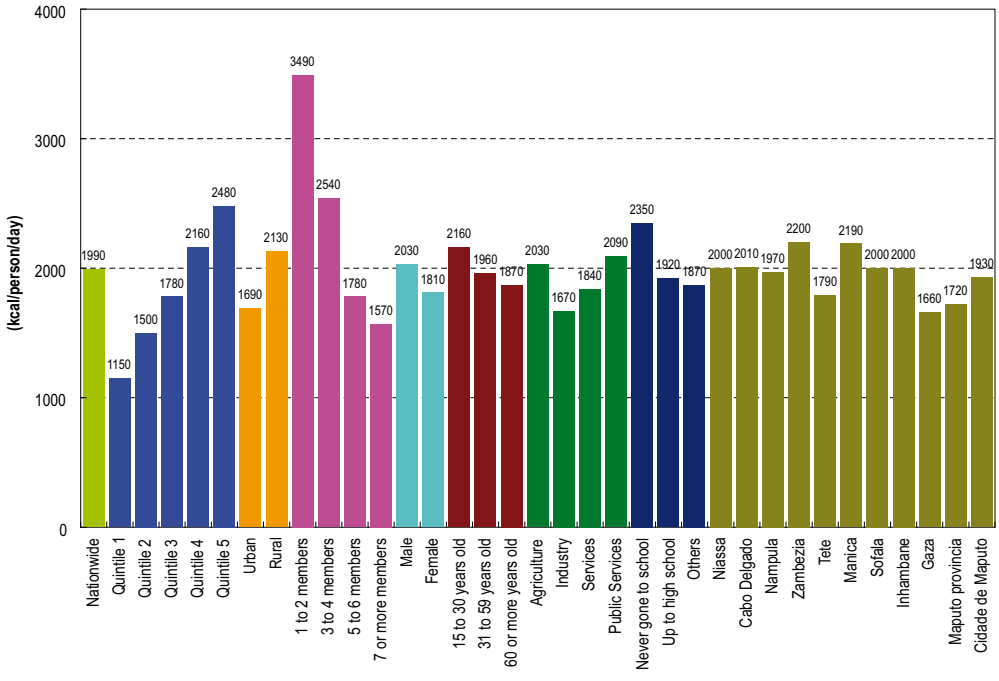
FIGURE 4.3.
**Prevalence of critical food poverty**




## Food consumption and expenditures

***Dietary Energy Consumption***: The average dietary energy consumption (DEC) in Mozambique was of 1990 kcal/person/day in 2002-03. The DEC levels increased with income, but showed different patterns among the different population groupings. Hence, the daily average of 1150 kcal/person/day consumed by low-income population groups contrasted with the 2480 kcal/person/day consumed on average by households with high income. In households with one or two members, the average DEC was 3490 kcal/person/day against households with seven or more members, with an average of 1570 kcal/person/day (Figure 4.4).

FIGURE 4.4.
**Dietary energy consumption**



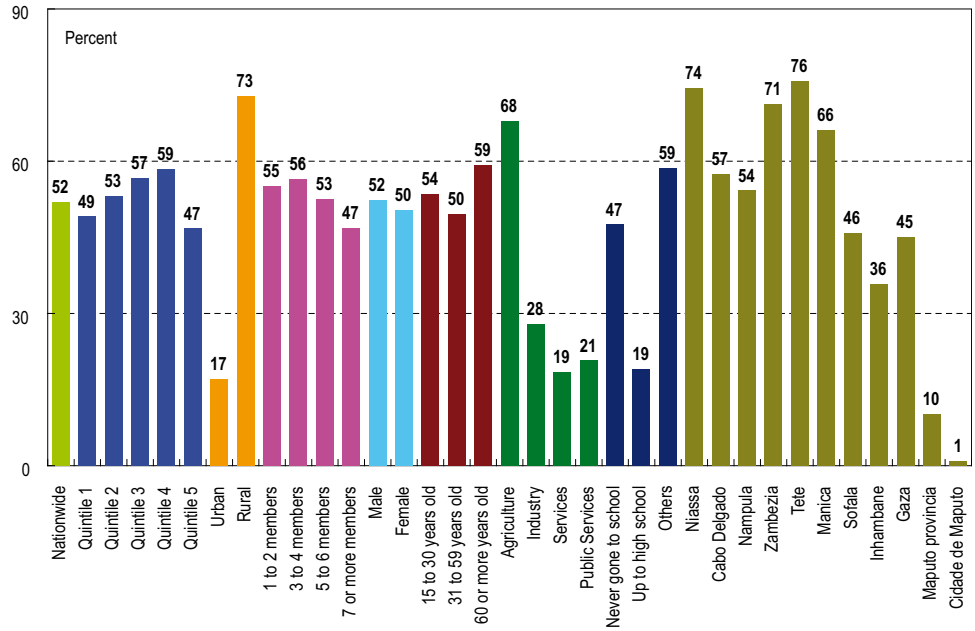
***Dietary energy unit value***: It costs on average 2.70 Mts (Mozambican Metrical) to acquire 1000 kcal at national level. But the dietary energy unit value (which does not include the cost of fuel energy needed to bring the food from as purchased state to that of ready to eat) differed according to the sub-national population groups. The value for 1000 kcal was 2.6 Mts for low-income groups but somewhat higher (3.00 Mts) for the highest income group.

The same difference was observed between urban and rural areas, where the cost of 1000 kcal in urban areas was about 61 percent higher than that in rural areas. Finally, the highest dietary energy unit value found was for Maputo City, where 1000 kcal cost on average 3.9 Mts, which represented a 44 percent higher cost than national average.

