

Part 1

# **Monitoring food insecurity using national household survey food consumption data**

# 1 Uganda: gender information improves food policies and programmes

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## ABSTRACT

A food security analysis of the 2005/06 Uganda national household survey (UNHS) data was performed to derive a suite of food security indicators by gender. The analysis attempted to capture different food security dimensions, namely the availability, access and use of food, all of which underpin extreme poverty reduction strategies. The food inadequacy line was measured as an average for a group of individuals accounting for age, sex and metabolic functions and was estimated at 1 718 kcal/person/day for the average Ugandan in 2005/06. The food inadequacy rate or food dietary energy deprivation for Ugandan female-headed households (FHH) was 41 percent compared to 37 percent for male-headed households (MHH), indicating that FHH were more food insecure than MHH despite the significant role women play in the production of food in Uganda. The average daily DEC of the Ugandan FHH was 1 950 kcal which was well below their average daily needs of 2 124 kcal. FHH had a marginally lower food share of 41 percent as compared to 43 percent of MHH, which included additional food expenditures such as alcoholic beverages. Ugandans relied heavily on subsistence farming for their food consumption, as about 48 percent of their daily DEC was acquired from their own-production staples of carbohydrate-rich foods like matooke, sweet potatoes and cassava. The nutritional analysis revealed Uganda as a population that was deficient in protein. This deficiency was due to the high levels of carbohydrates in the Ugandan diet and the absence of protein-rich food such as meat, fish, milk and cheese. Income and food are not equally distributed among FHH with high Gini of income and CV of DEC standing respectively at 42.4 percent and 26.8 percent. The daily food deficit of the average food-deprived individual in Uganda was about 740 kcal/person/day in 2005/06. The total annual food deficit for the 10.2 million food-deprived of the Ugandan population, in terms of the staple food of matooke, was about 2 200 million tonnes. This amount was needed to alleviate hunger in Uganda in 2005/06. The development food security indicators by gender was useful for identifying the causes of hunger and for designing more focused interventions and programmes in agriculture and rural development which continue to be the main sources of livelihoods for women. In addition, they were useful as a monitoring process for a number of policy exercises. In particular, they were effective for holding countries accountable on their progress in achieving MDGs.

**Keywords:** female-headed household, food inadequacy, dietary energy consumption, food and nutrition policies

## BACKGROUND

During the past decades, most developing countries registered significant economic growth of about 6 percent, but hunger was still widespread. The 2010 estimate of hunger stood at 925 million. Hunger and gender have always been high on the

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development agenda of the international community whose mission is to improve the standards of living of populations in developing countries. Moreover, hunger and gender were considered as the fundamentals for the MDGs of 2000. Therefore, most policies for promoting economic growth and development in countries of the developing world, aim at achieving those goals.

Uganda presented a very particular situation. The country had been registering high levels of economic growth rates during the past decade and had reached about 7 percent in 2009. Uganda had successfully halved poverty rates from 52 percent in 1990–92 to 24.5 percent in 2009 (World Bank, 2011), while the proportion of food insecure population had been increasing from 19 percent in 1990–92 to 21 percent in 2005–2007 (FAO SOFI, 2010). Food and nutrition security remained Uganda's most fundamental challenge for human welfare and economic growth.

This paper presents the food security analysis of the UNHS 2005/06 on food data from a gender perspective. It should be noted that the objectives of the UNHS 2005/06 did not include food security analysis and as such, there are limits to the reliability of food data, in particular, the food quantity values. While the paper uses many official reports and research documents on issues of poverty, food security and gender, the analysis is limited to cross-tabulations and no data quality analysis is performed.

Using indicators of the three main pillars of food security (i.e. food availability, access and utilization), the food security analysis derived the food inadequacy or food dietary energy deprivation rate of the country. The analysis was performed at household level disaggregated by the gender of head of households. FHH represented about 28 percent of the total households sampled in the 2005/06 UNHS. The analysis also addressed the question of how food security is felt by FHH in Uganda, in addition to geographic, demographic and socio-economic factors. Additionally, the nutritional status of the Ugandan diet was assessed in terms of its diversity and macronutrient consumption.

While food security is traditionally viewed as having two related dimensions – spatial and temporal – gender is considered to be a third and important dimension. Women have a fundamental role in creating products from agricultural produce, in maintaining food and nutritional security for their households and in securing food for the family. Women are often the farmers who cultivate food crops and produce commercial crops as a source of income, alongside the men in their households. Substantial evidence indicates that women with incomes were more likely to spend it on food and the needs of children. Women are generally responsible for food selection and preparation, and for the care and feeding of children. In short, women are the key to food security for their households. Poorer households headed by women have often succeeded in providing more nutritional food for their children than those headed by men. This trend demonstrates the importance of gender-based knowledge and roles with regard to food security.

Female headship may have positive aspects. FHH are likely to be less constrained by patriarchal authority at the domestic level and female heads may experience greater self-esteem, more personal freedom, more flexibility to take on paid work, enhanced control over finances and a reduction or absence of physical and/or emotional abuse. If empowered, women heads of FHH may better be able to further their personal interests and the well-being of their dependants. Studies have shown that the expenditure patterns of FHH are more biased towards nutrition and education than those of MHH.

By highlighting differences between how women and men operate, advocates can make the case for the urgent need to reduce gender inequality in order to improve the overall well-being of the population. Gender-sensitive measurements can help hold institutions accountable for their commitments on gender and can be used to evaluate the outcomes of policies and interventions to enable better planning and actions.

Women in Uganda are considered the main providers of food, particularly in the rural areas. In 1985, about 90 percent of rural women were engaged in agriculture compared to 53 percent of rural men. Ugandan FHH increased from 28 percent in 2000 to 30 percent in 2009. High percentages of FHH predominated in the northern region of Uganda, which has long been a conflict-ridden region affected by the deaths of males in civil disputes and wars. In addition, Ugandan households have been affected by the high death rate caused by the high prevalence rate of HIV, which peaked at about 29 percent in the 1980s.

### The 2005/06 Uganda national household survey (UNHS)

In 1997, Uganda set up the National Task Force on Poverty Eradication, which formulated its poverty eradication action plan (PEAP). The formulation processes of all Uganda PEAPs have relied heavily on inputs from the UNHS and participatory poverty assessment process (PPAP).

The 2005/06 UNHS was the thirteenth survey performed by the Uganda Bureau of Statistics (UBOS) and was conducted from May 2005 to April 2006. It covered about 7 400 households that were selected as a representative sample of the 5.2 million Ugandan households.<sup>5</sup>

## RESULTS AND FINDINGS

The results of the food security analysis of the UNHS 2005/06 are presented in this section with reference to the various indicators of the three main pillars of food security, as listed in Table 1.1. The analysis was carried out on the collected food data, which was considered as a major component of household consumption. The food quantity values by items were converted into dietary energy and macronutrient values and aggregated at household level for the food security analysis. The derived indicators of food availability, food access and food utilization were used to define the minimum dietary energy needs and to estimate food inadequacy rate. In addition, these indicators were useful for defining the profiles of the food-insecure population and for evaluating the level of food insecurity in the MHH and FHH in Uganda and at sub-national levels. The average shortfall in DEC of the food deprived population from the level of the average dietary energy needs was estimated and quantified in terms of food useful for implementing food programmes for alleviating food inadequacy.

TABLE 1.1  
Selective food security indicators by the three main pillars

Food availability	Food access	Food utilization
Average food consumption in terms of energy, quantity and monetary values	Coefficient of variations of DEC	Macronutrient consumption (protein, fats and carbohydrate)
Share (%) of food monetary value (FMV) to total consumption (Engel Ratio)	Gini coefficient of DEC and Income	Diet composition
Share (%) of dietary energy consumption (DEC) from various food sources to total DEC		Share of energy coming from protein, fat and carbohydrates in total dietary energy
		Minimum dietary energy requirement
		Average dietary energy requirement

<sup>5</sup> The data used for the analysis was the 2005/06 UNHS (available on the OPENMICRODATA.ORG website at <http://openmicrodata.wordpress.com/2010/03/04/uganda-poverty-maps-1992-2002-and-2005/>).

The 2005/06 UNHS data was analysed using the FSSM to derive the food security indicators which are cross-analysed by population groupings based on the characteristics of household and head of households as listed in Table 1.2. Data for 7 419 households was available from the 2005/06 UNHS of which 2 019 (27.2 percent) households were headed by a woman. FHH were less predominant than MHH in most population groupings except in the group of heads of household who had not gone to school. However, rural areas and the agricultural sector had high percentages of FHH.

TABLE 1.2  
Percentage distribution of households and gender of head of households in population groupings (2005/06 UNHS) (Uganda)

Population groupings	Percentage of households within each category of the population groupings (%)		
	All households	Male-headed households	Female-headed households
<b>Uganda</b>	100.0	72.8	27.2
<b>Area</b>			
Urban	22.9	16.1	6.7
Rural	77.1	56.6	20.5
<b>Household size</b>			
One member	9.9	6.6	3.3
Two members	7.7	4.6	3.2
Three to five members	37.2	25.8	11.4
Six to eight members	30.2	23.3	6.9
More than eight members	15.0	12.5	2.5
<b>Age of head of household (Years)</b>			
Less than 30	23.3	18.4	4.8
Between 30 and 44	39.0	30.2	8.9
Between 45 and 59	21.8	14.4	7.3
60 and over	15.9	9.7	6.2
<b>Economic activity of head of household</b>			
Agriculture	60.1	42.8	17.3
Sale and repair, etc.	10.4	7.7	2.8
Other activity	29.5	22.3	7.2
<b>Education of head of household</b>			
Never attended school	17.5	7.4	10.1
Primary level	56.0	43.7	12.3
Secondary level	17.4	14.7	2.7
Tertiary level	9.0	6.9	2.1
<b>Region</b>			
Central	23.9	16.8	7.1
Kampala	4.4	3.1	1.3
Eastern	26.0	19.5	6.5
Northern	21.9	15.3	6.6
Western	23.8	18.1	5.8
<b>Occupation of head of household</b>			
Professionals	6.4	5.0	1.4
Service workers	11.5	7.7	3.8
Agriculture workers	56.1	39.5	16.6
Crafts workers	15.2	12.8	2.4
Elementary jobs workers	10.9	7.8	3.1

Table 1.3 shows the average household size in Uganda and for some selected population groupings. In 2005/06, the average Ugandan household had five people. Low-income households had the highest average number of members among all population groupings. Household size decreased with increasing income; low-income households having an average household size of six people compared to four people for high-income households. Rural households also had a higher average household size than those in the urban areas. FHH were smaller in size as compared to the MHH for all population groupings, which is indicative of the absence of the male in those households. In Uganda, FHH had an average size of five members; one member less than the MHH.

TABLE 1.3  
Average household size of selected population groupings by gender of head of households (2005/06 UNHS) (Uganda)

Population groupings	Average number of people in household		
	All Households	Female-headed households	Male-headed households
<b>Uganda</b>	<b>5.4</b>	<b>4.7</b>	<b>5.7</b>
<b>Income level</b>			
Quintile 1	6.4	5.8	6.7
Quintile 2	5.9	5.1	6.2
Quintile 3	5.6	4.5	6.0
Quintile 4	5.1	4.3	5.3
Quintile 5	4.2	3.9	4.2
<b>Area</b>			
Urban	4.9	4.5	5.1
Rural	5.5	4.8	5.8
<b>Region</b>			
Central	5.2	4.7	5.4
Kampala	4.5	4.4	4.5
Eastern	5.9	4.9	6.2
Northern	5.3	4.6	5.7
Western	5.6	4.7	5.9

Gender headship was an important element influencing the size and composition of households in Uganda. The absence of the male in the FHH indicated a reduction of the labour pool of those households. This fact influenced their production resources, particularly in the rural areas, and had an impact on their food security.

### Dietary energy requirement

The food inadequacy line, related to the energy expenditure of the human body, was estimated according to international standards defined by the Joint 2004 FAO/WHO/United Nations University (UNU) Expert Consultation on human energy requirements.<sup>6</sup>

Energy requirement for an individual was considered to be that amount of dietary energy needed to maintain health, growth and an appropriate level of physical activity. Dietary energy requirement was usually estimated for an average group of individuals such as the population of a country or different functional population groupings based on the age-sex group structure. The food inadequacy line or cut-off point quantifies the necessary (minimum) or the recommended (average) dietary energy

<sup>6</sup> The full report can be viewed at <http://www.fao.org/docrep/007/y5686e/y5686e00.htm>.

requirement, to balance the energy expenditures needed to maintain body size and composition, and a level of necessary or desirable (average) physical activity consistent with good health.

The international norms defined specific equations for determining the dietary energy requirement for different age-sex groups of infants, children less than 10 years, adolescents and adults. Other essential parameters required to calculate the dietary energy requirement included body weight, physical activity level (PAL) and basal metabolic rate (BMR). The body weight of individuals has a high variability over a short period of time and is considered an unreliable measure. Instead, the attained height of the individual was used to derive the corresponding body weight using the body mass index (BMI).

The three most common BMI values are the 5th, 50th and 95th percentiles, which relate respectively to the minimum (MDER), average (ADER) and maximum dietary energy requirement. The paper uses the 5th and 50th percentiles of BMI to estimate the specific MDER and ADER for the each category of the different gender population groupings using the age-sex data of the 2005/06 UNHS. Height data was not collected in any of the UNHS nor was it available from any other national surveys. The missing height data was obtained from James & Schofield (1990) reference tables, which give height for age-sex population of all countries of the world. Factors that influence energy requirements such as BMR, physical activity, body size, age-sex, children's growth and pregnancy/lactation have been accounted for in the estimation of both MDER and ADER for the different population groupings under study, as given in Table 1.4.

The MDER and ADER of the average Ugandan were, respectively 1 718 kcal/person/day and 2 133 kcal/person/day in 2005/06. The values of MDER and ADER of most categories of the population groupings under study were lower for FHHs as compared to the MHHs as the latter have higher number of males whose body weight and height are usually greater than females.

TABLE 1.4  
Estimates of minimum and average dietary energy requirement (2005/06 UNHS) (Uganda)

Population groups	Minimum dietary energy requirement (MDER) kcal/person/day			Average dietary energy requirement (ADER) kcal/person/day		
	All households	Female-headed households	Maleheaded households	All households	Female-headed households	Maleheaded households
<b>Uganda</b>	<b>1718</b>	<b>1709</b>	<b>1721</b>	<b>2133</b>	<b>2124</b>	<b>2136</b>
<b>Area</b>						
Urban	1767	1738	1777	2221	2184	2235
Rural	1709	1702	1711	2116	2110	2118
<b>Region</b>						
Central	1724	1709	1729	2141	2119	2149
Kampala	1780	1742	1796	2250	2212	2265
Eastern	1699	1704	1697	2099	2116	2095
Northern	1684	1653	1696	2075	2022	2094
Western	1743	1758	1739	2175	2111	2166

## INDICATORS OF FOOD AVAILABILITY

Food quantity indicators at household level are not meaningful as the quantity value was a combination of different types of food items having quantity units of measurement in either solids or liquid metric measurements. Food quantity data for each food item reported at the household level were converted to micronutrient values for a more harmonized food security analysis in terms of dietary energy, protein, fats

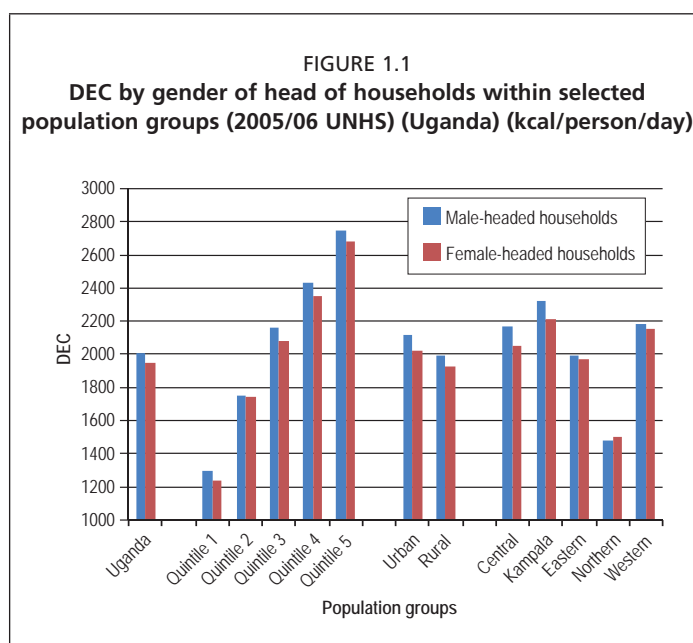
and carbohydrates. The indicators of food availability dealt with in this paper are: the dietary energy and macronutrient consumption, the Engel ratio, which was the share of food expenses to total household income, and the means by which households acquire their food.

### Dietary energy consumption (DEC)

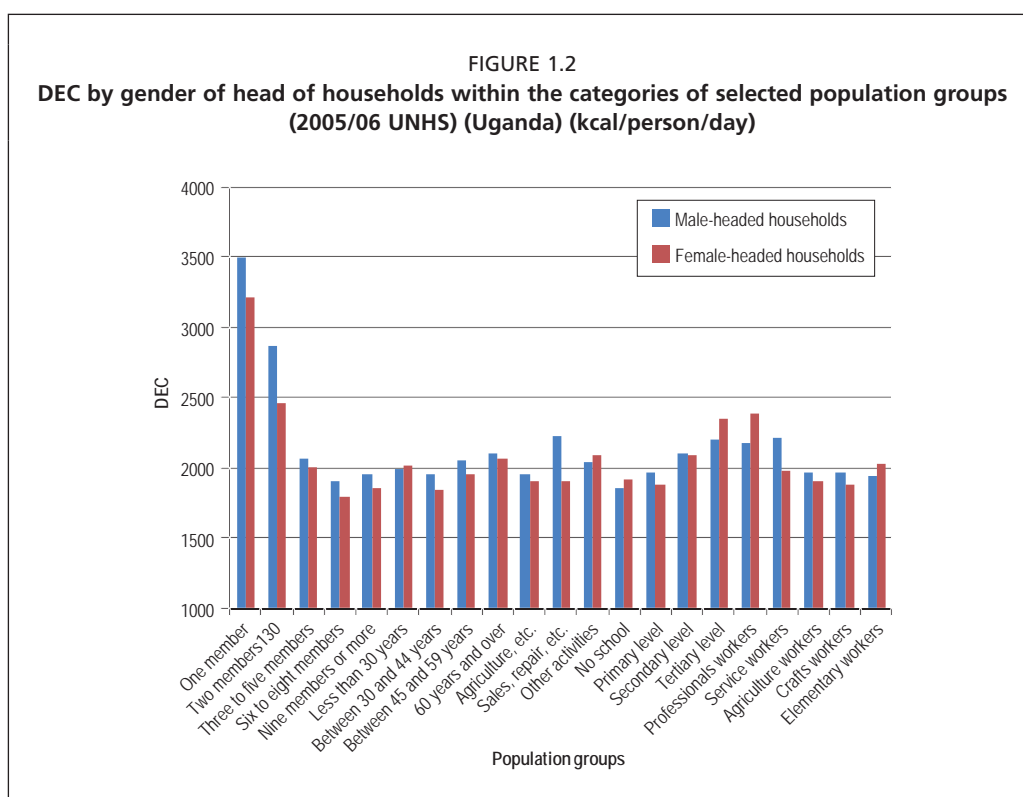
DEC is a very important indicator of food availability as it shows how much food the average individual is consuming on a daily basis. A DEC value close to ADER, as given in Table 1.4, points out a good level of food consumption among the referred population for a healthy and productive life.

Figures 1.1 and 1.2 give DEC values by gender of head of households for the different population groupings. The DEC of MHH, for most of the population groupings, was greater than that of FHH, except in a few categories. In particular, those with high levels of education, professional jobs and elementary occupations showed marginally higher DEC in FHH. However, those marginally higher DEC values of FHH do not necessarily indicate that FHH had better food availability than the MHH. That additional food consumption could be due to food aid or shared food among households, which is very common in Uganda.

DEC increased as income increases with the highest income households having an average DEC more than double that of the lowest income households for both sexes. In all regions, FHH had a lower DEC than that of MHH except in the northern region where the DEC of FHH was marginally higher than that of MHH by 20 kcal. Smaller households, particularly the one-member households, had high DEC as opposed to large households having six or more members. It was well known that large households have to share food and adopt economies of scale.





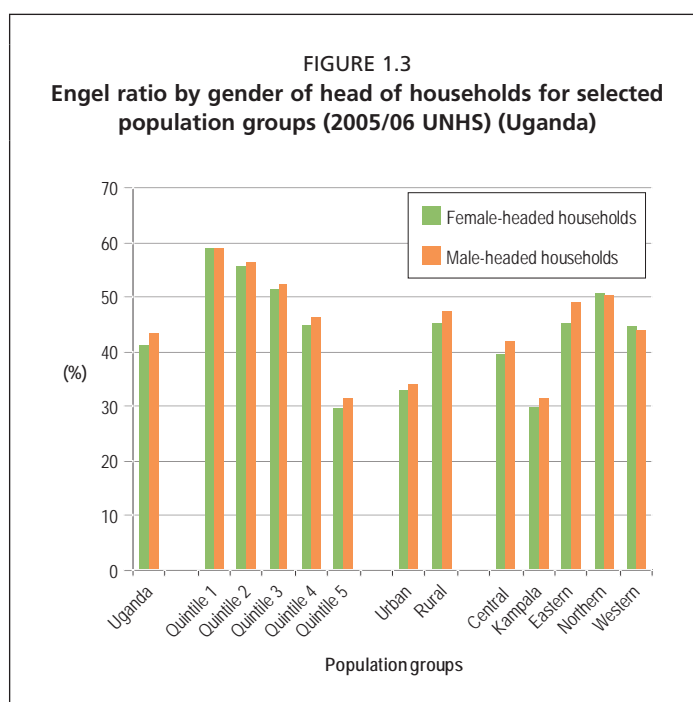


### Engel ratio

Household consumption expenditures<sup>7</sup> by its components are useful measures of the welfare levels of households. High percentages of expenditure on food were indicative of poor households while high percentages of expenditure on education, health, and clothing hinted at the good welfare of households. The Engel ratio, which was the percentage share of food expenses to the total household income/consumption, was considered a very important proxy indicator of poverty as it relates to the capacity of households to access food with their acquired income. Households having high Engel ratios indicated that their incomes were low and that high percentages of those low incomes were used to acquire food for survival. Low-income developing countries are likely to have high levels of Engel ratios in the order of 70 percent or more, while developed countries usually have an Engel ratio of about 20 percent or lower.

FHH had a lower food ratio (41.2 percent) than those headed by males (43.3 percent) indicating that FHH were marginally better off than those MHH, as shown in Figure 1.3. With increasing income, food ratio values decrease indicating better welfare of high-income households. Among households of the lowest income groups, both FHH and MHH had an almost similar food ratio of 59 percent. However, FHH of the highest income group had a lower food ratio of 29.6 percent as compared to 31.5 percent in MHH, indicating better welfare levels for FHH of higher income groups.

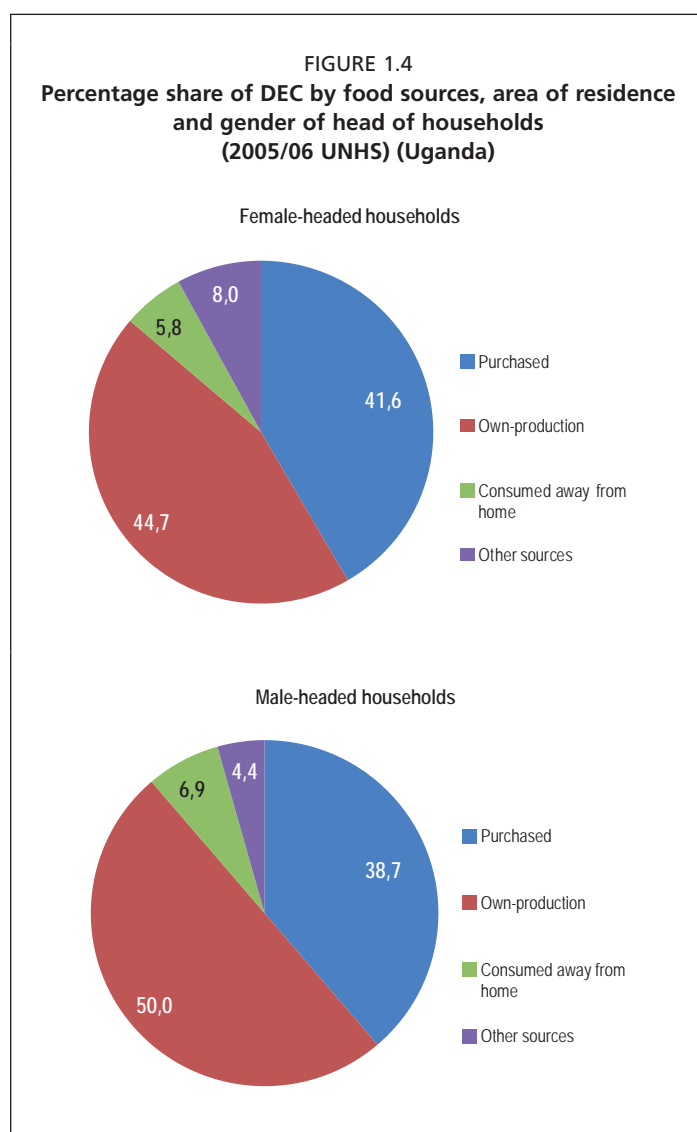
<sup>7</sup> The main components of household consumption expenditure as per International Classifications are: food and non-alcoholic beverages, alcoholic beverages and narcotics, clothing and footwear, housing and furnishings, health, transport, communications, education, recreation, restaurants and hotels, and miscellaneous goods and services.



Food ratios of FHH were marginally lower than the corresponding ratios of the MHH for most of the population groupings. It was surprising to note that in terms of DEC, FHH were more food insecure than the MHH, but in terms of food ratio, the FHH had better welfare than MHH. The plausible explanation was that MHH had higher additional food expenses, such as alcoholic food items (UBOS Gender analysis 2005/06).

### How Ugandan households acquire food

Households acquire their food for consumption from many different food sources, most commonly through purchase. Households sometimes produce their own food in their backyard garden or from small-scale farming; earn food as income as part payment of earnings for household members working in the food production sector; obtain it free from relatives and friends; collect forest food products; fish or hunt; or receive food aid. The analysis categories of those above-mentioned food acquisition sources fall into three main groups: (i) purchases, (ii) own production, and (iii) other sources. In the 2005/06 NHS, data was collected on food consumed from bars, restaurants, street vendors or food courts, which was categorized as a fourth group termed as away from home food consumption. Indicators of food acquisition by the population are useful for the implementation of food policies and programmes. These indicators also facilitate the assessment of the impact of any changes in food prices in local or international markets. Figure 1.4 illustrates the percentage share contribution of each food source by population groupings based on the gender of heads of households.

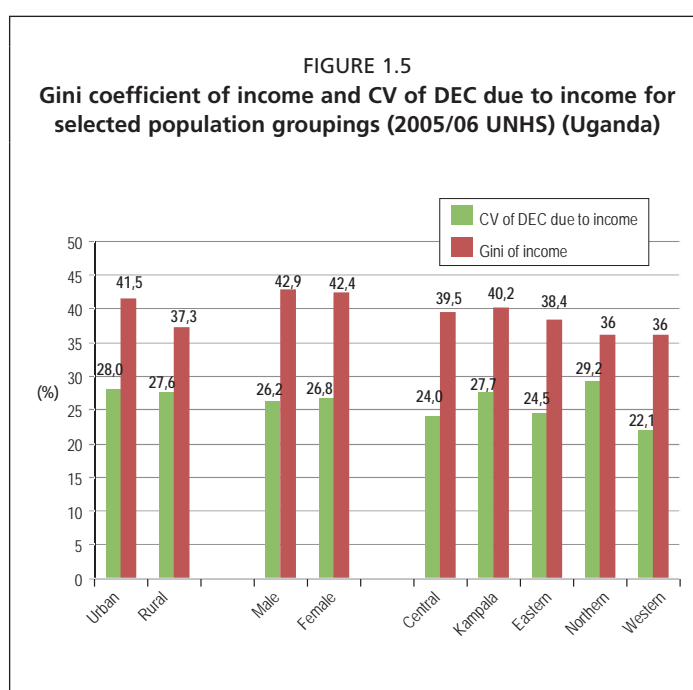


FHH had a higher percentage share (41.6 percent) of DEC from purchased food as compared to 38.7 percent for MHH. However, MHH had a marginally higher percentage share of their food from own production due to the fact that the males had more access to credit facilities and agricultural production resources, such as land. Uganda's traditions deprive women of land resources.

#### **INDICATORS OF FOOD ACCESS**

Food access is the ability to acquire sufficient quantity and quality of food to meet the nutritional requirements of all members of the household. It is commonly measured in terms of having adequate incomes or other resources to purchase or barter for foods needed to maintain an adequate nutritive level. Additional factors underlying food access are the markets for labour, productive inputs, and credit facilities.

Inequality and dispersion statistical measures of DEC and income are good indicators of food access. Two well-known inequality measures are the Gini coefficient of income and the CV of DEC, which have been estimated for Uganda and some selected population groupings as illustrated in Figure 1.5.



The Gini coefficient of income measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. Thus, a Gini coefficient index of 0 represents perfect equality, whereby each individual or household has the same income, while an index of 100 implies perfect inequality.

The rural population had a relatively lower Gini coefficient of 37.3 percent compared to the 41.5 percent value of the urban population. This value was probably due to the lower levels of income of the rural population, derived from agricultural sources. The Gini coefficient of income in the categories of MHH and FHH were 42.9 percent and 42.4 percent, respectively.

The CV of DEC was defined as the ratio of variability measured by the standard deviation (SD) to the mean of the DEC distribution. Food consumption was closely related to income and the CV of DEC was calculated taking account of the income distribution which was almost at the same level for both gender population groupings by head of households.

### INDICATORS OF FOOD UTILIZATION

Food utilization was usually measured in term of the diet composition and the types of food items consumed by the population. The consumption of protein, fats and carbohydrate from foods contribute to the supply of dietary energy to the human body and are considered as useful indicators of the quality of diet which influences human health. Indicators of food utilization evaluate the quantity of micronutrients the population consumes. Observed deficiencies have to be addressed through targeted policies such as the fortification of food items or through improved accessibility of specific types of foods at subsidized prices.

### Macronutrient consumption

All food items provide varying amounts of macronutrients and micronutrients, which the human body requires for good health to perform daily socio-economic activities. Table 1.5 shows the comparison of the consumption of micronutrients by gender of head of households and for some selected population groupings. The average daily

protein, carbohydrate and fat consumption per person of the MHH was slightly higher than that of the FHH.

Consumption of micronutrients varies with increasing income levels as households with more income consumed more food items both in terms of quantity and quality. It should be noted that micronutrient consumption, besides being related to income, is also influenced by the availability of food items, particularly with respect to geographic factors. Poor people with low income living near forests or lakes probably have high protein consumption due to their consumption of high protein food items, like wild animal meat or fish.

TABLE 1.5  
Daily average micronutrient consumption by gender of head of households and selected population groupings (2005/06 UNHS) (Uganda)

Populations groupings	Average food protein consumption (g/person/day)		Average food carbohydrates consumption (g/person/day)		Average food fat consumption (g/person/day)	
	MHH	FHH	MHH	FHH	MHH	FHH
<b>Uganda</b>	47.9	47.2	366.8	358.2	25.7	25.1
<b>Income level</b>						
Quintile 1	33.2	32.1	239.3	228.9	13.2	13.6
Quintile 2	41.4	41.6	326.6	328.8	18.5	17.3
Quintile 3	50.2	49.5	401.2	387.6	24.7	24.1
Quintile 4	57.4	56.8	442.1	434.0	33.1	31.5
Quintile 5	65.4	64.1	481.9	473.4	48.0	46.7
<b>Area</b>						
Urban	52.1	49.7	365.5	355.1	38.6	34.7
Rural	47.2	46.7	367.0	358.9	23.4	23.0
<b>Household size</b>						
One member	81.4	80.6	594.7	566.4	55.0	53.9
Two members	69.1	60.0	502.1	444.3	44.4	35.2
Three to five members	51.4	50.7	370.3	366.7	28.8	26.2
Six to eight members	45.7	42.0	347.7	333.1	23.6	21.7
More than eight members	44.7	43.6	366.3	342.0	23.0	23.3

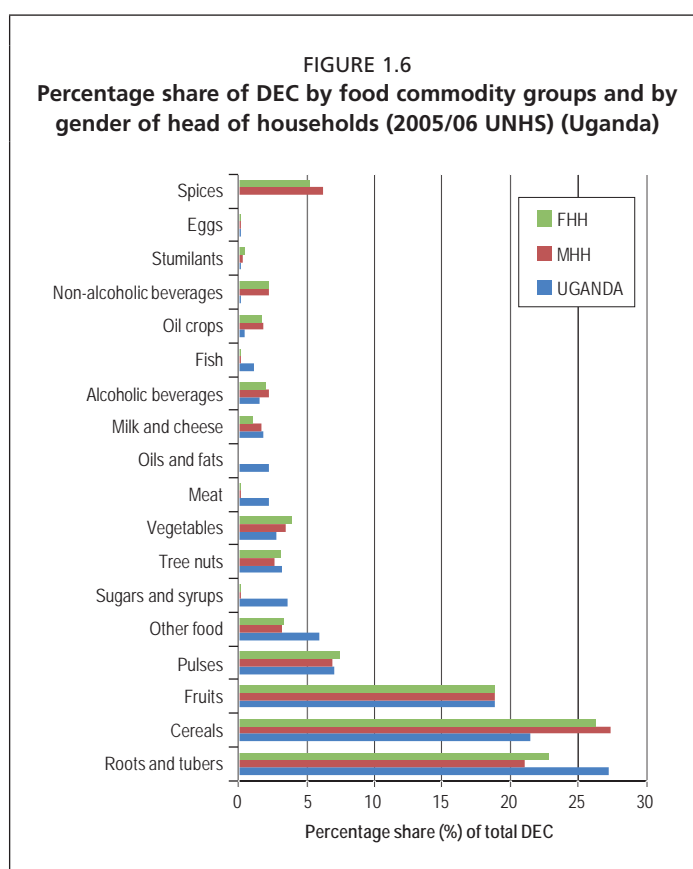
Households in urban areas had higher protein and fat consumption than those in rural areas. A better understanding of the consumption of micronutrients was revealed by the respective contribution of each micronutrient in providing dietary energy to the human body. These values were compared to the FAO/WHO/UNU recommendations<sup>8</sup> for a balanced diet. The micronutrient share contribution of total dietary energy for both male and female head of household population groupings showed no marked difference. The protein, fats and carbohydrate share contributions were respectively 9.7 percent, 11.6 percent and 78.6 percent. The protein share of the DEC was below the recommended lower limit of 10 percent and was indicative of a protein-deficient diet. Protein is necessary for key body functions and provides the EAA for development and maintenance of muscles. The fats share was well below the lower limit of 15 percent, while that of carbohydrate was slightly above the recommended limit of 75 percent. This value was due to the high consumption of carbohydrate-rich food items like rice, matooke and millet among the Ugandan population.

<sup>8</sup> FAO/WHO/UNU recommendations on the contribution of energy-yielding macronutrients in total dietary energy for a balanced diet are 55 to 75 percent from carbohydrate, 15 to 30 percent from fats and 10 to 15 percent from proteins.

### Food diet composition

Indicators of food diet composition are in terms of the types and quantities of food items usually consumed. An average diet should contain a variety of food items, which supply adequate quantities of macronutrients and micronutrients essential for maintaining good health. The Ugandan diet composition, by broad international food commodity groups,<sup>9</sup> showed the predominance of three main food groups, namely, roots and tubers, cereals and fruits, all of which are produced locally. This finding supports the observation that the average Ugandan had high food acquisition from own-production. Food items of those three commodity groups are rich in carbohydrates and contributed to the observed high share of carbohydrates of more than 75 percent of DEC in many population groupings.

Besides providing a high quantity of carbohydrates, cereals were also one of the main providers of proteins, together with pulses, for Ugandans. The main sources of fats were nuts, oils and meat, together contributing a daily average consumption of about 14 g per person. Roots and tubers commodity group was the main supply of DEC to Ugandans, followed by cereals and fruits. However, cereals commodity group was the main supply of DEC by heads of households, together with vegetables products (Figure 1.6).



Food consumption in Uganda is centred on three main food items: matooke, sweet potatoes and cassava. Together, these items constitute about 55 percent of the Ugandan diet (Table 1.6). As one of the main staple foods, matooke is widely cultivated in Uganda. It provided on average daily amount of 350 kcal per person or 18 percent of the Ugandan DEC in 2005/06. Maize flour was also widely consumed

<sup>9</sup> International food commodity classifications (FAO, 1996): 18 food commodity groups: cereals; roots and tubers; sugars; pulses; tree nuts; oils crops; vegetables, fruits, stimulants; spices; alcoholic beverages; meat, eggs, fish, milk, oils and fats, non-alcoholic beverages; and other (prepared food).

contributing to about 12 percent of the Ugandan DEC. Sweet potatoes and cassava were also consumed in large quantities as they supplied daily averages of 188 kcal and 171 kcal per person, respectively. The average Ugandan consumed similar daily amounts of matooke (280 g) and sweet potatoes (265 g), and smaller amounts of cassava, fresh and dried (190 g). It can be concluded that the Ugandan diet was not diversified, as it was limited to carbohydrate-rich food items. The diet was deficient of protein and fat food items.

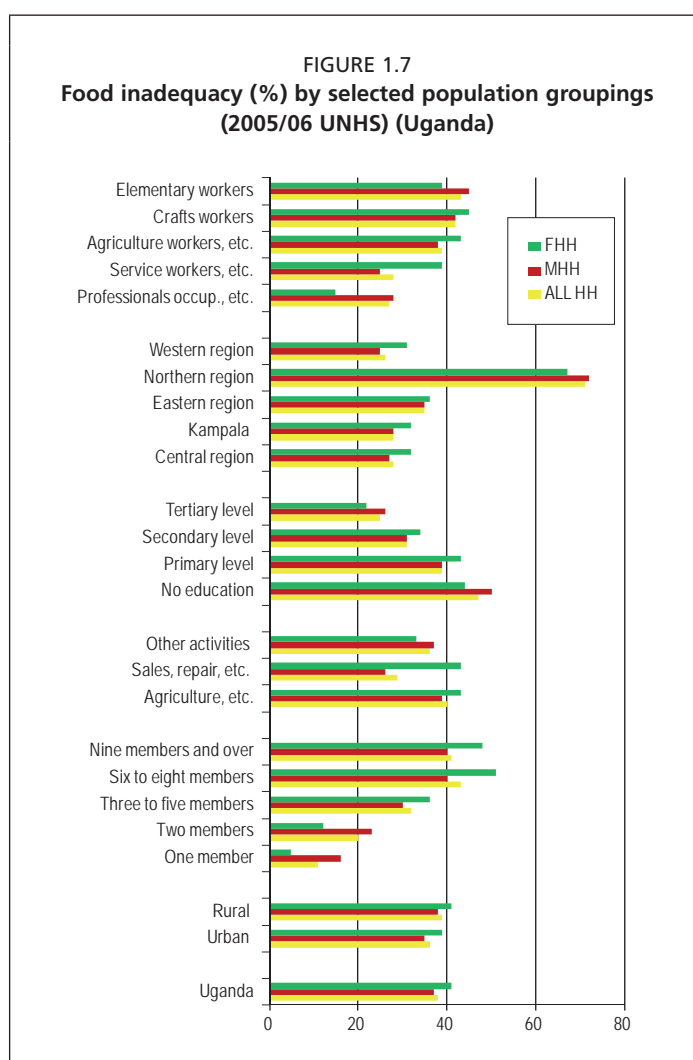
TABLE 1.6  
Food quantity and DEC by main food items (2005/06 UNHS) (Uganda)

Food item	Quantity consumed (g/person/day)	Dietary energy consumption (kcal/person/day)	Share of total dietary energy consumption (%)
Matooke	279.60	350	18
Maize flour	69.10	247	12
Sweet potatoes, fresh	264.60	188	9
Cassava, fresh	145.40	171	9
Cassava, dry/flour	43.20	136	7
Beans, dry	45.90	128	6
Sugar	18.10	72	4
Millet	16.70	53	3
Rice	13.20	46	2
Cooking oil	4.90	44	2
Sorghum	11.50	41	2
Milk, fresh	57.30	35	2
Ground nuts, pounded	5.40	32	2
Sweet potatoes, dry	8.60	32	2
Beef	13.30	29	1
Maize grains	6.70	25	1
Alcoholic drinks	9.90	25	1
Ground nuts, shelled	3.80	23	1
Onions	57.30	21	1
Fish, dry/smoked	6.40	18	1
Bread	6.10	15	1
Peas	4.00	13	1
Potatoes	30.40	13	1
Sweet bananas	18.20	11	1
Other vegetables	38.20	10	1

### FOOD INADEQUACY

Food security analysis is key in estimating the food inadequacy line for deriving the food inadequacy rate, or food dietary energy deprivation measure. This measure is simple and practical, particularly from the point of view of policies aimed at increasing food availability, and improving food access and better use of food items for ensuring a healthy and productive population. Indicators of the three main pillars of food security were used to estimate the food deprivation measure, based on the FAO methodological framework for the estimation of the global hunger indicator of MDG. The DEC of food availability, the CV of DEC of the food access and the MDER of food utilization were the three parameters used to estimate the food inadequacy measure. Figure 1.7 gives the estimates of food inadequacy measure for Uganda and by gender of head of households.

Food inadequacy in Uganda was at a high level of 38 percent in 2005/06 due to the low average daily DEC of 1 990 kcal per person. Urban populations were marginally less food insecure than were rural populations, which was probably due to the wide variety of food in rural areas. The northern region had the highest food deprivation level peaking at about 70 percent. This region, which had the lowest average daily food expenses per person of 346 UGX, has suffered from war. As a result, this region was home to a large proportion of displaced people. Smaller households, with one or two persons, were more food secure. Female-headed households were more insecure than male-headed households in most of the functional population groupings.



### Food deficit

After identifying and locating the food-deprived population, it was important to know the causes of food deprivation in order to formulate suitable policies and programmes, and effective hunger and poverty-reduction strategies. The food deficit measure indicated how much food-deprived people fell short of average food needs in terms of dietary energy. It was a useful measure to assess how much food was needed to eliminate food deprivation at regional or country levels. It also helps to calculate the cost involved in those food programmes and policies. The deficit was measured as the difference between the ADER and the average DEC of the food-deprived population grouping. The food deficit measure was calculated for the different



population groupings. The greater the food deficit, the greater the population's susceptibility to health risks related to malnutrition and under-nutrition.

The food deficit in Ugandan FHH was 735 kcal/person/day, which was marginally lower than 752 kcal/person/day for MHH. The daily food deficit of the average Ugandan was 740 kcal, which is equivalent to about 590 g of the most consumed food item of matooke on the assumption that 100 g of matooke provides on average 125 kcal (Table 1.7).

TABLE 1.7  
Food deficit at national and sub-national levels by gender of head of households (2005/06 UNHS) (Uganda)

Population groupings	Food deficit (kcal/person/day)		
	All households	Female-headed households	Male-headed households
Uganda	740	735	752
Urban	788	784	796
Rural	730	726	742

An estimated annual amount of about 2 200 million tonnes of matooke, if made available to the 10.2 million food-deprived population would, therefore, be enough to eradicate food deprivation in Uganda. The cost can be easily estimated using the available market retail value of matooke. Estimates for policies in supplying food aid on the basis of other staple food items of the Ugandan population may be derived using the food deficit in terms of calories. Food programmes may vary between different population groupings according to that population's most common staple foods.

## CONCLUSIONS

The observed trend of declining poverty rates in Uganda during the past decades reveals better economic conditions enjoyed by the Ugandan population. However, food insecurity still hovered at a high rate of 21 percent in 2005–07 (State of Food Insecurity in the World (SOFI), 2010). If the income poverty indicator showed that poverty had been reduced, it was surprising to note that this improvement had not trickled down to affect food security for Ugandans. While food consumption in Uganda was at a high level, it was also heavily dependent on subsistence food in 2005/06.