On average, 54 percent of total consumption was devoted to acquiring food. It was observed that the share of food expenditures as a percentage of total consumption expenditure decreases with higher income, which is in line with Engel's law on economic theory that the proportion of income spent on food decreases as income increases, other factors remaining constant. The population group with lowest income level (first decile) spent 81 percent of total consumption on food consumption; this decreased to 43 percent for the population group in the highest income level (tenth decile).

***Share of food consumption by food* source**: Most of the food consumed at national level was from own production (52 percent), while the food acquired from purchases was 45 percent. Food consumption away from home such as in restaurants, bars, etc and obtained free constituted the remaining three percent. However, the share of food consumption varied according to regions and sub-national groups. For example, rural households tended to consume more food from their own production (73 percent), compared to urban households (17 percent). In urban areas, purchases were the most important, with a share of 81 percent of total food value. There was also a notable difference from provinces in terms of share of food sources. In Maputo province and Maputo city the most important source of food was purchases, representing 86 percent and 98 percent of total food expenditure respectively (Figure 4.5).

FIGURE 4.5.
**Share of food from own production to total food value**



## Dietary diversity

About 70.1 percent of the DEC of an average Mozambican consisted of carbohydrates, followed by fat with a contribution of 19.3 percent, and then protein at 10.6 percent. This consumption pattern follows the norms recommended by FAO/WHO for a balanced diet consisting of 10-15 percent of proteins, 15-30 percent of fat and finally 55-75 percent of carbohydrates (Figure 4.6). When looking at the contribution of each food commodity group to the total DEC, it appeared that cereals and their products provided 49 percent of the total dietary energy, followed by 17 percent from roots and tubers and their products, and 12 percent from oil crops (Figure 4.7). Meat and fish had a very low contribution (slightly more than three percent) to total energy consumption.

FIGURE 4.6.
**Share of total calories of nutrients in total calories**

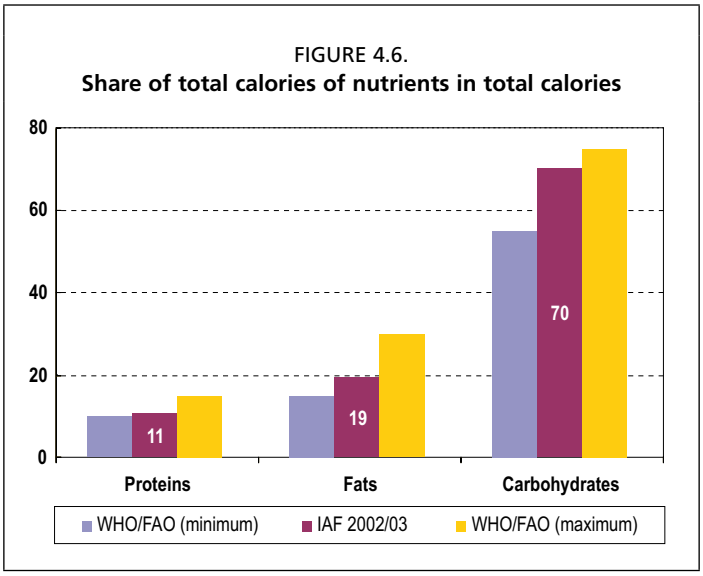
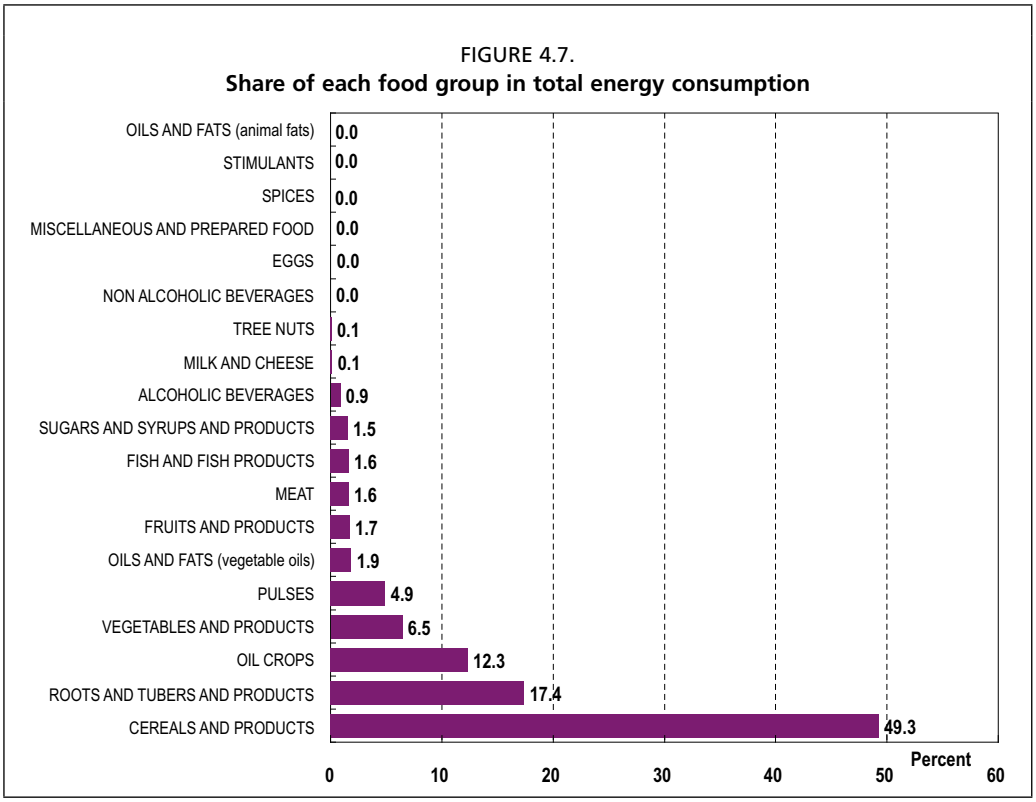