Ugandans rely heavily on their own production of basic food staples such as matooke, sweet potatoes and cassava, all of which provide an excess of carbohydrate consumption resulting in a protein- and fat-deficient diet. These deficiencies have an impact on the health status of the Ugandan population, particularly for those living in the rural areas, which lack adequate health services. The risk to food security in Uganda arises more from fluctuations in food production rather than from income or food price increases because very little of what Ugandans consume is purchased.

In estimating food inadequacy, a suite of indicators was derived to capture all the dimensions of the three main pillars of food security, which relate to policies of poverty reduction. The food security indicators are useful for determining the causes of hunger, which, in turn, help to identify needs, constraints and priorities for policies. From the gender perspective, it was concluded that FHH were more food insecure than MHH in Uganda.

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## 2 India: a review of food insecurity assessments and trends

Gopa Chattapadhyay<sup>10</sup> and Seevalingum Ramasawmy<sup>11</sup>

### ABSTRACT

In the two decades following the adoption of a policy of economic liberalization in the early nineties, India registered significant economic growth of about 6 percent. This sustained growth provided opportunities for a better standard of living for the population. At the same time, the national poverty rate decreased from 38.9 percent in 1987/88 to 27.5 percent in 2004/05. This paper presents a trend analysis of food insecurity in India and its provinces based on the food security analysis of four nationwide sample surveys, or Indian Consumption Expenditure Surveys (ICES) of the Indian National Sample Survey Organization (NSSO). Some key food security indicators, including the food inadequacy measure, have been derived at the national and sub-national levels in terms of geographic and socio-economic groupings. The results reveal a continuous decline in the daily DEC of the average Indian as compared to an increasing trend of the daily per person food expenditure over the period of 1997/98 to 2004/05. Food deprivation in India was on an increasing trend with the percentage of people undernourished as measured by the MDG 1.9 indicator on hunger: rising from 17 percent in 1995–1997 to 21 percent in 2005–2007 (SOFI 2010).

**Keywords:** dietary energy consumption, food deprivation, food security, provinces

### BACKGROUND

India's population of approximately 1.2 billion is the second largest in the world. Over 70 percent live in rural areas and depend on agriculture, primarily food grains, for their livelihood. With the economic reforms of the 1990s, the contribution of the agricultural sector to gross domestic product (GDP) has fallen to 17 percent in 2009 while that of the services sector increased to over 50 percent. Economic diversification has resulted in significant economic growth in India of the order of 6 to 8 percent during the past decade. This positive growth, coupled with decreasing rates of inflation, has helped to raise incomes and to reduce the overall national poverty level from 40 percent in 1994/95 to 26 percent in 2005. However, poverty was higher among the rural population.

Poverty is closely related to food inadequacy and the prevalence of undernourishment, which was still at a high level of about 21 percent in 2005–2007. Paradoxically, India is one of the world's highest producers of food grains and has the largest food schemes in the world. These include:

- entitlement feeding programmes for children under 6 years of age, primary school children and pregnant women;
- food subsidy programmes such as the targeted public distribution system (TPDS) in Annapurna;
- employment programmes; and
- social safety net programmes such as national age pension and national family benefit scheme.

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The country's economic growth did not contribute to reduce its rate of undernourishment (MDG hunger indicator 1.9), which registered an overall increase of one percentage point since 1990–92, when the prevalence was at 20 percent. India's high level of undernourishment represented over a quarter of the world's undernourished population of 848 million. This fact remains a concern to national and international food security stakeholders. Food insecurity has always ranked top of the agenda for the Government of India, which has made concerted efforts to implement the above-mentioned programmes in order to provide access to a basic nutritious diet for the poorest in the country.

The Ministry of Statistics and Implementation Programme (MSIP) has collaborated with Statistics Division to undertake a trend analysis of the available food consumption data collected in the regular programme of the ICES. In addition to understanding food consumption patterns, the analysis helps determine the profiles and location of the food insecure population. This information, in turn, helps in the formulation of more focused and effective food policies and programmes. The data sets of four specific periods from 1988/87 to 2004/05 were analysed using the FAO FSSM – a tool used to derive national and sub-national food security indicators from household survey data.

An assessment of the trend analysis of the three main components (availability, access and use) of food security at national and sub-national levels is presented in this paper.

## **TRENDS IN FOOD CONSUMPTION**

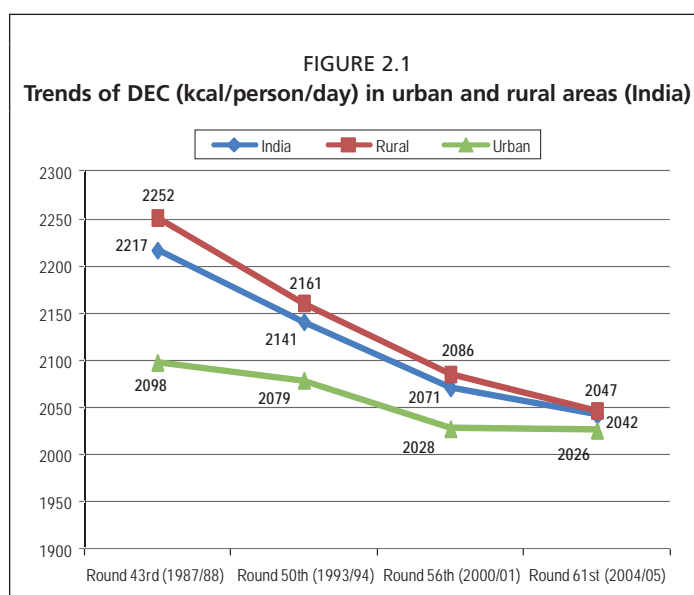
Food consumption data, as collected in the ICES, is shown in quantity and monetary values. Food quantity data for each food item reported at the household level has been converted to micronutrient values for a more harmonized food security analysis in terms of dietary energy and micronutrients of protein, fats and carbohydrates.

### **Dietary energy consumption (DEC)**

DEC declined over the period from 1987/88 to 2004/05. The daily DEC of an average Indian was 2 217 kcal in 1987/88 and dropped to 2 042 kcal in 2004/05, thereby registering a reduction of 175 kcal (9.9 percent) during that period. DEC among rural households was higher than the national level, and than that of urban households. This result was due mainly to the high consumption of food grains, which are rich in dietary energy, in rural areas.

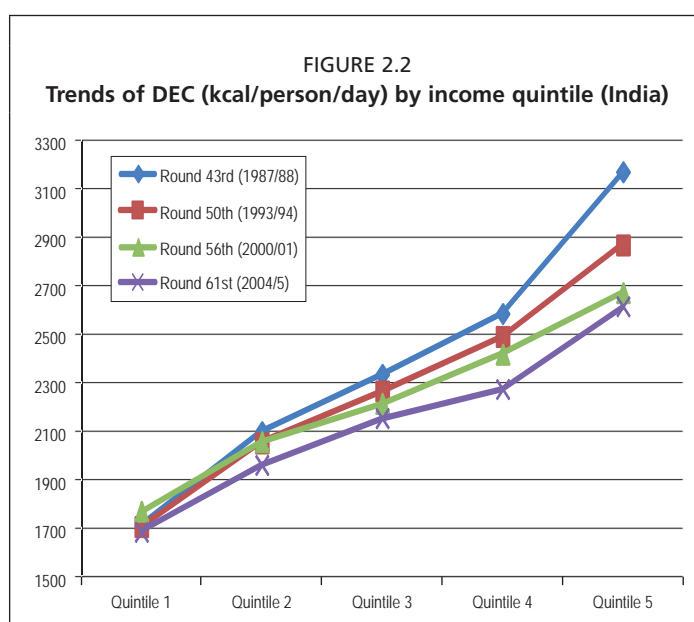
Figure 2.1 shows the declining trend of DEC from 1987/88 to 2004/05. The downward trend among rural households was more pronounced than that of urban areas because the DEC gap between these two areas decreased from 152 kcal to 21 kcal from 1987/88 to 2004/05. It was important to note that the DEC was converging to an average daily consumption of about 2 045 kcal per person.



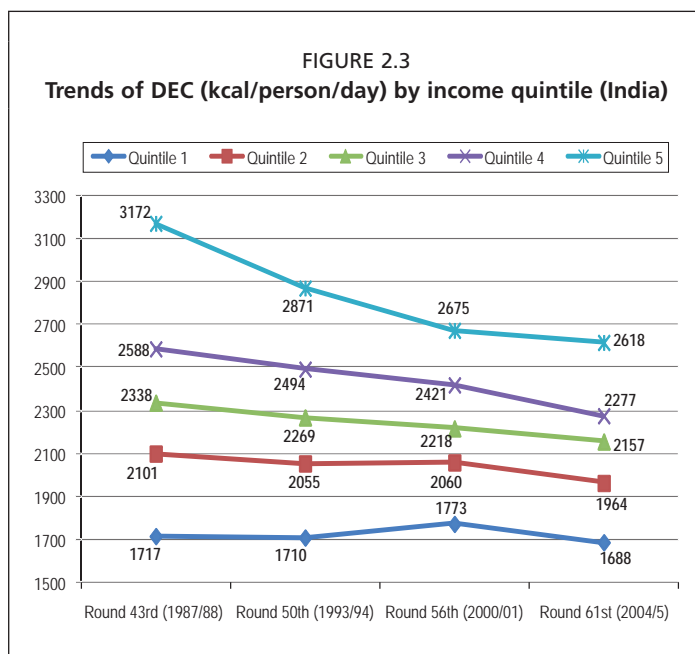


The DEC by income quintile<sup>12</sup> reveals the usual pattern of increasing DEC as income increases. The decrease in DEC had occurred mostly among households in the four highest income quintiles with the highest decrease registered among the richest households. This result was probably due to a change in diet from high-carbohydrate to high-protein food items. The economic liberalization of the 1990s resulted in reduced import duties and a consequent increase in food imports with a greater variety of food items becoming available to high-income households. Low-income households had an average daily consumption of 1 700 kcal per person over the same period. Changes in DEC were marginal given that the DEC levels met their subsistence food needs.

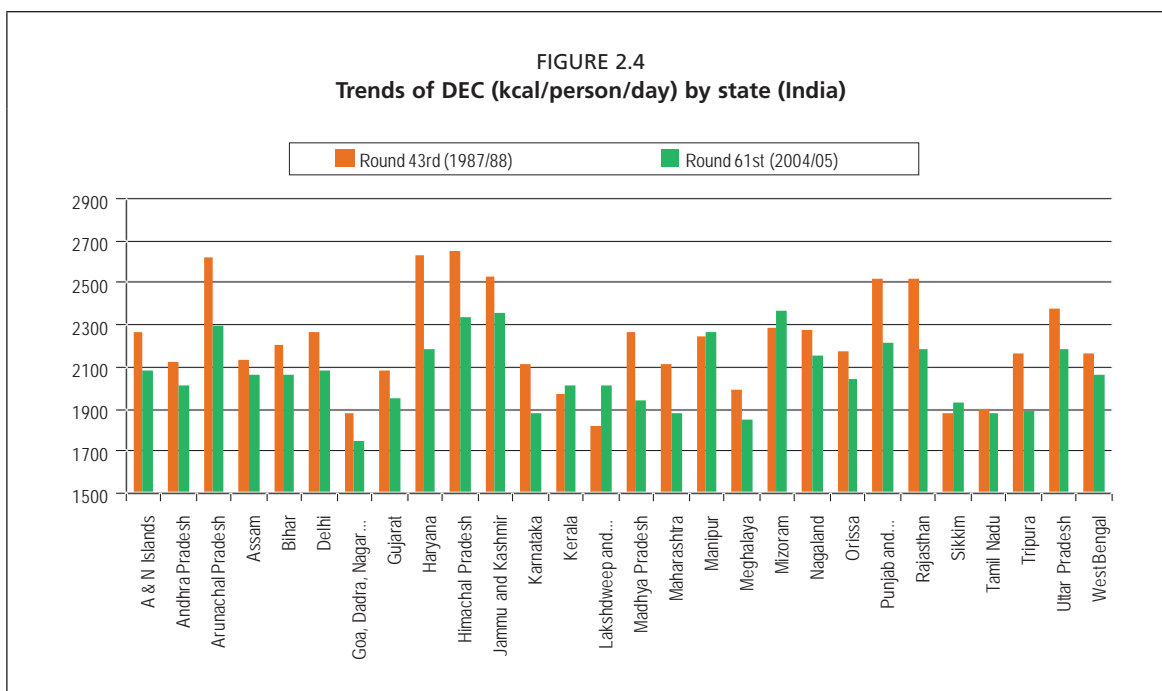
Figures 2.2 and 2.3 shows the trends of DEC by income quintile and the evolution of each quintile over the four survey periods.



<sup>12</sup> Note that total household consumption was used as a proxy of income because income data was not available.



Dietary energy consumption was at significant levels in 1987/88 as compared to 2004/05, as shown in Figure 2.4.



In 1987/88, only six states had an average DEC in the range of 1 824 to 2 000 kcal/person/day, while nine states had DEC with a wider gap ranging from 1 750 to 2 000 kcal/person/day. The population of the states of Goa, Dadra, Nagar Haveli, Daman and Diu had, on average, the lowest DEC during the years studied. The registered decline in DEC from 1 876 to 1 750 kcal/person/day indicated a worsening of food insecurity as the population had an average DEC at about the subsistence level. However, Lakshadweep and Pondichery, which also had a very low DEC in 1987/88, improved DEC to reach a safe food level of 2 006 kcal/person/day in 2004/05.



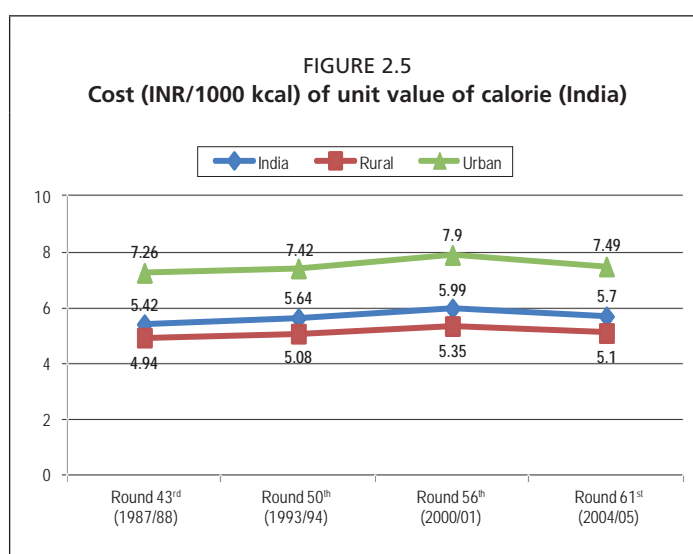
The decreasing trend in DEC was observed in most of the states of India during the reference period, except in the states of Mizoram, Manipur, Kerala, Sikkim, and Lakshadweep and Pondichery, all of which registered marginal increases. Himachal Pradesh had the highest DEC (2 642 kcal/person/day) in 1987/88, but with the decreasing trend, it dropped to the third highest DEC of 2 340 kcal/person/day in 2004/05. The two top DEC results in 2004/05 were in the two states of Mizoram (2 370 kcal/person/day), and Jammu and Kashmir (2 358 kcal/person/day).

### UNIT VALUE OF KILOCALORIES

The decreasing trend in DEC over the past two decades was the result of the decreasing quantity of food commodities consumed by the population in a booming economic environment. Food grain production in India has not kept pace with population growth. Over the ten-year period from 1990/91 to 2000/01, total production of food grains grew at an annual rate of 1.2 percent, while the population grew by 1.9 percent. The average annual food inflation rates were about 13 percent, well above the 6 to 8 percent annual growth in GDP. The substantial increase in food prices had pushed up the prices of the unit cost of 1 000 kcals, which has been on a rising trend from 1987/88 to 2004/05 in India, in urban and rural regions and in most of the provinces of India. In real terms, the unit cost of 1 000 kcal had increased by about 27 percent in India from 1987/88 to 2004/05. The real term increase in calorie cost was higher than food consumption expenditure and could be seen as the result of acquiring better quality food items over the reference period.

Urban households paid about 47 percent higher unit value of calories than their counterparts in the rural areas (Figure 2.5). This low value of energy cost in the rural areas could be due to: a high consumption of subsistence food, the availability of low quality food items and low food prices, as transportation costs and intermediate charges are not usually included.

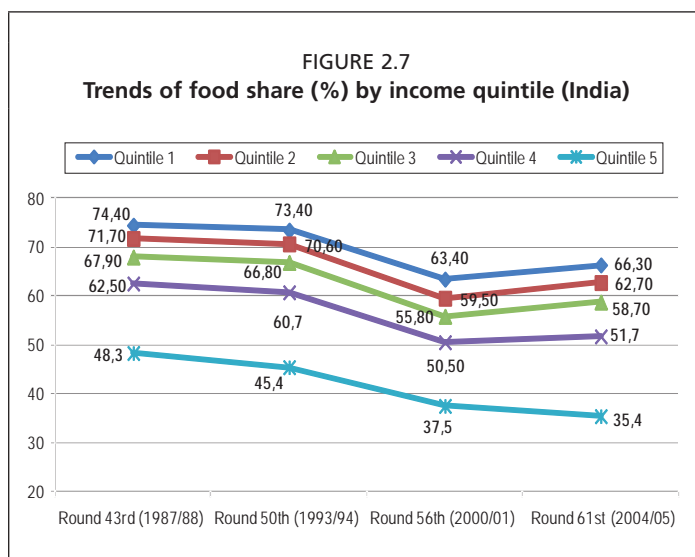
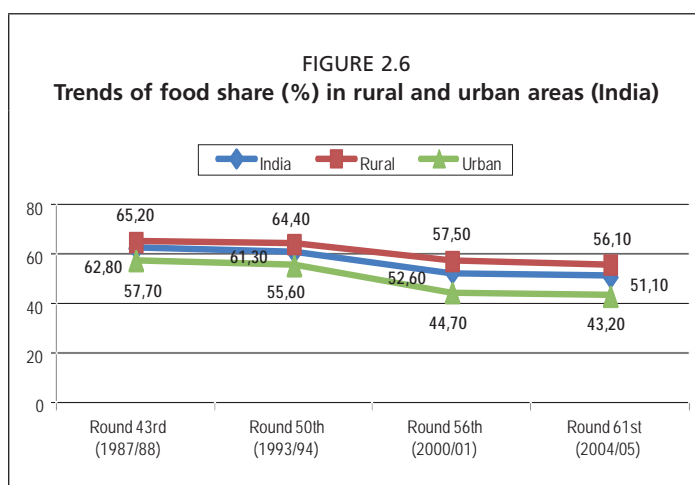
Households in the highest income group paid more than double the unit value of calories than did households in the lowest income group. Households in the high-income group are mainly found in urban regions and they usually consume high-quality food items, paying correspondingly higher prices. Households in the province of Andaman and Nicobar islands had the highest unit value calorie cost of 10.46 INR. This value was probably due to the overall higher cost of food products as this province was a net importer of food from other provinces.



Urban populations had to bear a high cost of unit value of calories as compared to the rural population. Food production was one of the main activities in rural areas and food was usually available at lower prices than in the urban areas, which are net importers of food. A downward trend of unit prices of calories has been registered in the first years of the twenty-first century.

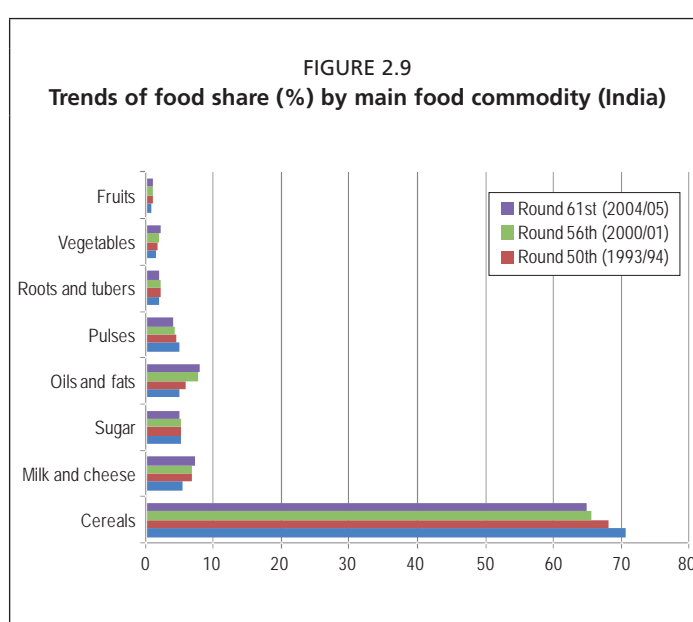
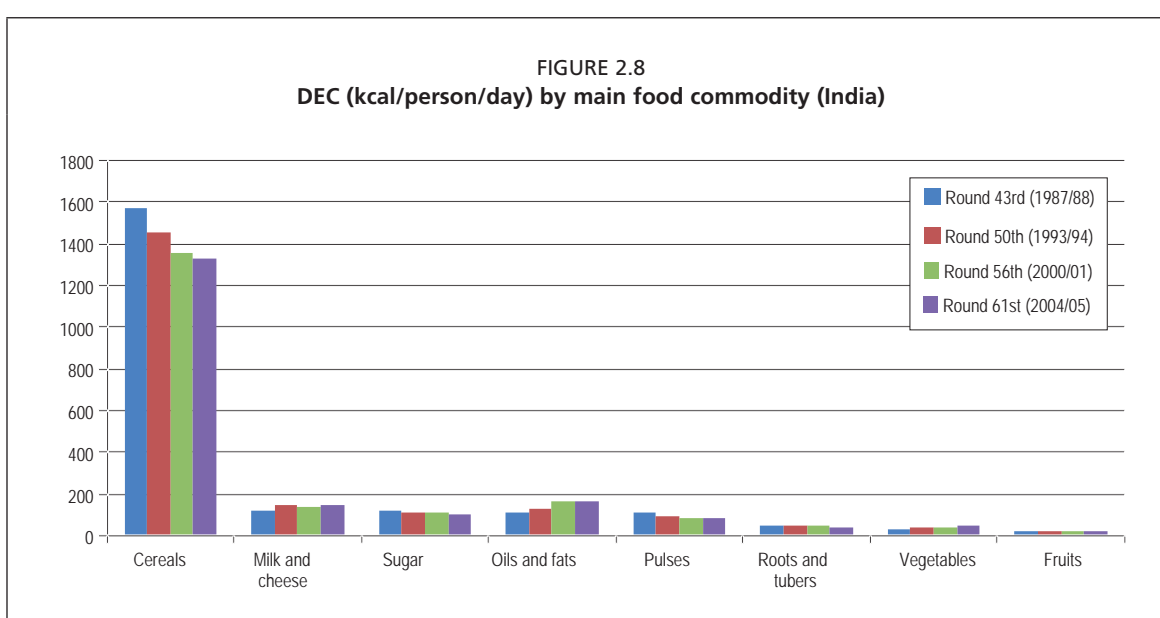
### FOOD SHARE

The average Indian household spent about half of its total consumption expenditure on food in 2004/05. The food share, which was the share of food expenditure in total consumption expenditure, was 51.1 percent in India in 2004/05. This result showed a decrease of 11.7 percentage points from the 1987/88 food share value of 62.8 percent. All population groupings, particularly those of area of residence and income, showed decreasing trends (Figures 2.6 and 2.7). Decreases in food share are a good measure to illustrate the improvement in the living standards of households. This improvement was observed with the lowest food share of the highest income quintile households, which was 35.4 percent in 2004/05. Households in urban regions had lower food shares compared to those from rural regions in all reference periods. Households in the lowest income quintile had a high food share of 66.3 percent, almost twice that of households in the highest income quintile.



## DIET COMPOSITION

On average, Indians consume food products from eight major food commodity groups out of the nineteen broad food commodity groups in the FAO classification. This composition of the Indian diet was largely determined by Indian culture and traditions and does not vary much across area of residence or states. Food items from commodity groups such as cereals, milk, sugar, root crops, oils, pulses, vegetables and fruits account for about 95 percent of the average Indian DEC. Cereal food items such as rice and wheat constitute almost three quarters of DEC. Cereal product consumption has always been high in rural areas mainly because such food items are readily accessible from local production, and sometimes from subsistence agriculture. The low share of cereal consumption in urban areas indicated a more diversified diet. However, the study shows a downward trend in cereal consumption from 1987/88 to 2004/05 with an increasing trend of consumption of milk and oils (Figures 2.8 and 2.9).



The commodity groups of milk and milk products, sugar, oils and pulses had dietary shares of less than 10 percent of total DEC. Consumption of milk and milk products, oils and fats was higher in urban areas. An increasing trend was observed for these food items from 1987/88 to 2004/05 while consumption of pulses and sugar was more or less stable at 4 to 5 percent. The second dietary energy contributor was oils and fats, which showed an increasing trend over the same period. There has been a change in the type of cereals consumed among the lowest income group. With the availability of wheat and rice through TPDS, households in the lowest income quintile have changed from coarse cereals to rice and wheat as staple cereals. The change in lifestyle over the last two decades may perhaps account for the steep reduction in cereal consumption in high-income group households.

The diet composition in terms of macronutrients for the average Indian was a balanced diet according to the WHO/FAO norms, which recommends that the proportion of the three major macronutrients to the total dietary energy consumption should be, as follows: proteins (10 to 15 percent), fats (15 to 30 percent) and carbohydrates (55 to 75 percent). In 2004/05 it was observed that though the shares of the three macronutrients at the national level were all within the recommended norms, they had a low share of protein and fats that was compensated with a high proportion of carbohydrate content in the staple cereals.

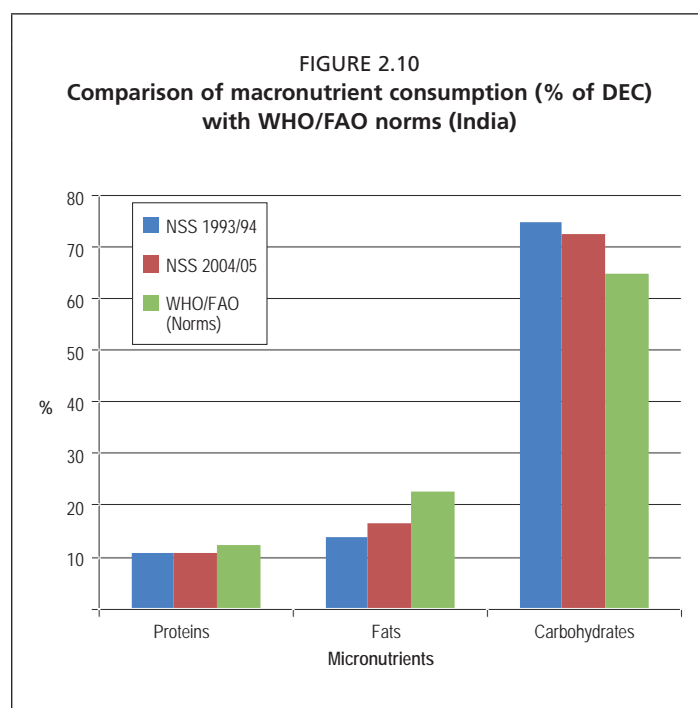


Figure 2.10 compares shares of proteins, fats and carbohydrates of the NSSO 1993/94 and 2003/04 with the average WHO/FAO norms. Although the diet was within the norms, protein and fats shares were marginally below the average recommended norms. The share of carbohydrate consumption was more than the norms, but was on a decreasing trend.

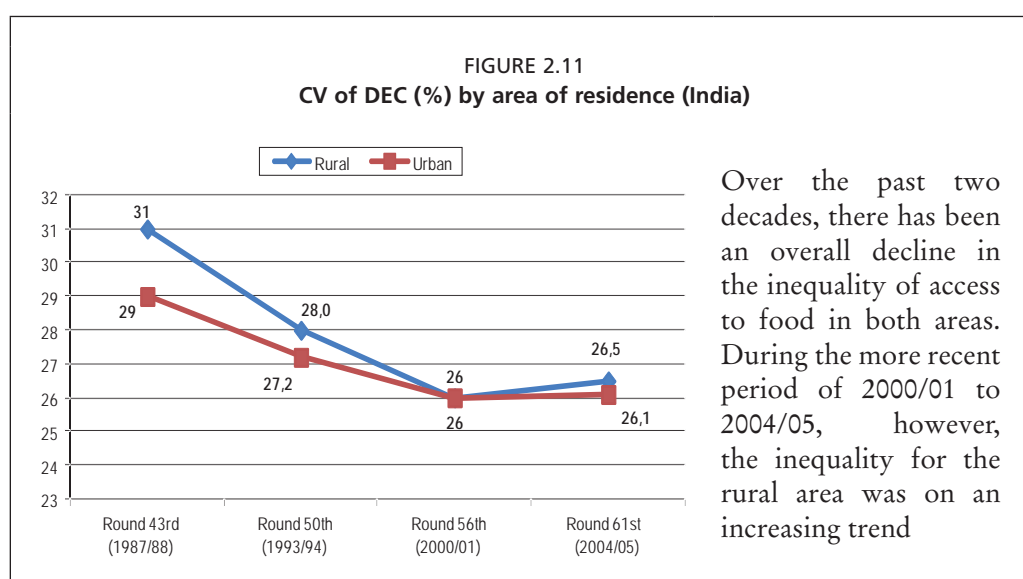
The share of protein consumption was at an average low level of 10 to 12 percent in most population groupings. This result was most likely due to low consumption or absence of consumption of meat and fish. A few provinces had a protein share below 10 percent. Rural households had carbohydrate consumption higher than urban households, whereas fat consumption share was higher in urban areas than in rural areas. In 2004/05, the northwestern provinces (Gujarat, Delhi, Punjab, Chandigarh, Haryana, Rajasthan and Himachal Pradesh) enjoyed a more balanced diet in terms of

macronutrient shares, particularly in terms of carbohydrates (65 percent), which were within the WHO/FAO recommended value. The share of carbohydrates in some provinces, particularly those in the eastern part of the country, was well above the 75 percent norm. This high carbohydrate share resulted in a reduced share of fats, which were below the recommended 15 percent value. Cereals and pulses were still one of the main sources of proteins and carbohydrates.

### INEQUALITY IN FOOD CONSUMPTION

The FAO measure of inequality in access to food is the CV of DEC, which includes two components of variations, namely: CV due to income and CV due to requirement. This CV of DEC is derived from NHS and is one of the three key parameters for the global estimation of the prevalence of undernourishment indicator within the FAO methodological framework.

Food consumption inequality due to income has been estimated at sub-national levels of rural and urban areas and for other population groups for the different surveys. The CV, due to requirement is due to variations in several factors such as biological, physical activity, temperature and tastes, and is usually assumed to be around the value of 20 percent. Inequality in access to food was higher in rural areas with a CV of 31 percent compared to a CV of 29 percent in urban areas in 1987/88 (Figure 2.11). Among the provinces, Kerala, and Lakshadweep and Pondichery were the provinces with the highest levels of inequality in access to food with 33 percent and 31 percent, respectively, in 2004/05. The Provinces of Manipur and Meghalaya had the lowest CV of DEC of 21 percent.



### CONCLUSIONS

The analysis of the four data sets of the food consumption data collected in the ICES has provided a large amount of information on the food situation in India and its provinces. It has also provided information about some specific population groupings in terms of some demographic and socio-economic factors of the heads of households. The declining trend of DEC has shown a change in food consumption patterns. Populations are moving from consumption of high carbohydrate food, particularly rice, to foods high in protein and to fats, despite an upward trend in food prices. In addition, the food ratio in total household consumption had improved over the two decades as a result of the successful economic growth over that same period of

reference, and because of the food policies of the Government of India. Improvement in food consumption has also been observed among the provinces of India.

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## 3 Togo: integrating food security statistics in the national programme of food security

Bontiébite Badjare<sup>13</sup>, Seevalingum Ramasawmy<sup>14</sup> and Micheline Detraux<sup>15</sup>

### ABSTRACT

The Government of Togo began its participatory process to create a National Programme for Food Security (NPFS) in February 2007. Therefore, it was important to have some baseline information on the food situation in terms of food availability and food access by the population in Togo. The most recent food database available was food data collected by the recent the 2006 questionnaire unifié des indicateurs de base de bien être (QUIBB).<sup>16</sup> With the technical assistance of FAO Statistics Division, the QUIBB 2006 food data was analysed to derive food security indicators at national and sub-national levels. These food security indicators are useful to determine the profile and the geographic location of food-deprived population groupings. Cross-analysis of results highlighted links to the perception of food safety by local actors and identified risk factors likely to aggravate and mitigate mechanisms of food insecurity. Policy-makers and stakeholders made extensive use of this information to develop the National Strategy for Food Security, whose overall objective is: “Ensuring food security for all segments of the population nationally and without any discrimination”. This objective was seen to contribute to achieving the first MDG of eradicating extreme poverty and hunger, and to align with the objectives of the poverty reduction strategy paper (PRSP) and the WFS.

**Keywords:** food security, food consumption data, food security indicators, national food security program.

### INTRODUCTION

As part of the participatory process to formulate the Togo NPFS, which was initiated in February 2007 by the Government of Togo and with the support of FAO, existing baseline data was used to derive national and sub-national food security information for the mapping of vulnerable population groups. There was a lack of comprehensive information on food and nutrition security to be used as inputs for the NPFS. Thus, the Togo Comité du Pilotage responsible for the formulation of the NFSP requested the technical assistance of FAO Statistics Division. They were asked to perform a food security analysis of agricultural and food data available in Togo to derive national and sub-national food security indicators.

FAO Statistics Division with the support of FAO Technical Cooperation and with the collaboration of the Direction de la Statistique et de la Comptabilité Nationale (DSCN) conducted a food security analysis of the available NHS food consumption data collected in the 2006 QUIBB using the FSSM.

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<sup>16</sup> The QUIBB is a tool developed by the World Bank, United Nations Development Program (UNDP), United Nations Children's Fund (UNICEF), International Labour Organization (ILO) and United Nations Population Fund (UNFPA), to provide countries with a means of producing essential statistical indicators quickly.



The derived food security statistics were combined with other analysis related to vulnerability, public and private food policies and interventions to define strategic areas and priority interventions of the NPFA. In addition, a list of food security indicators was defined for the evaluation and monitoring of the NPFS. This paper provides an overview of the food security information, which was used as baseline information for the NPFS. It also provides information for mapping and spatial purposes, using existing food data, including agricultural statistics. Far from claiming to characterize the food security in Togo in detail, this paper aims to provide a general overview of the problem of food security in the country. Of particular interest, was analysis of existing data of the 2006 QUIBB and agricultural statistics (including production and prices) in relation to the perception of food safety by local actors.

### **ANALYSIS OF METHODOLOGY**

The food consumption data used in this study was derived mainly from the food data collected from the QUIBB 2006 conducted by the Direction de la Statistique et de la Comptabilité National (DSCN), along with other reports on food security in Togo. The 2006 QUIBB survey data was analysed by the FSSM software and the expert support of the FAO Statistics Division. That analysis produced seven indicators on food security information at national and sub-national levels in terms of geographical, demographic and socio-economic factors.

Two relevant indicators strongly linked to household consumption in Togo were crossed and analysed to determine the result of their effect. These indicators are the prevalence of food inadequacy and diet composition. For each indicator, a value of one to five was assigned to each income quintile within regions according to the intensity of this indicator. From the matrix formed with these two indicators, the result was calculated as the sum of the various classes.

A reconciliation of the results with existing data on production and agricultural markets, the perception of food safety by local actors, and the risk factors aggravating and mitigating mechanisms of food insecurity has led to the setup of strategic plans for improving food security. These include the definition of zones and priority interventions. However, it should be noted that some constraints have been observed in the application of this methodology.

### **LIMITATIONS OF THE METHODOLOGY**

Based on the consumption data of the QUIBB 2006, the results in this report on food insecurity in Togo should be considered with caution. General trends more than magnitudes should be understood. Indeed, with the QUIBB survey, the DSCN had a very comprehensive database on household consumption in Togo. In particular, this data represented Togo's food consumption in quantity and monetary value. That said, the food consumption data had the following limitations:

- Data was collected over one month period only (from 4 July to 11 August 2006) for all households. This sample did not illustrate a comprehensive view of consumer spending during the year. Note, also, that this period corresponded to periods of crops or food availability for most of the prefectures of the bimodal zone (south), while in monomodal areas (north), this period corresponded to the seed or the vegetative phase of cultures when food availability was low.
- Quantitative data was collected for a large number of local units of measurement for which information on their equivalents in standard units (g/ml) was not available.
- Large quantities or monetary values were observed for certain products with particular reference to own-consumption and which could correspond to a declaration of own-production, and not consumption as such.



- Some products refer to dishes for which it was not possible to assign a precise and accurate nutritional energy value.
- Some daily records were entered more than once at the household levels, thus increasing the number of days of consumption, which was a ten-day period.
- With regard to food availability calculated from the data of agricultural production from Direction de l'Agriculture, de l'Élevage et de la Pêche (DAEP), a number of assumptions had to be made due to the incompleteness of the data.
- In calculating the available food by food commodity groups, only a few items have been included in a few groups: corn, sorghum, millet and paddy rice have been included in the food commodity group cereals; yams and cassava in the group roots and tubers; and beans and groundnuts were included in group vegetables.
- The calculated food availability did not take into account balances in inventory or stocks, and those in imports/exports.

### **CROSS-ANALYSIS OF INDICATORS OF CONSUMPTION AND FOOD SECURITY**

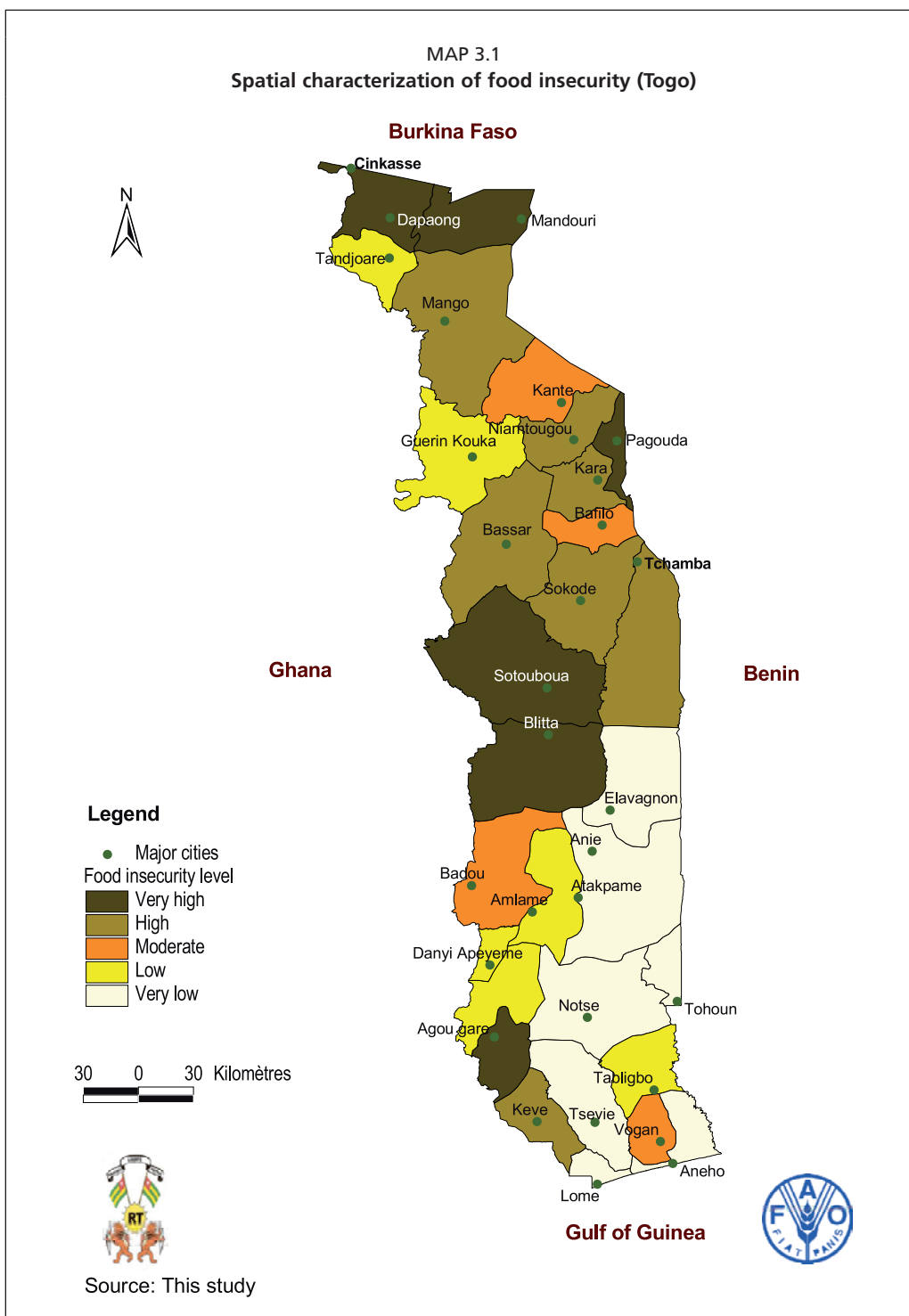
Analysis of the two selected indicators shows that over 30 percent of the population (about 1.7 million people) in 2006 were food deprived. Food deprivation varied significantly in the different quintiles of regions as shown in Table 3.1. Low-income quintile groups of households had high rates of food inadequacy, and high-income quintile households had relatively moderate food inadequacy rates. The average Togolese had a balanced diet, which is assumed to have energy yielding macronutrients of protein at 10 to 15 percent, fats at 15 to 30 percent and carbohydrates at 55 to 75 percent. The food diet of a Togolese was composed of 12 percent protein, 16 percent fat and 72 percent carbohydrates, reflecting a relatively low fat consumption at the expense of a high consumption of grain or carbohydrate products.

The results of the analysis of the combined effect of the two indicators and diet composition are summarized in Table 3.1 and illustrated on the Map 3.1. This data suggests that priority should be given to prefectures of the first and second quintile. It should be recalled, however, that there is need for a more detailed analysis and a typology of vulnerable groups and areas before action is taken.

TABLE 3.1  
Targeting vulnerable prefectures (Togo)

Income quintile	Targets		Target indicators				Other indicators		
	Districts	Region	Food inadequacy (%)	Diet composition (%)			DEC (kcal/person/day)	Food dietary energy deficit (%)	Coefficient of variation of DEC due to income (%)
				Protein	Fats	Carbohydrate			
1	Binah	Kara	66	12	11	77	1630	29	35
	Blitta	Centrale	58	12	14	74	1740	27	37
	Agou	Plateaux	46	11	17	71	1880	20	26
	Kpendjal	Savanes	42	14	11	75	1850	16	16
	Sotouboua	Centrale	52	12	13	75	1820	23	29
	Tone	Savanes	43	14	12	74	1890	20	26
2	Oti	Savanes	34	12.6	11.2	76.3	2110	20	32
	Doufelgou	Kara	42	13.4	13.8	72.8	2070	23	35
	Kozah	Kara	59	12.1	13.6	74.2	1730	25	30
	Bassar	Kara	31	12.6	13.2	74.2	2350	22	41
	Tchaoudjo	Centrale	41	11.6	14.2	74.3	2000	20	28
	Tchamba	Centrale	48	11.4	14.2	74.4	1890	24	34
	Ave	Maritime	42	11.5	14.0	74.5	2100	26	43
3	Assoli	Kara	27	12.0	13.0	75.0	2310	17	28
	Keran	Kara	32	13.9	12.7	73.5	2220	20	32
	Wawa	Plateaux	32	11.3	13.7	75.0	2180	20	33
	Vo	Maritime	37	11.5	15.7	72.8	2050	20	30
4	Amou	Plateaux	33	11.6	15.8	72.6	2160	20	32
	Danyi	Plateaux	38	11.5	15.3	73.2	2290	26	47
	Yoto	Maritime	36	11.5	15.6	72.9	2020	18	26
	Kloto	Plateaux	38	11.5	15.3	73.2	2290	26	47
	Tandjoare	Savanes	33	13.1	11.3	75.6	2110	19	30
	Dankpen	Kara	20	13.0	12.8	74.2	2410	16	28
5	Zio	Maritime	37	11.5	15.7	72.8	2080	21	33
	Est Mono	Plateaux	19	11.4	15.9	72.7	2390	15	25
	Golfe	Maritime	28	12.5	18.0	69.4	2470	21	38
	Haho	Plateaux	19	11.4	15.9	72.7	2390	15	25
	Lacs	Maritime	30	11.4	16.4	72.2	2190	18	28
	Moyen Mono	Plateaux	19	11.2	17.3	71.4	1880	15	26
	Ogou	Plateaux	20	11.6	17.1	71.3	2410	16	27

Source: This Study



### Perception of food safety by the locals

The regional consultations have highlighted many of the concerns of people with regard to food security. These concerns relate to: problems of access to resources and factors of production; inequalities within the household (income, food); eating habits; increasing difficulties during lean periods; and the challenges of marketing, processing, etc.. Issues of gender in terms of equal access to productive resources, information/education, income and nutrition are also a concern. These concerns, which were shared by stakeholders of the different regions, formed the basis of the discussions

during NPFS planning workshops in each region. They reinforce the various tests on the food and nutritional status of populations in different regions.