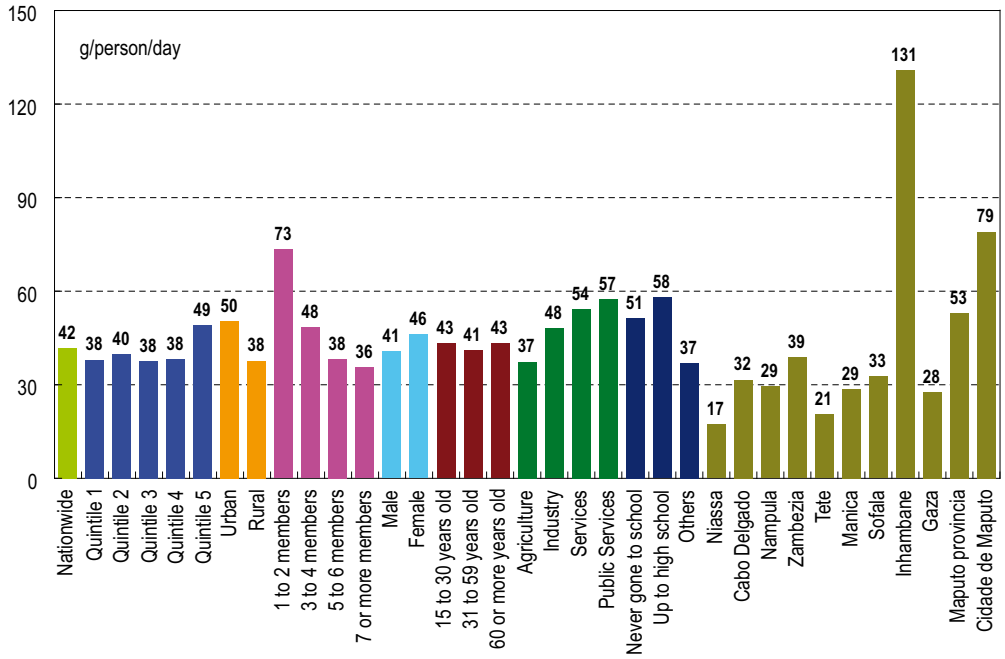

FIGURE 4.7.
**Share of each food group in total energy consumption**



On average, each Mozambiquan was consuming 341 grams/day of carbohydrates, 52 grams/day of proteins and 42 grams/day of fat, with larger amounts found among small size households and of the highest income quintile.

The cereals group was the most important food group in term of share of proteins (44 percent) and share of carbohydrates (59 percent) to total consumption. The data show that more than half of carbohydrates consumed come from cereals and their products, followed by roots and tubers and their products (23 percent) and vegetable products (almost seven percent).

FIGURE 4.8.
**Consumption of fat at sub-national level**




On average, consumption of proteins per person was low, at only 52 g/day. High consumption of fats was found in the Inhambane province (131 g/person/day) and Maputo City (79 g/person/day), while national average consumption was about 42g/person/day (Figure 4.8).

Urban areas reported higher consumption of fats than rural areas. Consumption of fat is mainly from oil crops (62 percent of total fat consumed), followed by cereals and their products (13 percent) and oils and fats (vegetables oils) at 11 percent.

## RECOMMENDATIONS

The following are some recommendations that can be made to improve the quality of estimates on food security:

- More reliable estimates could be obtained with the review of the IAF questionnaires so as to collect the household food outlay in terms of food stocks (from own consumption and purchases) food consumption, and food given away. In addition, more consistent income data have to be catered for in the questionnaire design.
- The country should complete and update the food composition table.
- Height data, used in the estimation of minimum energy requirement, should be also collected in the survey

- National Institute of Statistics should continue to coordinate with other organizations involved in food security and agricultural data collection and key users of food security statistics, at all steps of survey implementation, including analysis, in order to improve the quality and analysis of data.

Finally, this exercise can serve as an incentive for African countries to develop agricultural and food security statistics based on national surveys, in order to better monitor the achievement of the Millennium Development Goals; and FAO, in partnership with other agencies, should support the countries in this challenge.

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# Gender analysis of food security statistics by specific population group in Cambodia's CSES 2003/2005

**Pich Pothy, Guarascio Francesca, John Curry and Ricardo Sibrian**[13]

## ABSTRACT

The 2003/2005 Cambodia Socio-Economic Survey (CSES 2004) provides information on household production and final consumption for national accounts, and on social and economic conditions of households for policy studies on poverty and for updating the consumer price index (CPI). National Institute of Statistics of Cambodia conducts the CSES every five years. CSES 2004 also collected data on household consumption based on acquired food, using two different data collection methodologies: recall questions similar to previous surveys, and a monthly diary for recording all economic transactions of households. Applying the FAO Food Security Statistics Module (FSSM) to the CSES 2004 food consumption data allowed the derivation of food consumption statistics for analysis of the food situation in the country, at national and sub-national levels. The study also used complementary data on the height of individuals and the age and sex structure of the population, to update estimates of the minimum dietary energy requirement (MDER) for some specific population groupings. These data enhanced the accuracy of the food security indicators at sub-national levels.

This paper presents some of these statistics at national and sub-national levels. disaggregated by sex of head of household. In particular, a gender and regional analysis provides insights on food deprivation and critical food poverty.

**Key words:** food security indicators, gender analysis

## BACKGROUND

Poverty (income deprivation) and hunger (food deprivation) are two important aspects of food insecurity in Cambodia. Poverty is related to the economic problem of securing access to a minimum income to obtain an acceptable standard of nutrition, thereby affecting one of the three pillars of food security: economic access to available food and nutritional security. Both poverty and hunger are two consequences of economic dynamics that, along with other factors, affect the poor.