### **CROSS-ANALYSIS OF PREFECTURES**

Among the prefectures of the selected cross-analysis of indicators, there were some prefectures traditionally recognized as high risk (Kpendjal, Tone, Binah). Paradoxically, other prefectures, such as Sotouboua and Tchamba, known as areas of high production of cereals and tubers, appear vulnerable.

This paradox can be explained by the period of implementation of the QUIBB survey in July, which corresponds to the growing season in the northern region of Togo, which was also a period of food shortage (lean season). The result from the major production areas of the central region, especially in the prefecture of Sotouboua, also seems to be affected by this factor. Moreover, the lean season was considered to be the main constraint to food security by 91 percent of cantonal representatives present at the consultation meeting in the central region in Sokodé in 2007.

Based on the available data on the state of rural roads, we see that the prefectures most affected by food insecurity have a small rural road network, while most of the less affected prefectures have better rural roads. Thus, the prefecture of Sotouboua has 193 km of rural roads per 1 000 inhabitants (169 km in poor condition) and Blitta has 93 km per 1 000 inhabitants in poor condition. Conversely, the less food insecure prefecture of Haho has 626 km of rural roads per 1 000 inhabitants and Ogou has 429 km of rural roads per 1 000 inhabitants.

Finally, estimates of household wealth carried out on the basis of durable goods (QUIBB, 2006) reinforces the results obtained with indicators of food security by showing a low level of household wealth in the prefectures most affected by food insecurity.

### **FORMULATING NATIONAL STRATEGY FOR FOOD SECURITY**

The results from the previous analysis made in relation to vulnerabilities, stakeholders and the past and current interventions, helped to define and consolidate the six strategic thrusts of the national food security, which are:

1. promotion of the right to food and good governance around food security;
2. productivity improvement and development of crops, livestock and fisheries;
3. valuation of crops, livestock and fisheries;
4. sustainable management of natural resources and environment;
5. improve water distribution, particularly rural water supply; and
6. promotion of good nutrition and nutrition education.

Each strategy has to be focused at the subareas. The various constraints and priority interventions have to be identified and the expected results specified. The implementation of interventions has to take into account the geographical situation of vulnerable groups.

In addition, the inclusion of these indicators in the monitoring and evaluation of NPFS over time, should allow for improved analysis of the evolution of the food situation at national, regional and local levels.

### **CONCLUSIONS**

The integration of food security statistics in the formulation of NPFS in Togo has been initiated to address the lack of recent food security information. These statistics should provide a comprehensive analysis of the food and nutrition situation and a typology of vulnerable groups that is sufficiently detailed in terms of gender and spatial analyses.

In its implementation, this exercise has faced problems of access to recent national agricultural and food data. That data could support the consolidation of the strategies

of the Togo NPFS and allow for a better understanding of the spatial dimension and typology of vulnerable groups. Conclusions to be drawn from this paper, include the following:

- People living mainly in rural areas of central Togo and savannah were the highest proportions of people with food deprivation, at close to or exceeding 40 percent.
- Regions with low DEC included the central region with 1 880 kcal/person/day and the savannah with 1 960 kcal/person/day. The lowest levels of DEC occurred in Binah, while the highest levels occurred in the prefecture of the Golfe.
- By combining the two indicators considered in this analysis, the prefectures of Kpendjal, Tone, the Binah, Kara, Tchamba, Sotouboua and Blitta were the most food insecure regions.
- The isolation of production areas, the lack of support for producer organizations and inaccessible spatial and temporal surveys of agricultural inputs by farmers during the regional consultations were important factors in explaining the food situation.

In addition to the results obtained from this study, it is important to make a number of recommendations that will help to improve food statistics in the country:

- consider developing a mechanism to take into account the data for the derivation of indicators of food security in developing the methodology of the QUIBB survey or other investigations of food in the country;
- build a nutrient conversion table for all the nutritional food products, including prepared meals identified through household surveys, with the help of nutrition experts and from the food composition table of Togo;
- integrate the anthropometric data on the members in the household for a better estimate of the minimum energy requirements at national and regional levels;
- use information on food prices to identify what values or quantities are inconsistent;
- possess the base maps for a variety of multi-criteria analysis; and
- harmonize methods of analysis of vulnerability among the various national and sub-regional organizations to strengthen collaboration and consensus between the partners concerned with food safety and nutrition.

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## 4 Tanzania: linking food insecurity trends with food policies

Komba Aldegunda<sup>17</sup> and Ana Moltedo<sup>18</sup>

### ABSTRACT

The United Republic of Tanzania has been carrying out medium and long-term plans to address its poverty issues and improve its food security, among other development concerns, such as education and health. In the past decade, the government developed and implemented its national strategic framework with the National Poverty Eradication Strategy (NPES) in 1998, the PRSP in 2000 and the National Strategy for Growth and Reduction of Poverty (NSGRP) in 2005, in collaboration with national and international stakeholders. As a result, the economic performance of Tanzania improved and the country enjoyed positive annual growth rates of around 5 to 7 percent with low inflation rates. Under its regular survey programme, The National Bureau of Statistics conducted two national household budget surveys (NHBS) in 2000/01 and 2007, collecting a large amount of demographic and socio-economic data from the Tanzanian population. Food data was available in both surveys and a food security analysis was undertaken to study the impact of food policies and programmes relating to food security issues at national and sub-national levels. The FAO FSSM was used to derive a suite of food security indicators for the two surveys. The trend analysis revealed some progress in certain food security issues in Tanzania over the two reference periods. While there has been a marginal increase in the average DEC in mainland Tanzania from 2 200 to 2 230 kcal from 2000/01 to 2007, there has been substantial improvement in the quality of diet consumed by the population. Two of the four nutritional disorders identified by the NSGRP, namely protein energy malnutrition and vitamin A deficiency, were improved. The findings show that the contribution of proteins to the total DEC by the population in the mainland increased from 10 to 12 percent and that the vitamin A available to be consumed by an average household member increased by 50 percent. This paper analyses the link between the trends of food security indicators and the country's food policies.

**Keywords:** food security, food inadequacy, dietary energy consumption, proteins.

### BACKGROUND

Since its independence in 1961, the Government of Tanzania has been concerned with three development problems: ignorance, disease and poverty. Efforts to tackle these problems have been carried out under relatively decentralized, but largely complementary, policy initiatives. Several processes and activities aimed at improving food security in the country have been implemented.

During the World Summit for Social Development held in Copenhagen in 1995, Tanzania committed itself to reduce abject poverty by 50 percent by the year 2010, and to effect its total eradication by 2025. To carry out its firm commitment, the government developed the NPES in 1997, focusing on poverty eradication efforts through to the year 2010. This strategy had a three-pronged approach: (i) to reduce income poverty; (ii) to improve human capabilities, survival and social well-being; and (iii) to contain extreme vulnerability among the poor. One of the strategic targets aims to reduce the proportion of the population below the food poverty line to 14 percent by 2010.

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The NSGRP, or MKUKUTA in Swahili, was the second five-year national organizing framework that focused on poverty reduction in 2005. It was committed to the aspirations of Tanzania's Development Vision 2025 (Vision 2025) and the MDG.

The NSGRP Goal Three under Cluster One was to improve food availability and accessibility at the household level in urban and rural areas. The two targets to achieve those goals were: (i) to increase food crops production; and (ii) to maintain a strategic grain reserve of at least four months of the national food requirement. According to the NSGRP Annual Implementation Report 2006/07, the proportion of districts reported to have food shortages increased from 15 percent in 2001/02 to 50 percent in 2006/07. The NSGRP Goals Four and Five aim at reducing food and basic needs poverty. The government recognized that farmers' incomes were low because of the lack of marketing structures and ensured that the related policies would be successful. The NSGRP also recognized that forestry and fishery form partial income sources in many areas. These natural resources were recommended for assessing progress in the reduction of income poverty in rural areas.

As for nutrition, the NSGRP identified four nutritional disorders as a public health concern: (i) protein energy malnutrition; (ii) nutritional anaemia; (iii) iodine deficiency disorders; and (iv) vitamin A deficiency. The challenges included: (i) increasing food intake by raising feeding frequency and consumption of high-energy dense foods; (ii) increasing consumption of fruits and vegetables that are rich in vitamin A; and (iii) addressing the unequal distribution of resources and services and the inadequate household food security.

The National Bureau of Statistics (NBS) estimated the proportion of the population below the national food poverty line for mainland Tanzania as 19 percent in 2000/01 and 17 percent in 2007 while the national basic needs income poverty line was 36 percent in 2000/01 and 34 percent in 2007.

### **OBJECTIVE, METHODS AND DATA**

The NBS of Mainland Tanzania conducted two nationwide HBSs during the past decade. The first survey was conducted in 2000/01 and the second, in 2007. Both surveys collected individual and household characteristics including income and food consumption in quantitative and monetary terms. The NBS survey in 2000/01 was the largest household budget survey ever conducted in Tanzania, covering about 22 000 households. It provided a set of baseline measures for tracking the future progress of the government's poverty reduction policies. The 2007 HBS had a smaller sample than its predecessor, with 10 466 households interviewed. The sample frame used was a more recent one, based on a revised national master sample developed out of the 2002 population census data. The sample of households was selected using multi-stage sampling techniques. The two surveys used similar data collection methods and questionnaires, though the 2007 HBS was slightly modified in order to capture information for monitoring the NSGRP. The HBS data sets estimated some food security indicators based on dietary energy, inequality in access to food and diet composition.

The data was processed using the FAO FSSM analytical tool to estimate these food security indicators. The nutrient values conversion factors were obtained from the Tanzania food composition table and were used to convert all food quantities into nutritional values of food consumed by households.

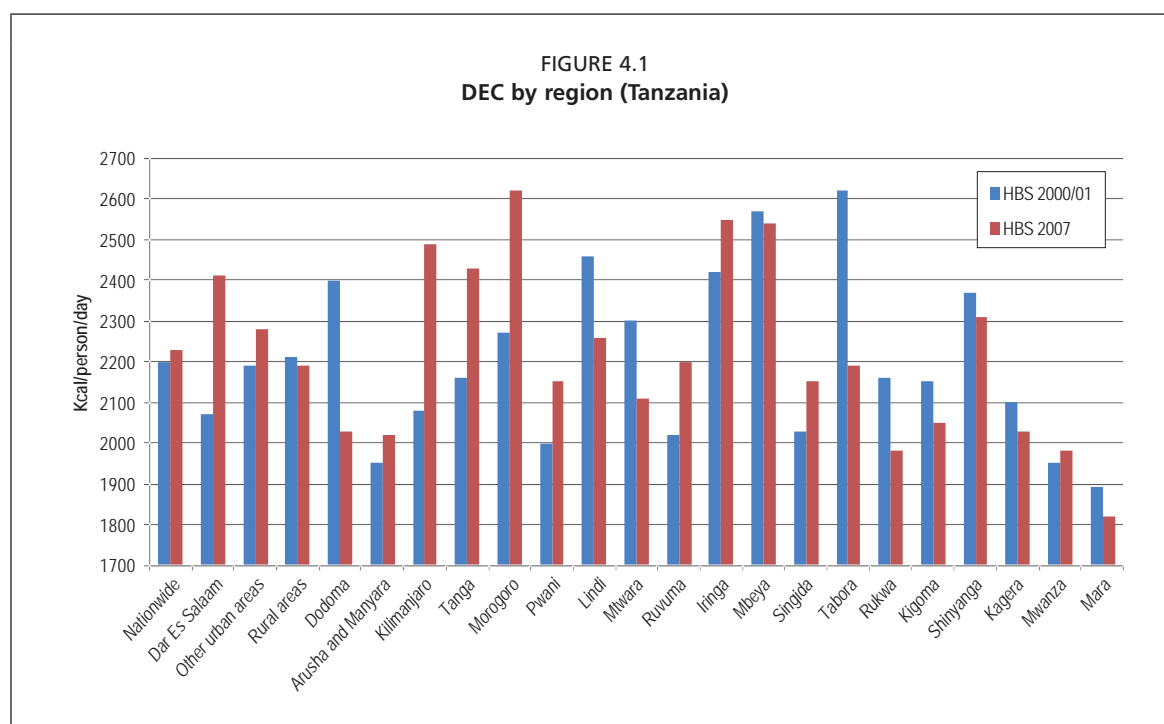
Due to the comparability of the two surveys, it was possible to do a trend analysis of some food security indicators in mainland Tanzania between 2000/01 and 2007. The objective of this paper was to link this trend analysis with national food policies.



### Dietary energy consumption (DEC)

In mainland Tanzania, the average daily DEC was 2 200 kcal/person in 2000/01. The 2007 survey estimates showed a slight increase in DEC to 2 230 kcal/person/day (Figure 4.1). In the same year, the DEC in urban areas increased; the highest being 2 410 kcal/person/day in Dar es Salaam and 2 280 kcal/person/day in other urban areas. This trend was not the case in rural areas as the average daily DEC decreased marginally from 2 210 kcal/person/day in 2000/01 to 2 190 kcal/person/day in 2007.

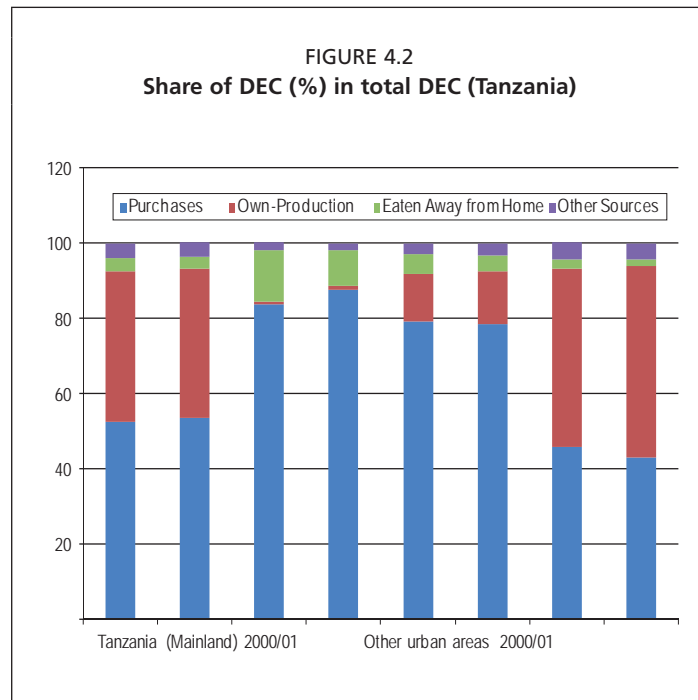
The regions were split into two groups: the first showing an upward trend and the second, a downward one. Within the first group, Kilimanjaro and Morogoro had the largest increase in average daily DEC per capita, while the regions suffering the largest decrease were Tabora and Dodoma. In the case of these two regions, the difference of DEC between 2000/01 and 2007 was more than 340 kcal/person/day.



### Dietary energy acquisition sources

At the national level, there were two main sources of acquisition of dietary energy: purchases and the household's own-production. Their respective shares of dietary energy in total dietary energy did not change significantly between 2000/01 and 2007, being 53 percent and 40 percent, (Figure 4.2). However, in Arusha and Manyara, the consumption of dietary energy that came from the household's own-production increased from 27 percent in 2000/01 to 44 percent in 2007. This difference indicates an increase in subsistence food. The regions that showed the largest decrease of dietary energy consumed from own-production were Kigoma and Shinyanga (both regions with 6 percentage points less than in 2000/01).





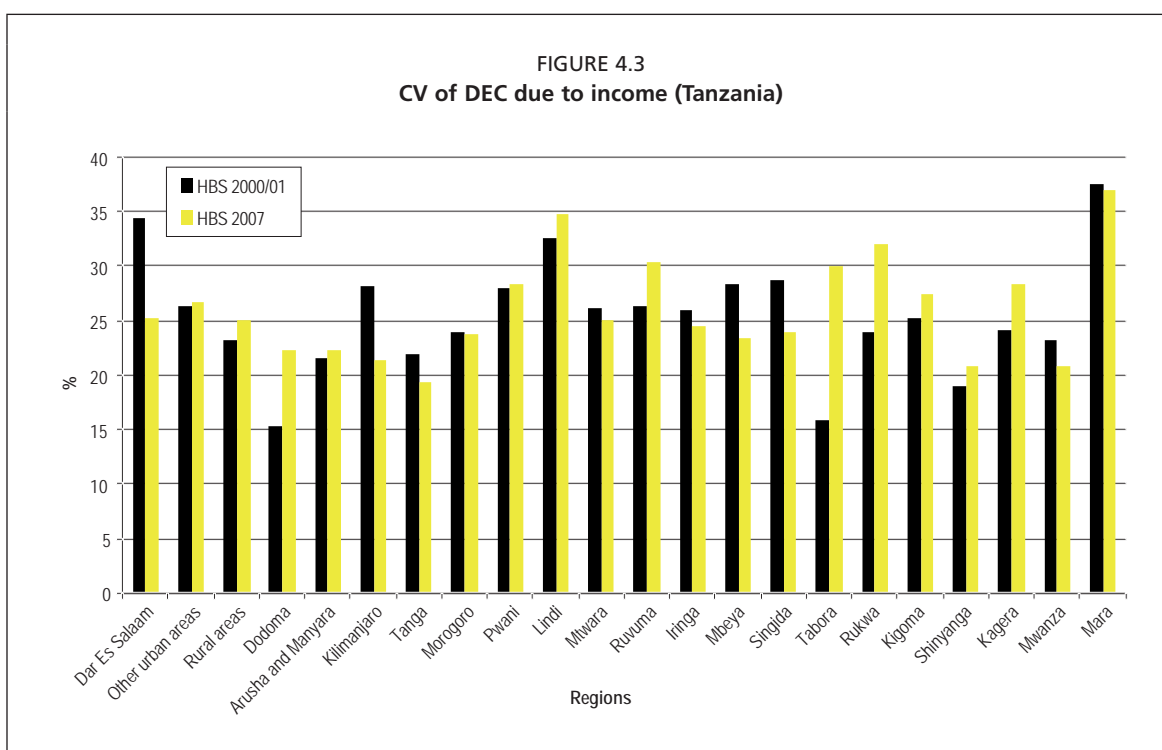
### Access to food

DEC varies with income and factors like age-sex composition, body weight and activity level of the household members. One of the indicators used to measure the inequality in access to food is the CV of DEC. FAO defines a full CV of DEC with two components: CV due to income and CV due to energy requirement.

The variations of DEC due to energy requirement correspond to a CV of approximately 20 percent, while the CV of DEC due to income was estimated from the distribution of DEC using the national household surveys data. Values CV due to DEC for the different populations groups are shown in Figure 4.3.

### Inequality in access to food

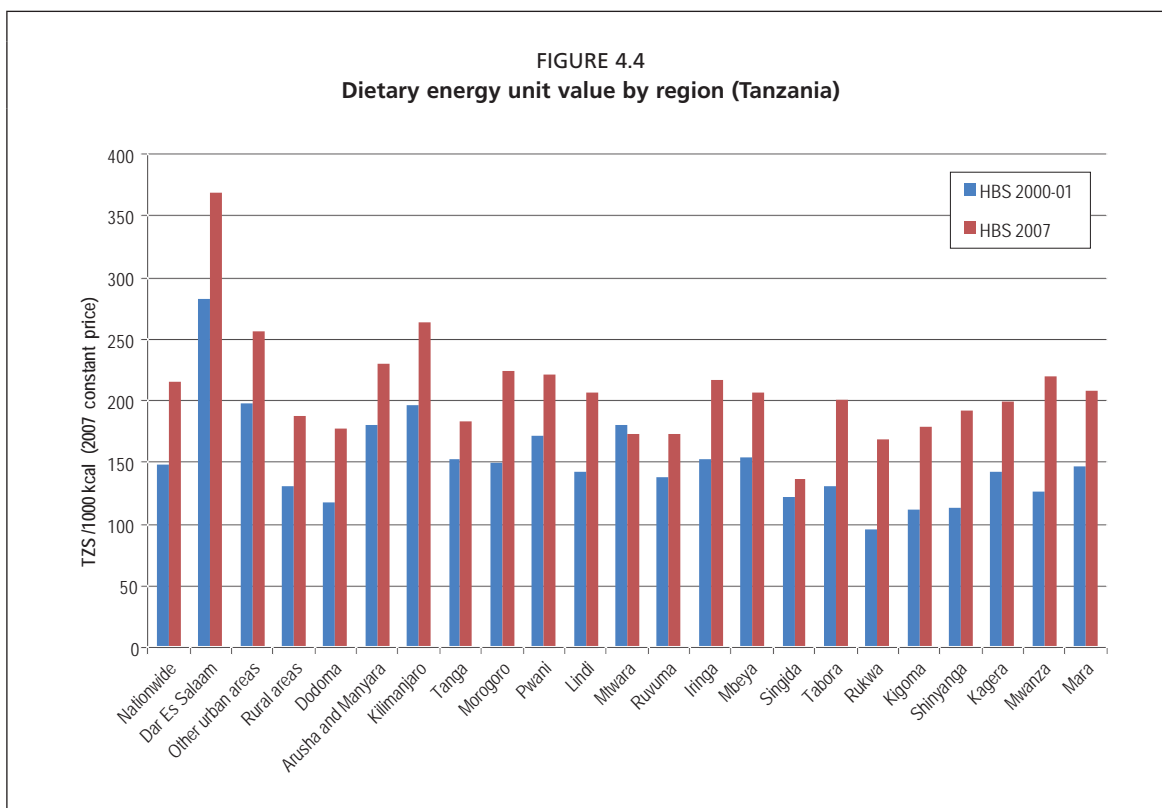
The data analysis revealed that Tabora region had the largest increase of 14 percentage points in the inequality in access to food measured by the CV of DEC due to income from 2000/01 to 2007. On the other hand, Kilimanjaro was the region facing the highest reduction of CV of DEC due to income with 7 percentage points. In the capital city, the CV of DEC due to income decreased even more than in the Kilimanjaro region, from 34 percent to 25 percent.



### Dietary energy unit value

At the national level, an average mainland citizen spent, at 2007 constant price, 149 TZS per day to acquire 1 000 kcal in 2000/01. In 2007, the dietary energy cost increased to 216 TZS/person/day. During the period of study, the cost to acquire the same amount of kilocalories increased more in Dar es Salaam (from 283 to 369 TZS 2007 constant price/person/day) than in other urban areas (Figure 4.4).

Between 2000/01 and 2007 all regions had an increase in the cost of 1 000 kcal, with the exception of Mtwara which showed a slight decrease. These increases were between 15 and 94 TZS at 2007 constant price/person/day in Singida and Mwanza regions, respectively.



### Diet composition

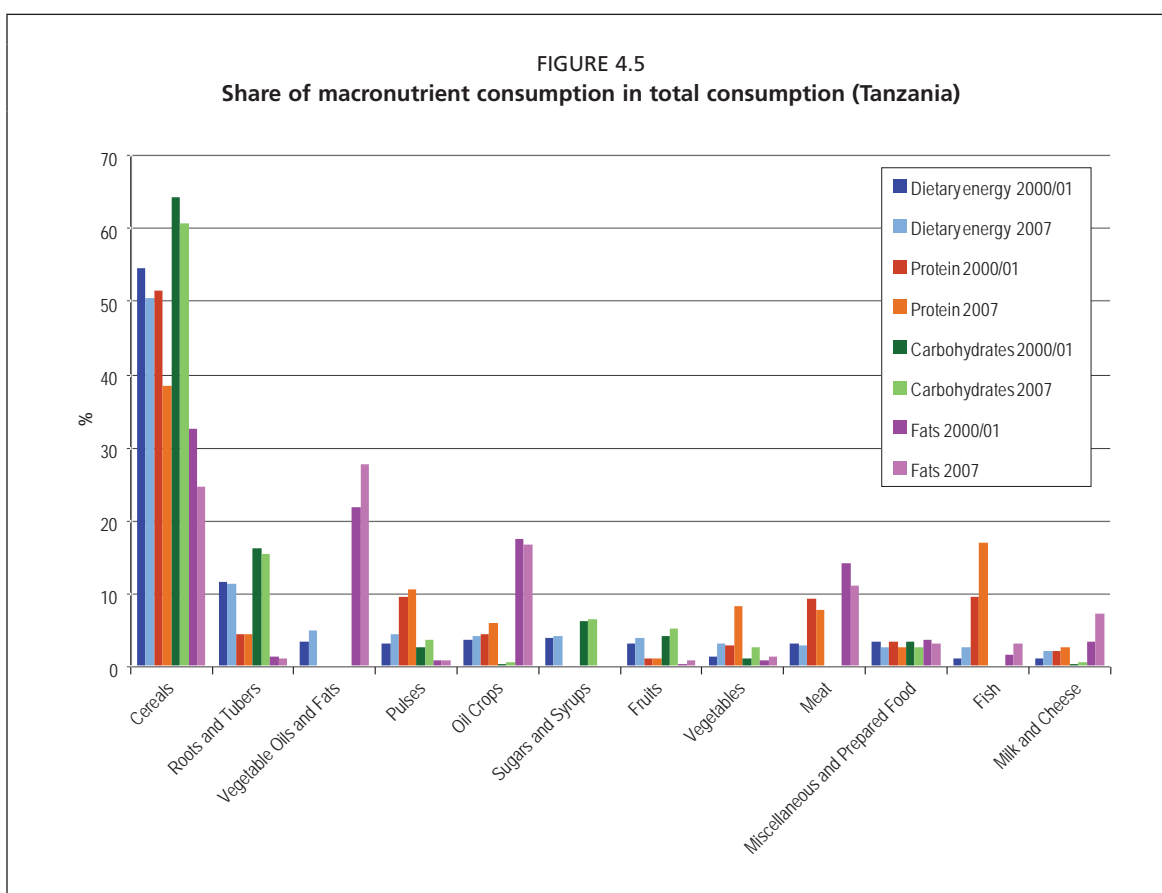
Even with the changes in food patterns during the first seven years of this decade, the population of mainland Tanzania was still consuming a balanced diet (the share of DEC in total DEC coming from protein, fats and carbohydrates were within recommended values).

From 2000/01 to 2007, the percentage of dietary energy consumed from cereals in total DEC fell from 74 to 70 percent. On the other hand, the share of dietary energy coming from proteins and fats increased from 10 percent to 12 percent and from 16 percent to 18 percent, respectively.

Both surveys showed that cereals were the main source of energy, carbohydrates and proteins. They were also the main source of fats in 2000/01, until an increase in vegetable oil consumption (from 8 to 16 g/person/day) made it the main source of fats in 2007.

While cereals and meat consumption decreased in 2007 compared to 2000/01, the consumption of fish, vegetables, fruits and vegetable oils increased. The increase in fish consumption entailed doubling the fish contribution of protein from 5 to 11 g/person/day.

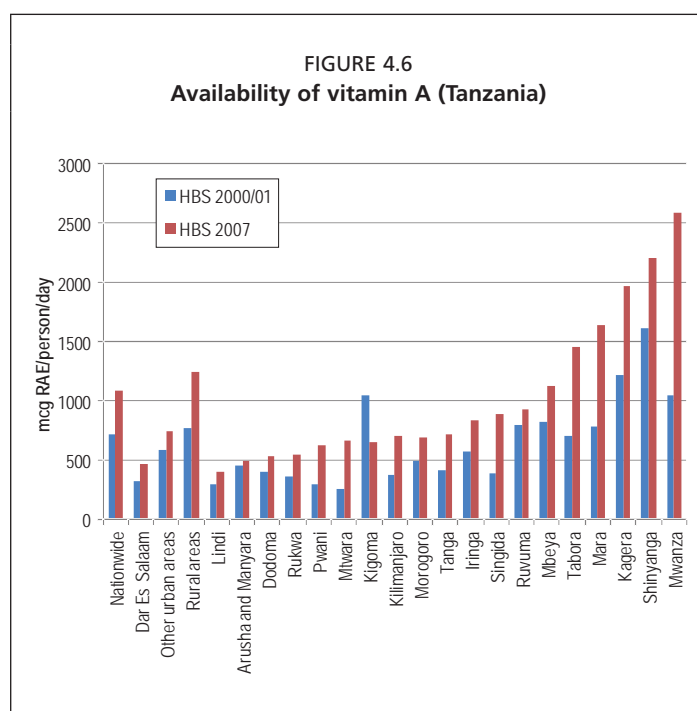
Maize flour, maize grain, rice and cassava flour contributed half of the national DEC in both periods. In rural areas, the consumption of maize (flour and grain) and sorghum decreased while the consumption of rice, cassava flour, sweet potato and vegetable oil, increased (Figure 4.5).



### VITAMIN A AVAILABILITY

The main sources of vitamin A were vegetables (including spinach, vegetable sponge leaves, tomatoes and pumpkins), sweet potatoes, plantains and cow milk. In 2007, the availability of vitamin A in mainland Tanzania increased by 52 percent from 2000/01 (Figure 4.6). The 1 088 mcg retinol activity equivalent (RAE)/person/day of vitamin A available for consumption in 2007 was well above the recommended safe intake of 527 mcg RAE/person/day. That said, in 2007, the population in the capital city, Dar es Salaam, did not meet the recommended safe intake level of vitamin A per capita.

From 2000 to 2007, all regions showed an increase in vitamin A availability per person, except Kigoma where the availability of vitamin A decreased by 38 percent, partially due to a 60 percent decrease in sweet potato consumption.



## CONCLUSIONS

During the period in which both the National Strategy of Reduction of Poverty and the NSGRP were being implemented, mainland Tanzania saw an increase of 30 kcal/person/day of dietary energy consumed from the years 2000/01 to 2007. However, the opposite was true in rural areas where there was a drop of 20 kcal/person/day during that same period.

The distribution of DEC within the country has varied with time. While in the regions of Kilimanjaro and Morogoro, the daily DEC increased by more than 340 kcal per person, it decreased by almost the same amount in the regions of Tabora and Dodoma.

With regard to the first target of the NSGRP Goal 3 of Cluster 1, food crop production reached 10.9 million tonnes in 2005/06, which increased the availability of food in the country. On average, the mainland citizen increased his or her DEC. However, access to food in the same time has worsened. To buy and consume 1 000 kcal in 2007, an individual living on the mainland needed 216 TZS daily, while in 2000/01 he needed only 149 Tsh to buy the same amount of calories, at 2007 constant price.

One of the four nutritional disorders of public health concern identified by the NSGRP was the protein energy malnutrition. Policies related to fisheries have been carried out during the period of study, and they resulted in a doubling of fish consumption at the national level. It was noted that urban areas consumed greater amounts of fish than rural areas. The increase in fish consumption by the population on the mainland contributed to an increase of 2 percent (from 10 percent to 12 percent) in the proportion of proteins in the total dietary energy consumed.

Vitamin A deficiency was also one of the public health concerns identified by the NSGRP. From 2000-01 to 2007, all regions registered an increase in vitamin A availability, with the exception of Kigoma which had a decrease of 38 percent. This result was due to a 60 percent drop in sweet potato consumption.

The patterns of diet consumption on mainland Tanzania changed during the first seven years of this decade. The population consumed less cereal and meat and favoured more fish, vegetable oils, fruits and vegetables in their diet. The increase of vegetable consumption was one of the NSGRP challenges.

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Part 2

**Methodologies to enhance food  
security statistics from national  
household surveys**



## 5 Sudan: using statistical tools to derive national and sub-national food security indicators

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### ABSTRACT

Sudan's food security statistics at national and sub-national levels were estimated using FAO's FSSM, which used the food consumption data from the country's 2009 NHBS. One out of three Sudanese was classified as being food-deprived in 2009. The food-deprived constituted over 50 percent of people living in the states of Western Bahr Al Ghazal, Unity, Upper Nile, Warrap and Lakes. The average Sudanese had a daily DEC of 2 180 kcal/person. DEC was lower in urban areas (2 140 kcal/person/day) than in rural areas (2 270 kcal/person/day). Nationwide, the food gap illustrating the MDER for undernourished population groupings was at 344 kcal/person/day (about 100 g of cereal equivalent). However, within states, there is a difference in daily intake ranging from 249 kcal to 521 kcal. Protein consumed was at 68 g/person/day, of which 24 percent came from meat. The share of meat protein varied among states from 13.8 to 53 percent. On average, a Sudanese spent 3.53 SDG daily on food in urban areas and 2.32 SDG daily in rural ones. More than 60 percent of the average household budget was devoted to food, though that percentage was lower in urban areas (56 percent) than in rural areas (66 percent). DEC from carbohydrates, fat and protein were within recommended ranges at 66 percent, 22 percent and 12 percent, respectively. Four out of five (81 percent) Sudanese purchased their DEC, while only 8 percent came from farmers' own-production. These alarming statistics were probably due to the fact that the data was collected during the lean pre-harvest season. That said, farmers' own-produce consumption was higher in Eastern Equatoria (42 percent) and Western Equatoria (50 percent) states. Food was not equally distributed among households as high CVs of DEC due to income above 30 percent were observed in urban and rural areas.

**Keywords:** household survey, food security, food insecurity, Sudan

### BACKGROUND

The signing of the Comprehensive Peace Agreement (CPA) on 9 January 2005 brought an end to nearly four decades of civil war in Sudan. In the following year, the Sudan Household Health Survey was undertaken to provide a comprehensive baseline of health and nutrition data for the whole of Sudan. In 2008, the fifth Sudan Population and Housing Census was undertaken to provide up-to-date food security data on Sudan's population.

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This paper reports on the findings of food security statistics and indicators derived from processing the Sudan 2009 NHBS data using the FSSM developed by FAO's Statistics Division. The FSSM uses the collected food data details and other variables of the households and household members to perform the food security analysis. The analysis involves the following steps: i) estimate the MDER for each identified population grouping; ii) process the food data to derive aggregated statistics at household and food item levels; iii) analyse the aggregated data to derive statistics and indicators by population groupings; and iv) create 45 tables and charts with food security statistics and indicators by population groupings.

### **OBJECTIVE, METHODS AND DATA**

The 2009 NHBS, was conducted by the Southern Sudan Centre for Census, Statistics and Evaluation (SSCCSE) and the Central Bureau of Statistics (CBS). The comprehensive survey had the primary purpose of preparing the PRSP and generating weights for compiling the consumer price indices (CPI) of the basket of goods and services in Southern Sudan.

The sampling frame of the 2008 Sudan census was used and an identical methodology was carried out across all states and fieldwork during the lean season, April to May 2009, in South Sudan and May to June 2009, in North Sudan.

The sample selected for the 2009 NHBS was based on a stratified two-stage sampling design. The first sampling stage was the selection of primary sampling units (PSU), the enumeration areas (EA), which were stratified by state, urban and rural areas. At the second sampling stage, 12 households were randomly selected from each of the selected 44 EAs of each of the 25 states, making up a total of 13 200 households in Sudan. EAs within each stratum of households were selected systematically with probability proportional to size (PPS). Non-interviewed households were substituted with pre-selected random-replacement households to maintain sample size.

The NHBS questionnaire was designed in consultation with users and donors. A technical working group and a user needs group were both set up in Khartoum and Juba during the finalization of the 2009 NHBS questionnaire. These groups included representatives from various ministries in northern and southern Sudan, UN agencies and international non-governmental organizations (NGOs). The questionnaire included a food consumption module to collect detailed information on food consumption and expenditure, produced or acquired, in quantity and monetary values, over a recall period of one week for 150 food items.

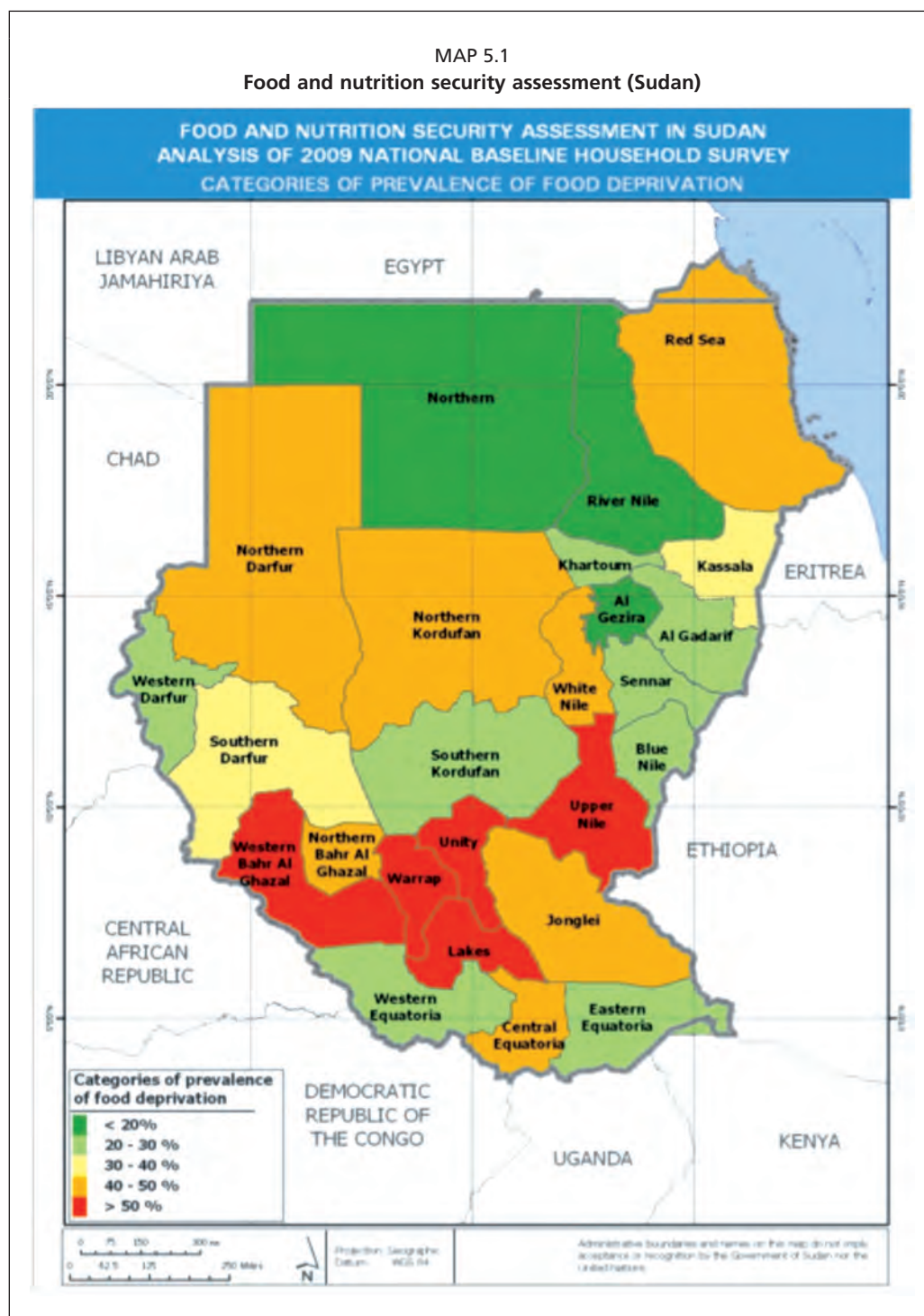
The FAO FSSM analytical tool was used to process the Sudan 2009 NHBS data to derive food security statistics at national and sub-national levels. The Sudan Food Composition Table was the main source of information on food item nutrient values for the conversion of food quantities to dietary energy, protein, fats and carbohydrate values at food item level. These values were then aggregated at household level. The sampling scheme of the 2009 Sudan NHBS was self-weighted and the derived estimates were considered as population-based. Estimates of population-based standard errors were derived for the main variables.

### **RESULTS**

The 2009 NHBS data showed that the average Sudan had a daily DEC of 2180 kcal and the food inadequacy rate was about 33 percent when compared with the MDER of 1 751 kcal/person/day.

### FOOD DIETARY ENERGY DEPRIVATION

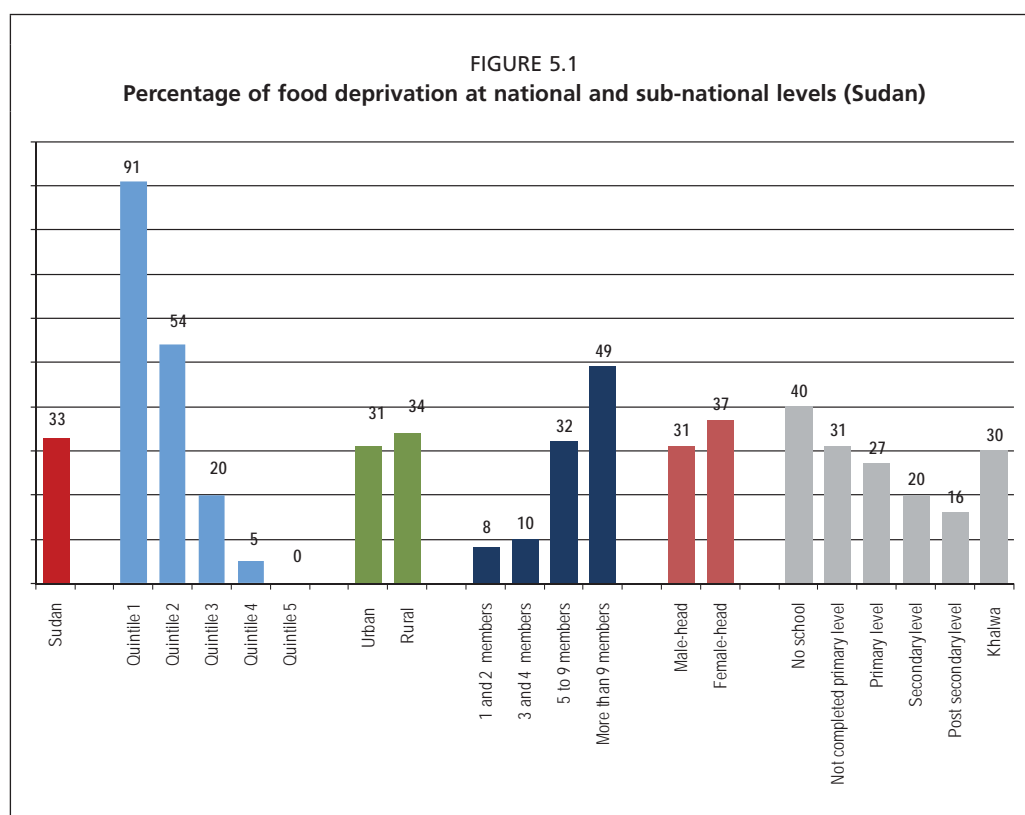
Food deprivation levels varied significantly among states. The highest level was observed in Western Bahr Al-Ghazal (74 percent) followed by Unity (72 percent), while the lowest levels were recorded in Al Gezira and River Nile (15 percent each) and Northern (16 percent) as shown in the Map 5.1 below.