In 2004 in Cambodia, more than one-third of the population (36 percent) of 15 million inhabitants was classified as poor. Rural people represented 90 percent of the poor. Recent economic transformations, driven by cheaper goods, have triggered competition for foreign markets, thereby decreasing gains for locals and consequently causing national food insecurity, particularly for high-risk groups such as households where women are the sole income earners.

In their role of food producers, care givers and income generators, women are subject to unfavourable conditions and face additional burdens that make them one

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of the most vulnerable and food-insecure groups. This can be especially true when they are household heads. In Cambodia, one-third of households are headed by women (35 percent).

Moreover, the unpaid burden of caring for people with disability falls disproportionately on women, in both economic and psychological terms. Traditionally, caring for sick relatives is the duty of the head of the household, who is often an older woman. This responsibility for care of the sick is particularly relevant when considering disabilities from landmines and unexploded ordinances (UXOs), which are one of the legacies from the civil war. Between four and six million mines were laid - one for every two Cambodians - and landmines and UXOs kill and injure 1000 people every year (SCW, 2006). People (mainly children) who survive the explosions are forced to accept that they are no longer self-sufficient and must adapt themselves to being marginalized members of the community. As these accidents happen in peace time, it is very hard for the disabled or the head of the household to obtain financial support. However, the Government of Cambodia has taken action for poverty reduction and food security by developing the Cambodian Millennium Development Goals (MDGs) in 2003. These added a ninth goal regarding UXOs to the eight global MDGs.

Cambodia has achieved progress in gender equality through women's movements, in particular the steps taken concerning property rights since the 1980s, when private land replaced communal property and the majority of properties were registered in the name of the husband only. Women's movements with strong advocacy campaigns have expanded, and about three-quarters of women who are landowners can now sell without the need to obtain permission from men. In addition, two-thirds (68 percent) of Cambodian women are owners or co-owners of their dwellings, a similar proportion (64 percent) own some land, and about half are owners or co-owners of livestock.

Rice production in Cambodia represents the basic food supply, occupying 90 percent of total cultivated area. Poultry raising and fishing also comprise significant parts of food production; the Cambodian Department of Animal Health Production's 2003 poultry census reported that the Plain Penn area contributed 41 percent and the Tonle Sap area 37 percent. Fish and other aquatic animal consumption accounted for 30 kg per person per year (Baran, 2005).

## OBJECTIVE, DATA AND METHODS

Women are fundamental in achieving food security, given their role as food producers, care givers and income generators. However, women's contribution to food security has been under-documented in food insecurity statistics owing to the lack of analysis concerning gender. This paper attempts to fill this gap through analysis of food security statistics derived from the 2003/2005 Cambodian Socio-Economic Survey (CSES 2004). This analysis is expected to provide inputs for planning geared towards gender equality, equity and female empowerment within a framework of national development in Cambodia, and to serve as a model for similar analyses elsewhere.

CSES 2004 collected data on household consumption using two different data collection methodologies: traditional recall questions, and a monthly diary for all household economic transactions. The FAO Food Security Statistics Module (FSSM) was applied to the CSES 2004 food consumption data and yielded food consumption statistics for analysis of the food situation in the country at national and sub-national levels. For the analysis, this study used the food security statistics for sub-national groups, particularly household groups, by gender of household head, area of residence (urban and rural) and region.

FSSM converted food consumption into quantities of dietary energy consumption (DEC) using energy conversion factors for energy-yielding macronutrients (proteins, fats and carbohydrates); these energy conversion factors were extracted from the

Association of South East Asian Nations (ASEAN) food composition table. FSSM also estimated inequality in access to food in energy terms due to income, that is, the coefficient of variation (CV) of DEC due to income at national and sub-national levels. Using sampled age and sex population structures and heights collected in the Demographic and Health Survey (DHS 2005-2006), FSSM estimated the minimum dietary energy requirement (MDER) for different population groups.

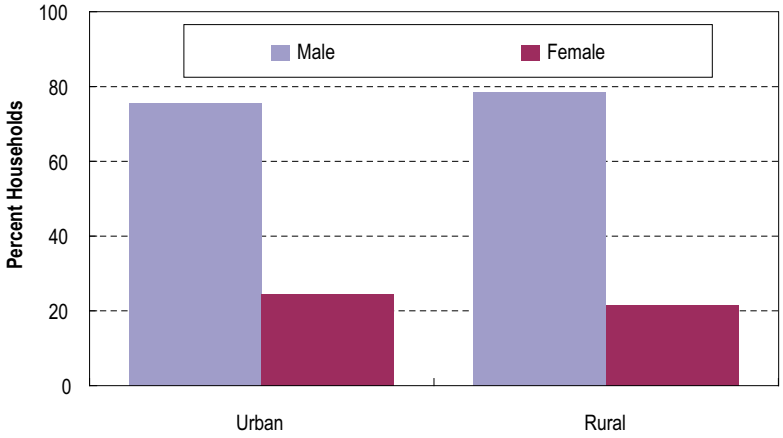
## FOOD SECURITY STATISTICS RELATING TO GENDER

### Proportions, age and sex structure of population from household surveys

Figure 5.1 shows the proportions of male and female-headed households in the sample, in urban and rural areas.

In both areas, the proportions of female and male-headed households were very similar. The higher proportion of female-headed households in urban areas was probably due to the work-related migration of single females working in the garment sector.

FIGURE 5.1.
**Proportion of sample households for urban and rural areas by sex of household head**




Maltoni notes that young, unmarried women are most likely to migrate to work in the apparel, sex or tourism industries, or as domestic servants (Maltoni, 2007: 5). The higher proportion of male-headed households in rural areas was probably due to male employment in agricultural activities, including fishing activities (30 versus 22 percent). Male-headed households were also more prominent among those with seven or more people (50 versus 32 percent).

Figures 5.2, 5.3, 5.4 and 5.5 show the age-sex structure, that is, the proportional contribution of males and females in various age categories to total household population for female and male-headed households in urban and rural areas. For all four household types, about half of the household population was made up of males and females aged 19 years or younger. In female-headed households, particularly those in rural areas, the proportion of males in the household began to decrease in the 20 to 34 years of age category, and decreased markedly through the middle-age categories and beyond. In male-headed households, the proportional contributions of males and females remained virtually at parity, even though there were fewer individuals in this category itself. Such patterns are perhaps due to the decline in fertility from 1995, and to internal migration patterns, as 35 percent of Cambodians have been classified as migrants (Maltoni, 2007: 4).

FIGURE 5.2.
**Age-sex structure in urban female-headed households**

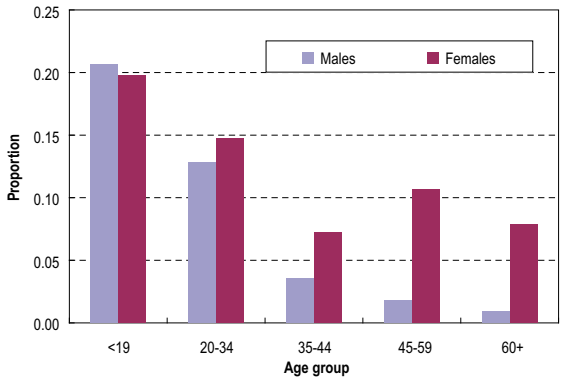



FIGURE 5.3.
**Age-sex structure in rural female-headed households**

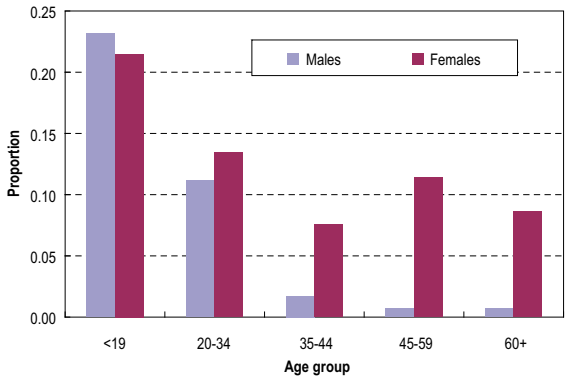



FIGURE 5.4.
**Age-sex structure in urban male-headed households**

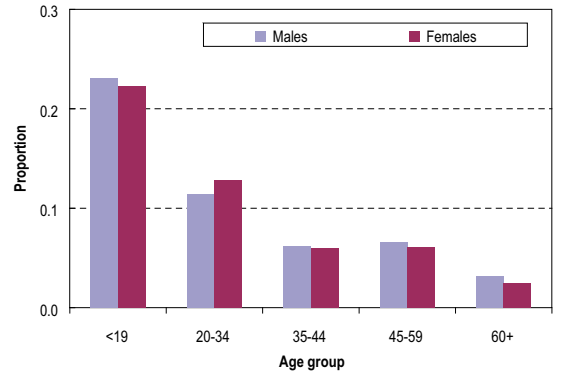
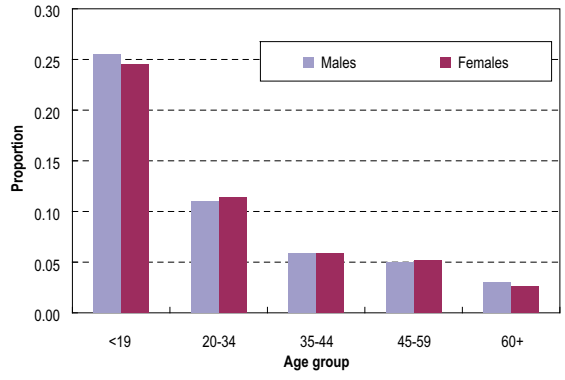



FIGURE 5.5.
**Age-sex structure in rural male-headed households**




At national level, the age-adjusted adult mortality rate was 520 and 310 per thousand people for males and females, respectively, aged 15 to 49 years. This illustrates the reasons for such a low proportion of males in Cambodia, particularly in female-headed households. The return of refugees may have determined the lower proportion of males with respect to females in female-headed households. Among the 41000 refugees returning to Cambodia since 1992, mainly from Thailand, the majority of families were headed by women.

FIGURE 5.6.
**Age-sex structure of male-headed households with more than six people**

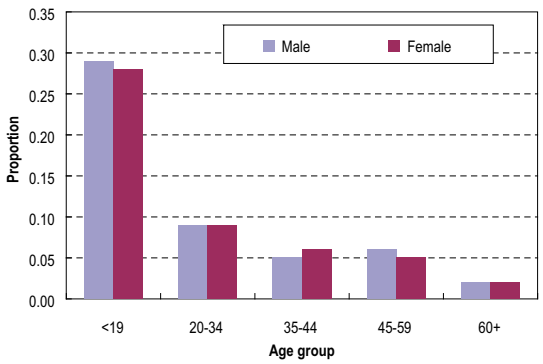
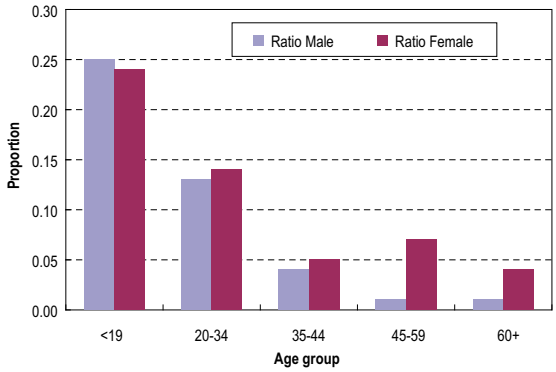