Food deprivation was at a similar level in both urban (31 percent) and rural (34 percent) areas; urban areas may have been marginally more food secure due to higher levels of consumption and better access to food markets. Food deprivation was more than 50 percent in households belonging to the two lowest income quintiles. Figure

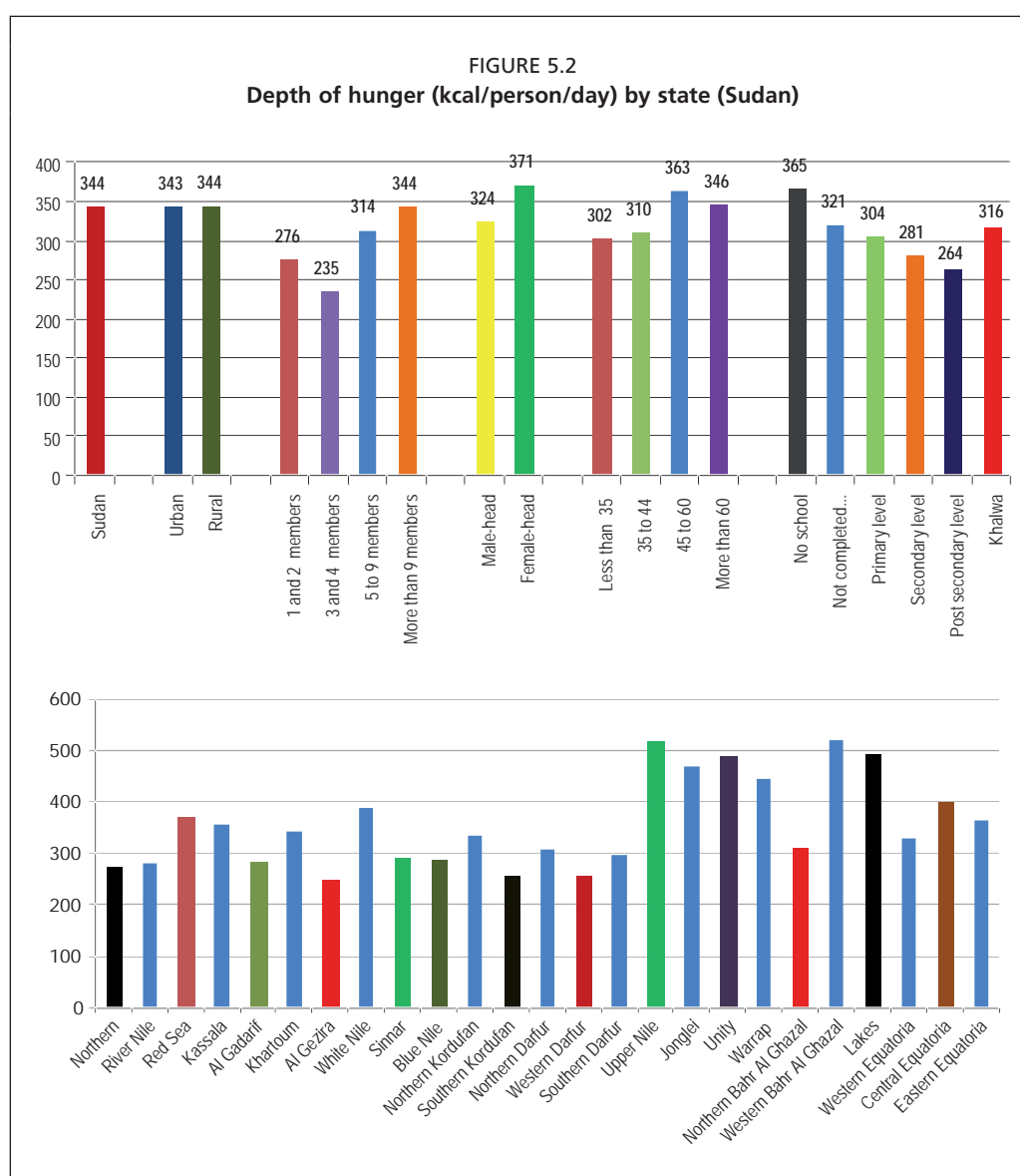
5.1 shows that food deprivation was higher in FHH (37 percent) than in MHH (31 percent). This difference may be explained by men in MHH having better access to education, jobs and, therefore, to higher incomes. FHH tended to be poorer and, thus, more vulnerable to suffering the effects of hunger. The proportion of food inadequacy according to household size varied from 8 percent (one or two members) to 49 percent (more than 9 members). While there are usually economies of scale in larger households, it seems that the access to food diminished greatly with the increase in household size.

Not surprisingly, the most important factor tied to high levels of food deprivation appeared to be low income. The level of food deprivation in the poorest 20 percent of the population was alarmingly high at 91 percent (Figure 5.1).



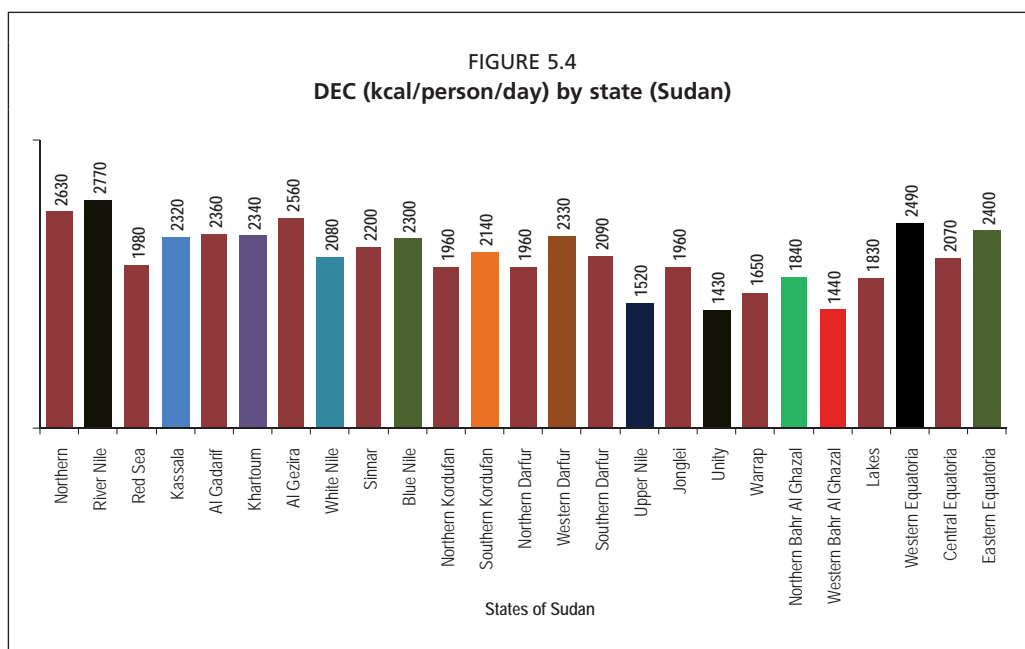
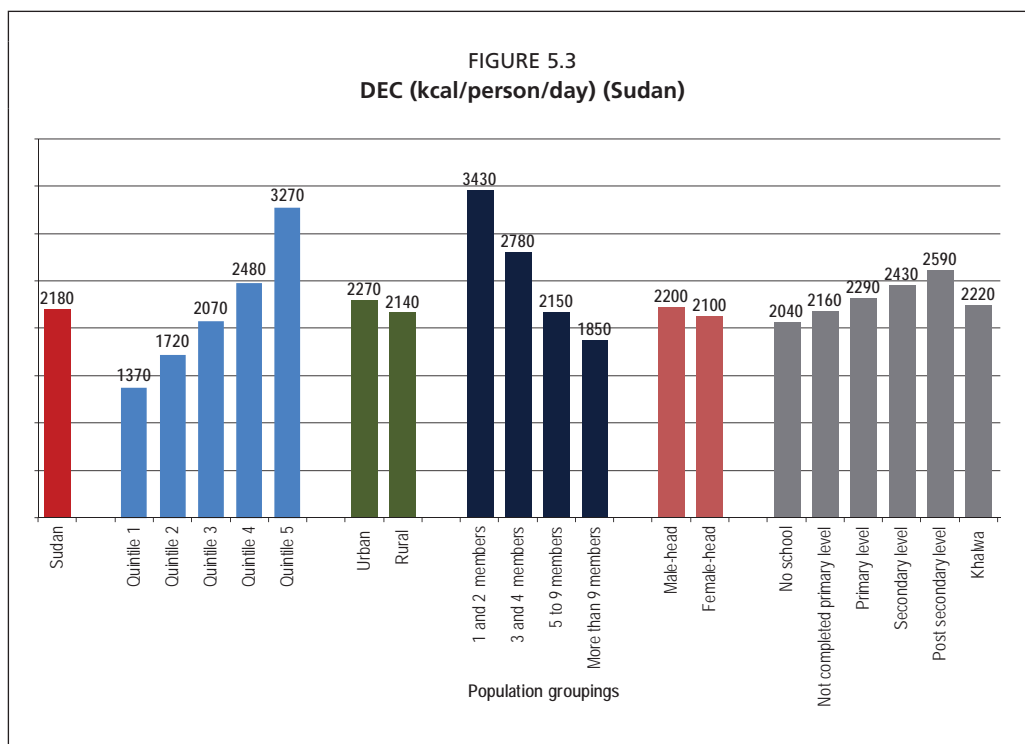
### Food deficit

The food deficit shows the amount of extra calories an average individual of the food-deprived population group needs in order to reach its MDER. In Sudan, an average food-deprived person lacked a daily consumption of about 100 g of cereal equivalent (344 kcal) to reach their MDER. The food deficit in urban and rural areas was similar to the national level. However, there was a difference between MHH and FHH, with a deficit of 324 kcal and 371 kcal, respectively (Figure 5.2). Across the 25 states in Sudan, there were large variations in the level of food deficit. The highest level was in the state of Western Bahr Al Ghazal (521 kcal) with the lowest being in Al Gezira state (249 kcal). This disparity can be explained by the fact that different states had different policies on food security management and agriculture, as well as different levels of stability.



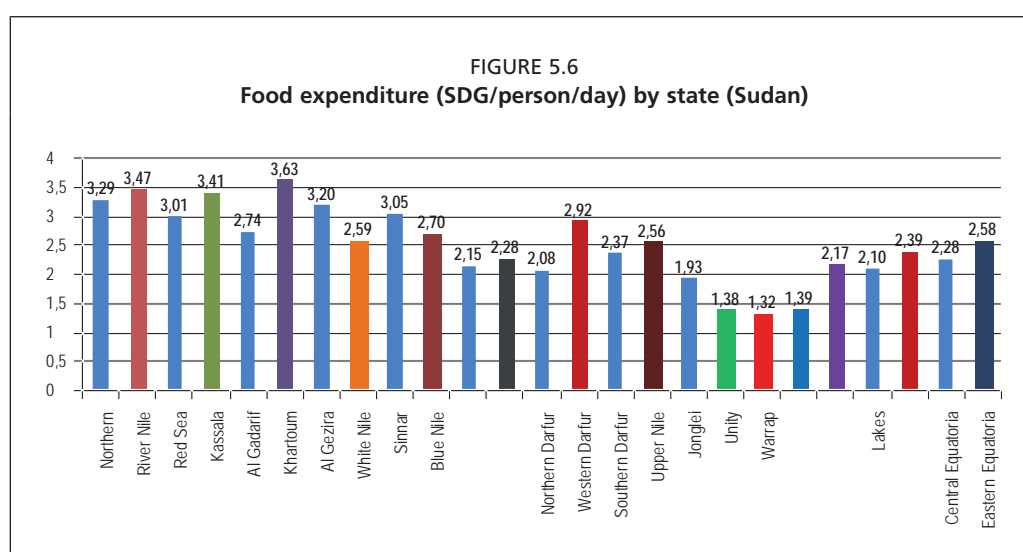
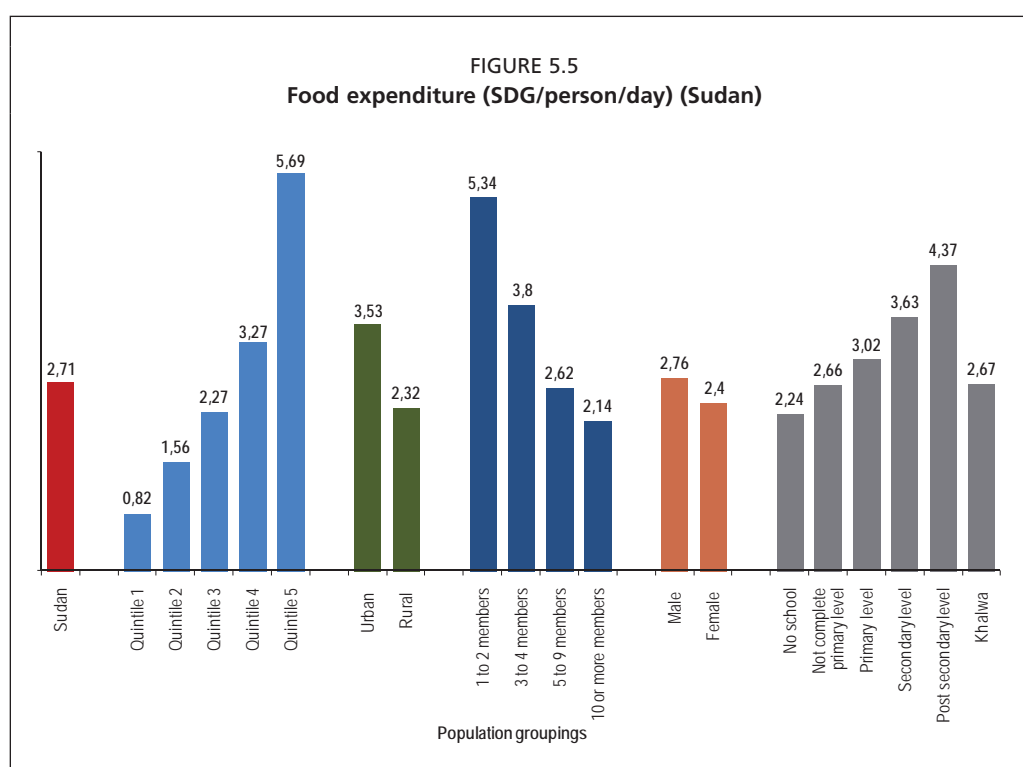
### Dietary energy consumption (DEC)

DEC was 2 180 kcal/person/day in Sudan in 2009. The increasing DEC trend according to income level was evident; the highest income group has a DEC of 3 270 kcal/person/day, more than twice that of the lowest income group at 1 370 kcal/person/day. Urban households consumed more calories than households in rural areas (see Figures 5.3 and 5.4). The daily DEC per person varied among states. The highest levels were found in Northern and River Nile (2 630 kcal/person/day and 2 770 kcal/person/day, respectively). The lowest level was found in Unity at 1 430 kcal/person/day.



### Food expenditure

At the national level, a person spent 2.71 SDG to consume 2 180 kcal per day, on average. Figure 5.5 shows that food expenditure increased according to income. Households in the fifth quintile spent almost seven times more on food than the first quintile: 5.69 SDG/person/day and 0.82 SDG/person/day, respectively. Urban households spent more money daily on food than rural households at 3.53 SDG/person and 2.32 SDG/person, respectively.

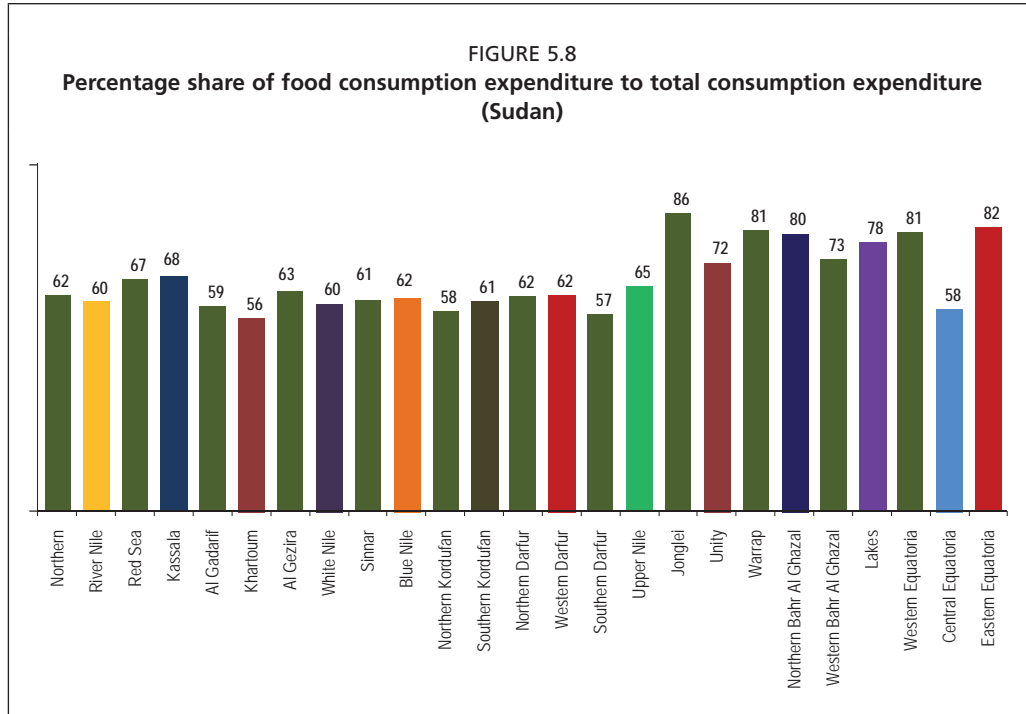
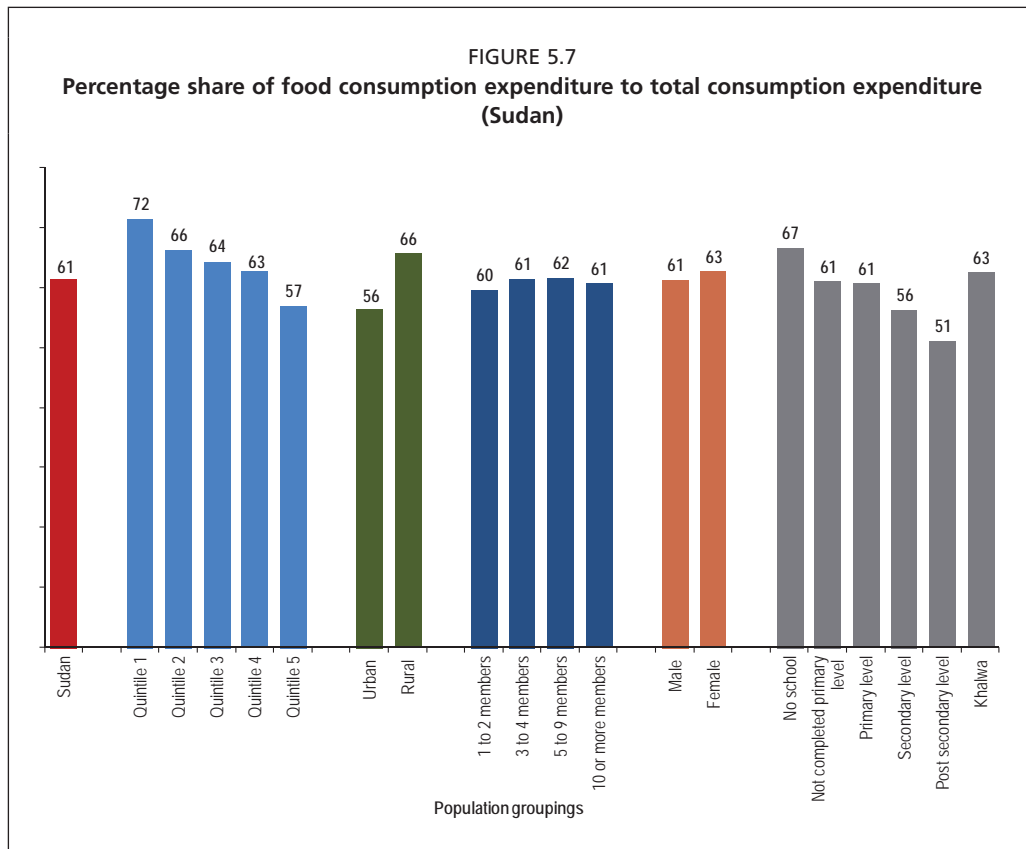


Among states, expenditure on food ranged from 1.32 SDG in Warrap to 3.63 SDG in Khartoum, as shown in Figure 5.6.

### Food ratio

In Sudan, 61 percent of the total household consumption budget was devoted to food (see Figure 5.7). The share of food expenditure to total consumption, termed as Engel or food ratio, decreased as income increased. The first and fifth income quintiles had a 72 percent and 57 percent share, respectively; values which are consistent with Engel's Law. Given that, on average, urban areas have higher incomes than rural areas, it was not surprising that the food ratio was lower in urban areas than in rural ones.





Households in the states of Eastern Equatoria, Western Equatoria, Northern Bahr Al Ghazal, Warrap, and Jonglei spent more than 80 percent of their total consumption expenditure on food, as depicted in Figure 5.8.

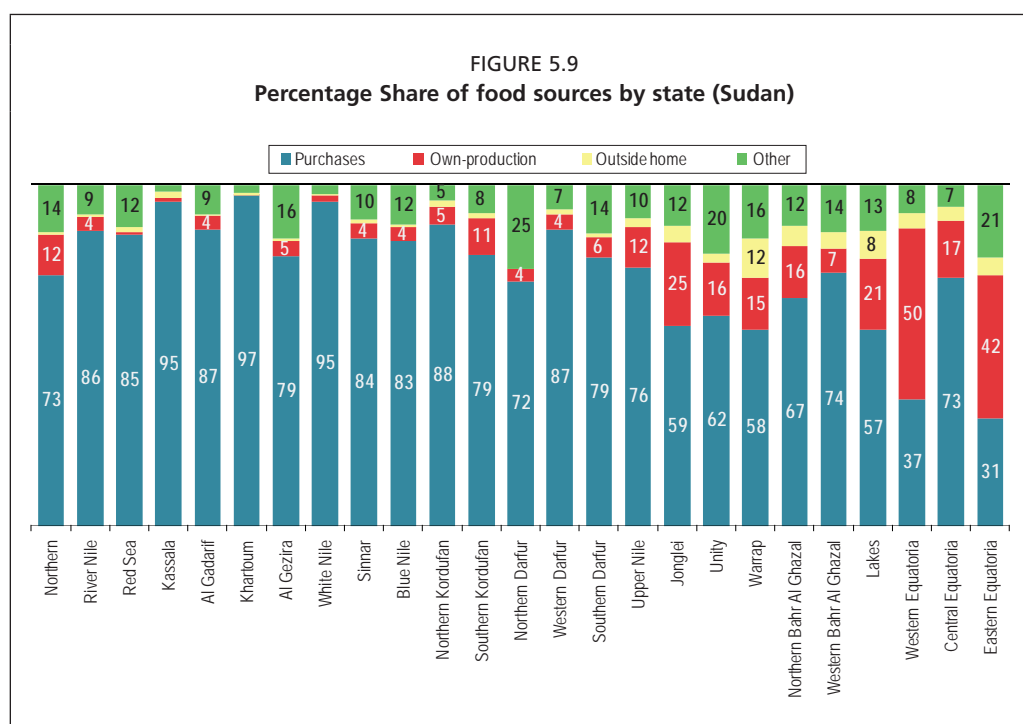
### Dietary energy consumption (DEC) by food sources

Families in Sudan acquired most of their dietary energy from purchases (81 percent), followed by other sources (10 percent), which included gifts, food aid, and payment in kind. In addition, families in the highest income quintile purchased more than 80 percent of their dietary energy, while the lowest income quintile only purchased 68 percent of its total DEC.