FIGURE 5.7.
**Age-sex structure of female-headed households with more than six people**




At national level, the proportions of males and females in male-headed households with more than six people were similar, except for those aged less than 19 years. In female-headed households, the proportion of females was higher than that of males in all age groups, except for those aged less than 19 years (Figures 5.6 and 5.7). Although the proportion of young people was higher in male-headed households, female-headed households with more than six people were more likely to face difficulties because they were maintained by one adult instead of two. This illustrates the higher vulnerability of female-headed households with more than six members to food deprivation and critical food poverty.

## Hunger and poverty

***Food deprivation:*** Food deprivation, defined here as not consuming enough food to meet MDER, is linked to the amounts of food consumed and to inequality in access to food as mediated by income within the population.

As shown in Figure 5.8, food deprivation percentages were slightly higher in female than male-headed households at national level (28 versus 22 percent), in urban areas (29 versus 22 percent) and in rural areas (29 versus 23 percent). Food deprivation percentages were considerably higher in female than male-headed households in the 35 to 45 years age group (32 versus 22 percent) and in households with seven people and more (50 versus 32 percent).

FIGURE 5.8.
**Prevalence of food deprivation in various population groups**

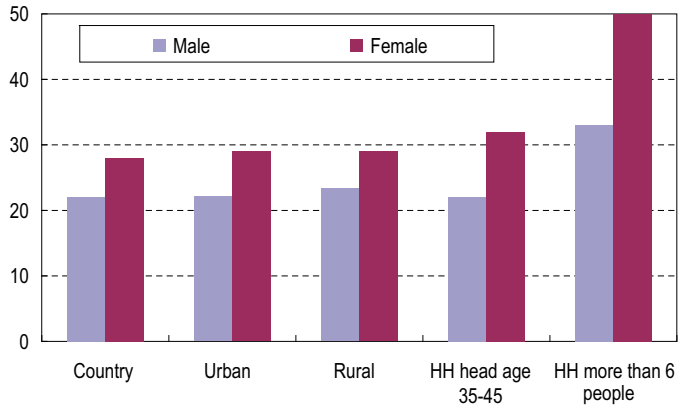
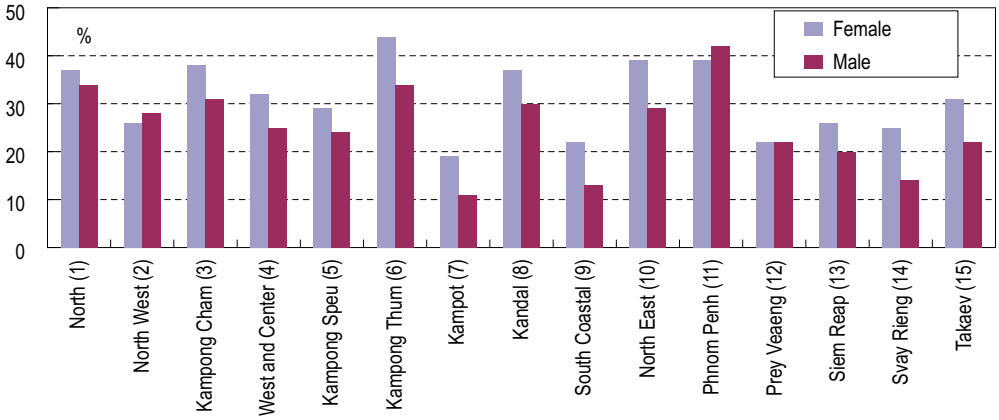



FIGURE 5.9.
**Prevalence of food deprivation by household head gender and province**




North (1): Banteay Mean Chey and Oudor Mean Chey.
North West (2): Bat Dambang and Krong Pailin.
West and Center (4): Kampong Chhnang and Pousat.
South Coastal (9): Kaoh Kong, Krong Preah Sihanouk and Krong Kaeb.
North East (10): Kratie, Mondul Kiri, Preah Vihear, Rattanak Kiri and Stueng Traeng.

At provincial level[14] (Figure 5.9), proportions of food deprivation were higher for female-headed than male-headed households in North, North East, West/Center and South Coastal areas and for Kampong Thum, Kampong Cham, Svay Rieng and Kampot provinces, while male-headed households were proportionally more food-deprived in the Phnom Penh province.

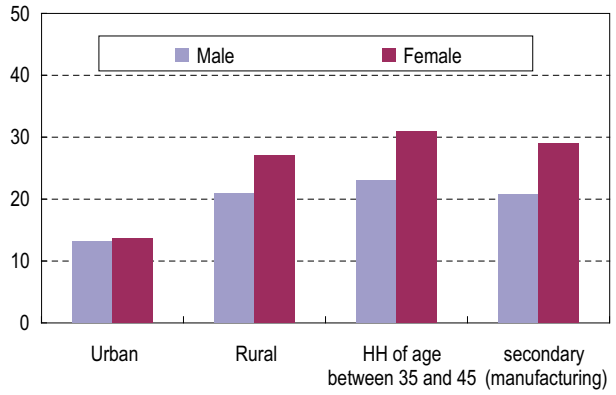
***Critical food poverty:*** The prevalence of critical food poverty refers to the proportion of the population whose income is lower than the cost of a food basket providing balanced MDER. MDER was higher in female than male-headed households at national level (1732 versus 1713 kcal/person/day), in urban areas (1766 versus 1756 kcal/person/day) and in rural areas (1725 versus 1705 kcal/person/day). The cost

[14] Lack of data urged the grouping of some provinces into broader areas (see legend for Figure 4.9). Provinces were grouped in the same area only if contiguous.

of the balanced MDER was 559[15] riel for females and 500 riel for males at national level; it was 685 and 535 riel in urban and rural areas, respectively, for female-headed households, and 641 and 483 riel in urban and rural areas, respectively, for male-headed households, at macronutrient prices for households in the first quintile of income. The differences in MDER costs were linked to the different macronutrient unit values in the various household groups, particularly in urban population groups with higher food costs.

As shown in Figure 5.10, the prevalence of critical food poverty in both urban and rural areas was marginally higher in female than male-headed households. In particular, rural female-headed households were more critically food-poor than male-headed households, 27 versus 21 percent. The prevalence of critical food poverty was high in households with heads aged between 35 and 45 years, and higher in female than male-headed households (31 versus 23 percent).

FIGURE 5.10.
**Prevalence of critical food poverty in various population groups**

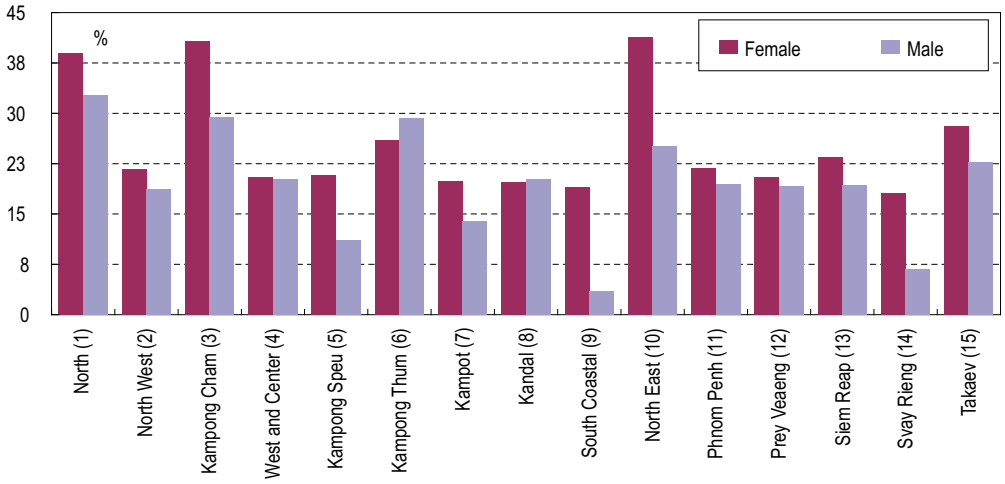



Critical food poverty by economic activity shows that, of all other economic sectors, 29 percent of the population of female-headed households working in manufacturing sectors were critically food poor, compared with 21 percent in male-headed households at national level. Rural women constituted 46 percent of unpaid workers at national level.

At provincial level, critical food poverty was higher for female than male-headed households in Kampong Cham, a province with 95 percent rural population. In North and North-East areas, which are mainly rural, and in South Coastal areas, 41 percent of female-headed households were critically food poor and 30 percent of male-headed households.

[15] Average inter-bank exchange rates for 2004 were US$1.00 = 40 to 62 riel (source: FX History at www.oanda.com/convert/fxhistory).

FIGURE 5.11.
**Prevalence of critical food poverty by household head gender and province**




North (1): Banteay Mean Chey and Oudor Mean Chey.
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North East (10): Kratie, Mondul Kiri, Preah Vihear, Rattanak Kiri and Stueng Traeng.

Critical food poverty was higher for male than female-headed households in Kampong Thum province (Figure 5.11).

## Food consumption and expenditure

***Dietary energy consumption:*** In both urban and rural areas, male-headed households consumed on average more food energy than female-headed households, 2340 versus 2200 kcal/person/day) in urban areas and 2320 versus 2270 kcal/person/day in rural areas (Figure 5.12). Nevertheless, female-headed households spent more on food (Figure 5.13), and their dietary energy prices were higher than those of male-headed households.

FIGURE 5.12.
**Dietary energy consumption**

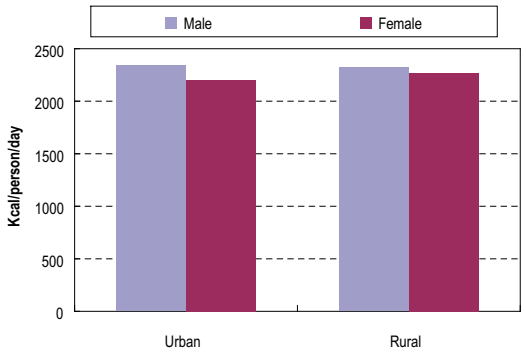
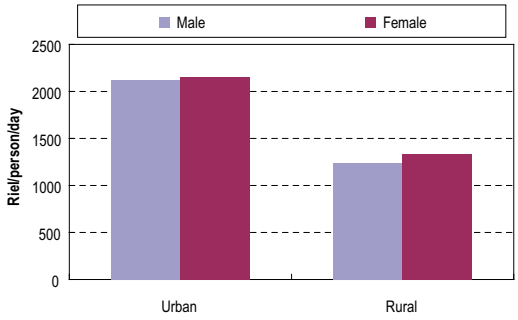



FIGURE 5.13.
**Monetary values of food consumed**



In both urban and rural areas, average food consumption in monetary value was higher for female than male-headed households. In rural areas, the monetary value of food consumption in a female-headed household was 1330 riel/person/day, while in a male-headed household it was 1242 riel/person/day. In urban areas, on average, the monetary value of food consumption in a female-headed household was 2156 riel/person/day, while in a male-headed household it was 2121 riel/person/day. Consequently, female-headed households had less money for meeting other needs, thus making life harder for them.

***Shares of food consumption by food source:*** Figure 5.14 shows that in urban and rural areas, for both male and female-headed households, the share of DEC from purchases was the highest. The share from purchases was higher in female than male-headed households, while the opposite occurred for the share from own production, which was higher in male than female-headed households. The share of food eaten away from home to total DEC was slightly higher in male than female-headed households.

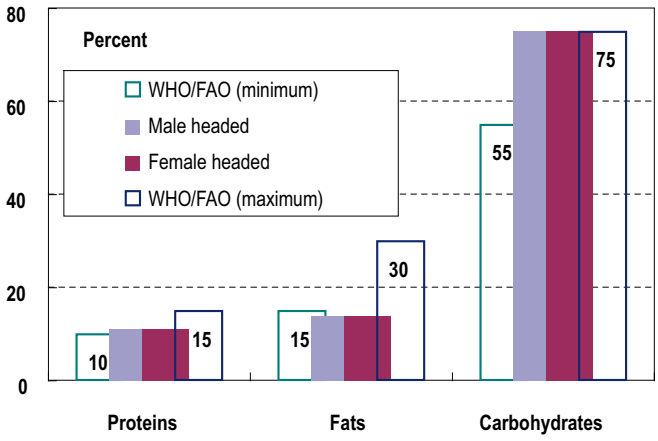
FIGURE 5.14.
**Shares of DEC from different sources**


The share of DEC from purchases was higher in female than male-headed households, in urban areas by 73 versus 66 percent, and in rural areas by 53 versus 47 percent. The share of food DEC from own production was higher for male than female-headed households, in rural areas (42 versus 35 percent) and in urban areas (12 versus ten percent).

***Diet diversity:*** As in the CSES 2004 in its preliminary report (issued in 2007), the dietary quality was the same for female and male-headed households at national level.

It was poor in fats, which accounted for less than the recommended minimum level of 15 percent, and excessive in carbohydrates, at more than the recommended maximum level of 75 percent. The share of energy from proteins was very close to the minimum level recommended. Rice was a significant source of dietary energy, and consumption of carbohydrates provided three-quarters (75 percent) of total energy from food. Almost one-quarter (24 percent) of total protein consumption was from fish.

FIGURE 5.15.
**Shares of DEC from proteins, fats and carbohydrates**




***Dietary unit energy cost:*** In both urban and rural areas, female-headed households had a higher average dietary energy unit value than male-headed households. In both areas, female-headed households spent more on food than male-headed households. In urban areas, female-headed households spent 940 riel to acquire 1000 kcal, while male-headed households spent 908 riel. In rural areas, female-headed households spent 586 riel to acquire 1000 kcal, while male-headed households spent 536 riel. Food may cost more because of acquisition mechanisms such as credit or frequent acquisition of small quantities of food, which cause prices to increase. Poor households are most likely to ask suppliers for credit to obtain small quantities of food for consumption, so that high prices are made even higher by the use of credit.

***Share of food in total consumption:*** At national level, female-headed households in the first and last quintile income groups spent a large share of their total consumption expenditure on food. This indicates that female-headed households had less money for buying goods other than food.

***Inequality in access to food:*** The CV of DEC indicates that in both rural and urban areas inequality in access to food was higher in female than male-headed households.

## CONCLUSION AND REMARKS

This paper has presented the results of an analysis of household food consumption statistics from CSES 2004 using a gender perspective. Although the preliminary food security analysis revealed considerable urban-rural differences and gender differences concerning several measures, the gender aspects of these within urban and rural areas have been made more apparent through the present analysis.

Food deprivation rates have been shown to be higher in female-headed households than in their male-headed counterparts, in both urban and rural areas. The gap between male and female prevalence rates is also considerable for households whose head is aged 30 to 45 years, and in households with more than six members. This gap was observed in the North, North-East, West/Center and South Coastal regions, particularly in the provinces of Kampong Thum, Kampong Cham, Svay and Rieng. The overall gender pattern of food deprivation rates was quite varied according to regions or provinces, reflecting the complexity of gender differences in the dataset. Similar patterns were observed for critical food poverty. Female-headed households

in both urban and rural areas consumed fewer kilocalories of food energy and paid more compared with male-headed households; large urban-rural differentials in the monetary value of food consumed for both types of household reflect the higher prices paid for food in urban areas. One of the many interesting findings of the analysis is that female-headed households in rural areas are highly reliant on food purchases to obtain their DEC, despite their low per person incomes.

The analysis reported here has assisted food policy formulators to identify more complex patterns of food insecurity, based on gender considerations, than conventional food insecurity analysis permits, and serves to illustrate the value of utilizing a gender perspective in the analysis of household food consumption. In order to explain these patterns, and be able to identify the appropriate solutions to reduce such situations of food insecurity, a more in-depth investigation of both secondary and primary sources of information is required.

One limitation of this study is that the dataset used to perform a quantitative analysis did not support a qualitative analysis in terms of providing explanations of the patterns.

- Three recommendations can be made:
- Ethnographic/qualitative studies should be undertaken to analyse and compare the social structure of consumption and food access for the household groups analysed. An ethnographic study would resolve the gaps that emerge from quantitative analysis.
- Having identified the vulnerabilities of both male and female-headed households to different dimensions of food insecurity, thus policy support measures, particularly regarding income generation and livelihood support activities for rural women, should be considered.
- Given the value-added to the preliminary food insecurity assessment in Cambodia, similar analyses employing food insecurity patterns based on household food consumption statistics and using a gender perspective should be encouraged for other countries.

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