Own production food was not a major source of calories in the country as a whole given that on average it accounted for only 8 percent of total DEC. As expected, own-production was negligible in urban areas (1 percent) and more popular in rural ones (11 percent). These values were partially due to a depletion of household stock in the lean season when the data was collected. The lowest income quintile also made an important contribution to its total DEC from own-production (15 percent).

Food eaten away from home was a small component of DEC, with less than 2 percent coming from this source in Sudan.

The different food sources reflect the agricultural possibilities in specific states in terms of subsistence food. As expected, Khartoum had the lowest contribution from own-production, which was practically 0 percent, and the highest contribution from purchases (97 percent). Other more agrarian states like Western and Eastern Equatoria had a much higher share of DEC from own-production: 50 percent and 42 percent, respectively. Their populations depended on subsistence food (see Figure 5.9).



### Diet composition

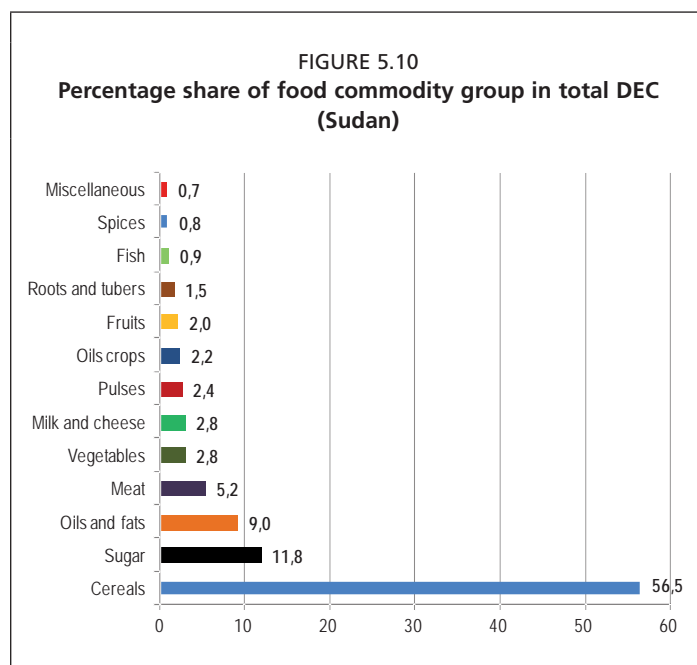
About 65.7 percent of the national average DEC was derived from carbohydrate-rich food products, which were the highest energy source, followed by fat, with 21.9 percent; and protein, with 12.4 percent. These patterns of macronutrient contribution to total energy fell within the range of WHO/FAO recommendations for a macronutrient-balanced diet.<sup>27</sup> Within the states, Western Equatoria registered the lowest share of DEC from protein (9.8 percent), which was slightly below the minimum recommended level, while Bahr Al Ghazal showed the lowest share of DEC

<sup>27</sup> A balanced diet consists of: 10 to 15 percent of DEC from protein; 15 to 30 percent of DEC from fat; and 55 to 75 percent of DEC from carbohydrates.

from fats (14.7 percent), which was also slightly below the minimum recommended level. Upper Nile was the only state to exceed one of the maximum recommended levels, as its share of DEC from protein was 16.6 percent.

### FOOD CONSUMPTION BY MAIN COMMODITY GROUPS

The contribution of each food commodity group to total DEC (Figure 5.10), showed that cereals and derived products provided 57 percent, followed by sugar and products, with 12 percent; animal oils and fats, with 9 percent; and meat, with 5 percent. The main source of energy among states was the food item, dura. Other main sources of energy were millet in the states of Northern and Western Darfur, wheat in Northern state, bread in Khartoum, Red Sea and River Nile states, and cassava flour in Western Equatoria state.



### Protein consumption

The daily protein consumption was 68 g per person. At the national level, dura was the main source of protein with average consumption of 17 g/person/day. The share of animal protein in total protein consumption in Sudan was 24.3 percent. There was a significant variation among states. The highest share was recorded in Upper Nile with 53 percent followed by Western Bahr Al Ghazal with 45.5 percent. The lowest protein consumption of 13.8 percent was in Northern state. This value can be explained by the Northern state's dependence on agriculture as a food source. In general, the southern states seemed to consume a higher share of animal protein, which was a reflection of the prevalence of cattle, and thus meat, in the region.

### Inequality in food consumption

The inequality in access to food as measured by the CV of DEC due to low income was high across all population groups. In urban and rural areas, the CVs were 31 percent and 32 percent, respectively. The inequality in FHH was higher at 35 percent than in MHH where it was 30 percent. The CV varied greatly among states, from 21.5 percent, 43.5 percent and 43.3 percent in South Kordofan, Jonglei and Lakes, respectively.

## CONCLUSIONS

The use of the FSSM tool to process the 2009 NHBS allowed the SSCCSE and CBS to produce food security statistics at both national and sub-national levels. These were presented at a one-day national seminar in Khartoum. The users of these statistics were from various socio-economic sectors. They included national and international stakeholders involved in the design of policies and actions towards monitoring the progress of MDGs on hunger reduction.

The national statistics offices of Sudan, SSCCSE and CBS, considered that food security analysis needs to be included as part of the Sudan household survey programmes.

The FSSM has two other modules, which derived statistics on the household consumption of selected vitamins and mineral as well as protein quality. Therefore, an expansion of this study to include an analysis of vitamins, minerals and protein quality was recommended, in order to assess the nutritional situation in the country

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## 6 Niger: deriving food security using household food accounting methods

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### ABSTRACT

Niger is one of the poorest African countries. At US\$ 700, its per capita GDP is one of the world's lowest. In 1993, its poverty level stood at around 63 percent. The level of prevalence of undernourishment in 2005–2007 stood at 20 percent with a daily average food dietary energy availability of 2 300 kilocalories per person (SOFI, 2010). Information on food security over long periods, was not available for the country. There was a pressing need to establish a system of harmonized quality information to provide more effective support of decision-makers in the implementation of poverty and hunger reduction programmes and policies. The National Institute of Statistics (INS) of Niger conducted its third national survey on the budget and household consumption (ENBC III) over a one-year period from June 2007 to May 2008. The data was collected from the daily record of all household expenditures for a one-week period. Food consumption data was collected by analysing household accounts of food stocks, food acquisition, consumption and expenditure. The closing food stock for the reference week was recorded for each household. Food items used to prepare meals were weighed and quantities recorded to gain a precise measure of quantity of food actually consumed by household members. These food data quantities were analysed to derive a set of food security indicators using the FSSM developed by FAO's Statistics Division. Niger's daily average DEC was 1 860 kcals per person. However, the daily DEC for the rural population was 6 percent higher than the national average. This finding was indicative of a high level of own food production of more than 70 percent in the rural areas. Low DEC in the capital city and urban areas revealed a greater inequality of food access. This inequality was attributable to a weak, marketing setup resulting in low availability of local staples and high food prices.

**Keywords:** national household expenditure survey, food dietary energy consumption, food inadequacy

### INTRODUCTION

In collaboration with a number of developing partners, Niger's INS organized its third NHBS in 2007/08. One of the objectives of this survey was to define the profile of Niger's poor population groupings since its figures dated back to 1993 when 63 percent of the population lived under the poverty threshold. These figures were estimates of previous surveys that were undertaken in 1989/90 in urban areas and in 1992/93 in rural areas. The national survey of 2007/08 covered all areas of the nation and was conducted among 4 000 households, proportionately selected from rural and urban areas. Several questionnaires were used to collect detailed demographic and socio-economic data, which included food and non-food consumption. Food data was collected using a questionnaire to quantify the intake of food. Measures were recorded in terms of quantity and monetary value of every product

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consumed within every household, during a period of seven consecutive days. The quantity of every food ingredient used in the preparation of daily meals was recorded by weight to determine consumption levels. The survey also collected information on the number of household members, including records of those present at mealtimes. The different components of the questionnaire were as follows:

- daily expenditure and purchases by the household;
- preparation and meal consumption habits;
- inventory and follow-up of food product stocks, including cereals, legumes, tubers, condiments and others;
- meals prepared at the house, including menu, weight of the ingredients used in preparation and number of portions; and
- weaning of children under 2 years of age.

The weight of the food products was directly proportionate to those people who consumed the prepared food. However, there was a weakness in the data collected. Some households recorded food consumption for abnormally high numbers of people, especially during celebrations linked to the traditions and customs of Niger. The collection of food data has permitted the identification of a list of 273 food products that included food consumed outside the home.

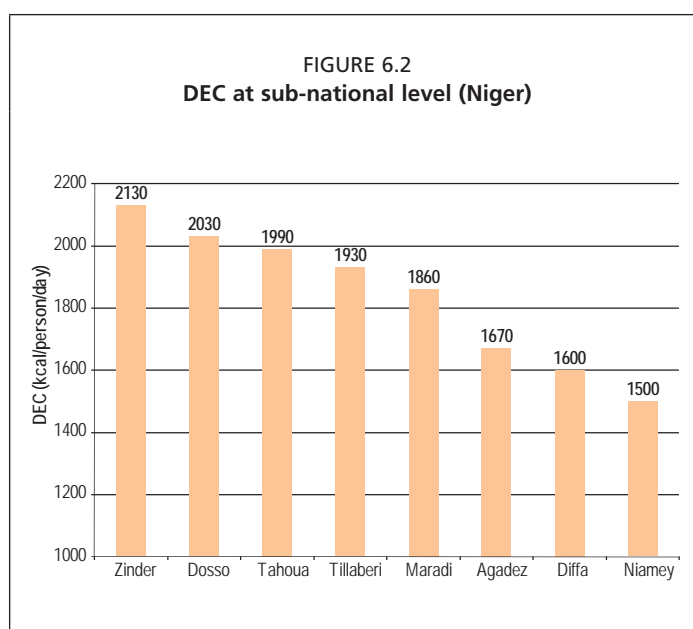
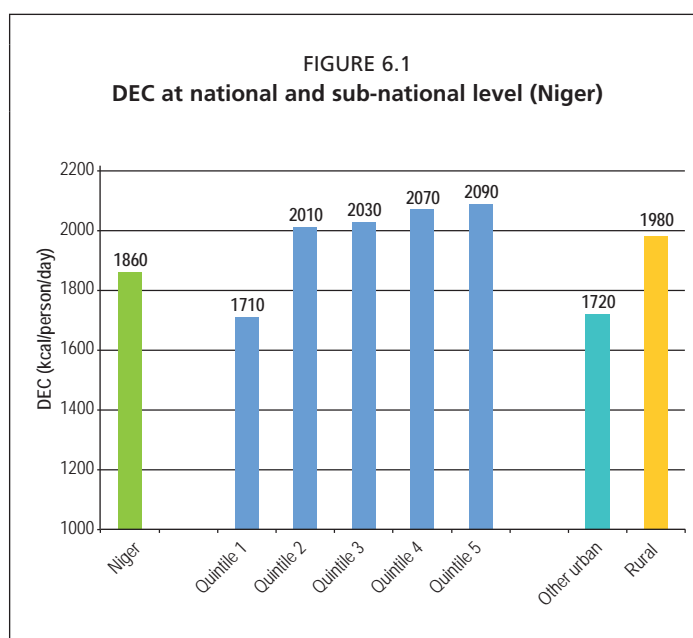
The available data of the 2007/08 national survey allowed an analysis of food security in three main areas: consumption or food availability; food accessibility; and utilization of food. FAO's FSSM was used to derive a series of indicators in food security at national and sub-national levels. These indicators, in turn, helped to define the profile of undernourished people so that food programmes could be appropriately designed to reduce hunger.

## RESULTS

### Dietary energy consumption (DEC)

In 2008, the average daily DEC per person in Niger was 1 860 kcal. Household members in the lowest income (first quintile) had an average daily DEC of 1 710 kcal/person/day and this figure reached 2 090 kcal/person/day for those individuals of households with the highest income levels (last quintile). The DEC of rural households (1 980 kcal/person/day) was much higher than that of urban households (1 720 kcal/person/day) (Figure 6.1). The undernourished low-income bracket households were thus situated in the urban areas, including Niamey which had low levels of DEC of 1 500 kcal/person/day. The disparity between DEC in urban and rural areas was accounted for by the fact that rural areas produced their own food products, while members of urban households lacked sufficient resources to obtain them.

The low level of DEC was noted in every region in Niger with the exception of Zinder and Dosso, which showed a level greater than 2 000 kcal/person/day (Figure 6.2).



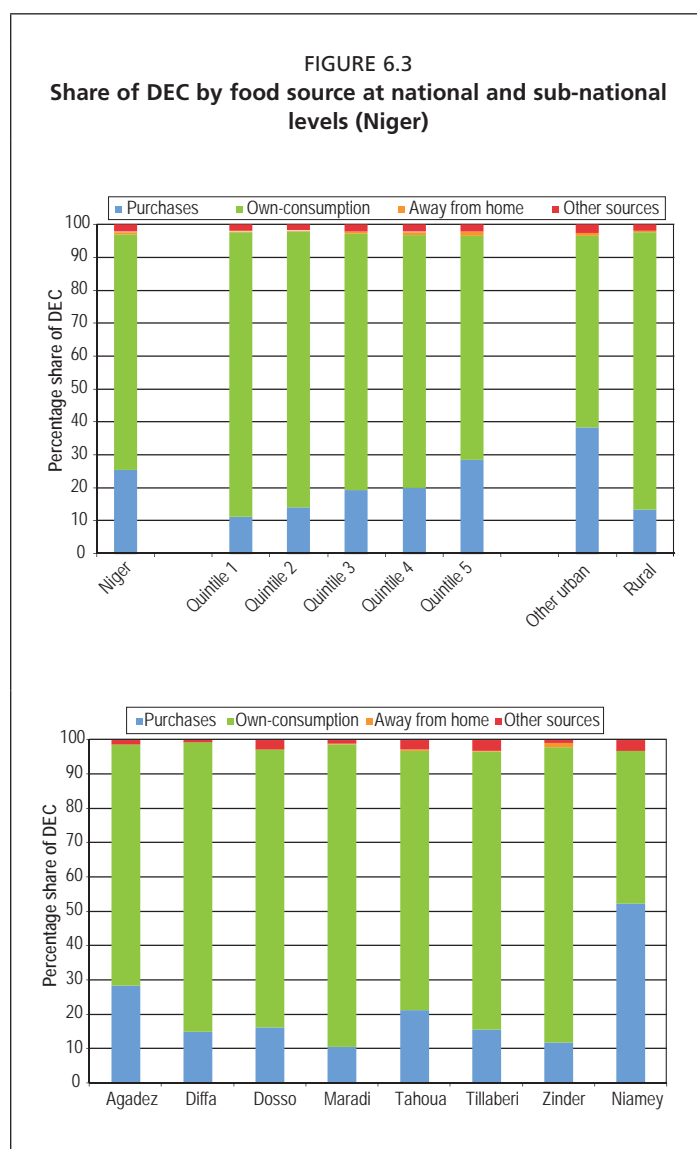
### Food dietary energy consumption (DEC) by food sources

Analysis of DEC by food sources indicated a greater contribution of consumption in relation to own-production at national and sub-national levels. Niger households obtained about 72 percent of their DEC from the food products they grew themselves (Figure 6.3). The same trend was seen for all the population groupings whose food consumption from own-produced food was over 70 percent, indicating a high dependency on subsistence farming. Exceptions to this trend were noted in the regions of Niamey and other urban areas where the values were 44.5 percent and 58.1 percent, respectively. These urban households were food consumers rather than food producers. Though limited due to high prices, purchased food accounted for 52 percent of DEC in Niamey and 38 percent of DEC in other urban areas. These statistics show that the majority of households in Niger are dependent on subsistence agriculture in rural areas for their food consumption. As such, they are highly



vulnerable to climatic shocks like drought, and to scarcity of resources such as land, water, seeds and other inputs.

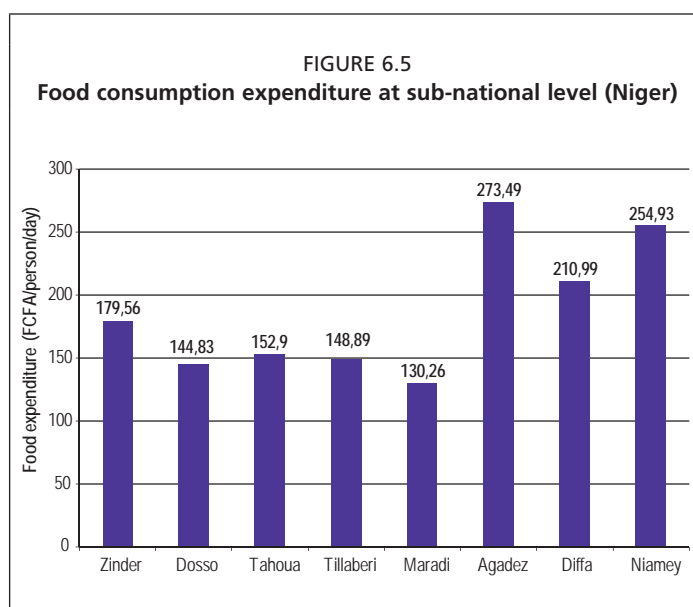
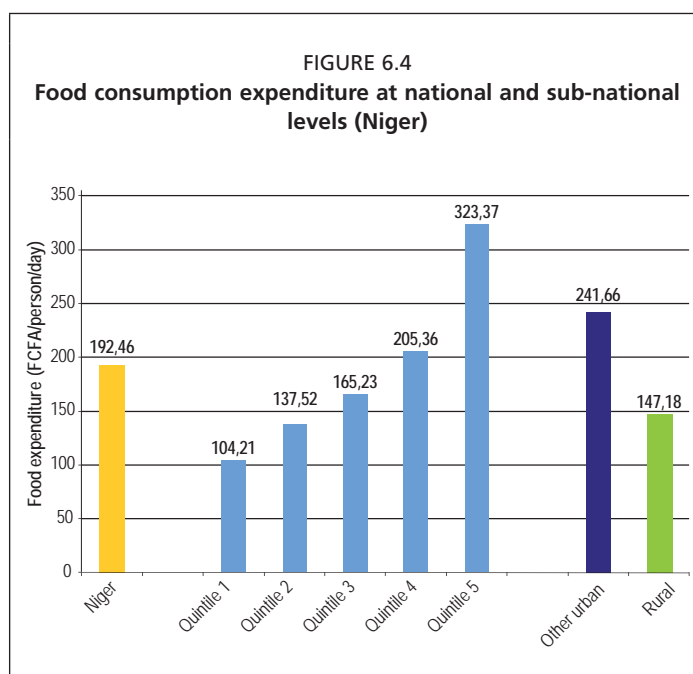
The dependency on subsistence farming among the Niger population may be strongly correlated to the high level of the food inadequacy rate observed in the country and its regions. Policies for reduction of food insecurity have to be linked to support of small farmers. They need assistance to improve food productivity and to diversify their produce towards commercial foods both for local consumption and export. Access to land and other resources should be among the main policies of decision-makers. Policies are needed to boost food production in rural areas, while better marketing infrastructure is required in urban areas.



### Food consumption expenditure

The results of the survey showed that Nigeriens spent about CFAF 192.46 person/day on food consumption (see Figures 6.4 and 6.5). The values of food expenditures should be analysed with caution. It should be noted that these values contain a high percentage of estimates of food consumed from subsistence farming. These values are usually subjective as they may relate either to producers' or retail prices, which are also influenced by spatial and temporal variations. These expenses were estimated at CFAF 241.6/person/day in urban areas and CFAF 147.18/person/day in rural areas.

Households in Niamey, Agadez and other urban areas, and those in the fifth quintile had a purchasing power that was almost double that of other population groups. Consumer spending and food consumption were highest among households in the fifth quintile with CFAF 323.37/person/day, and in the region of Agadez, with CFAF 273.49/person/day.



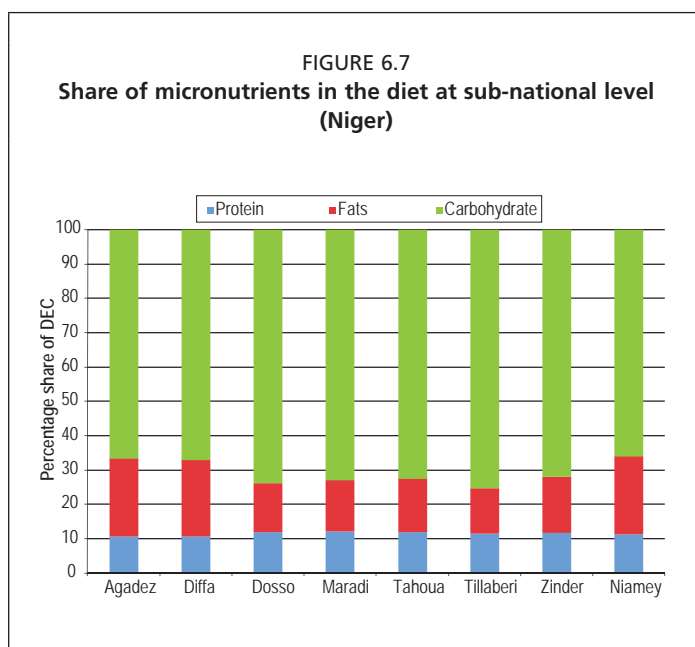
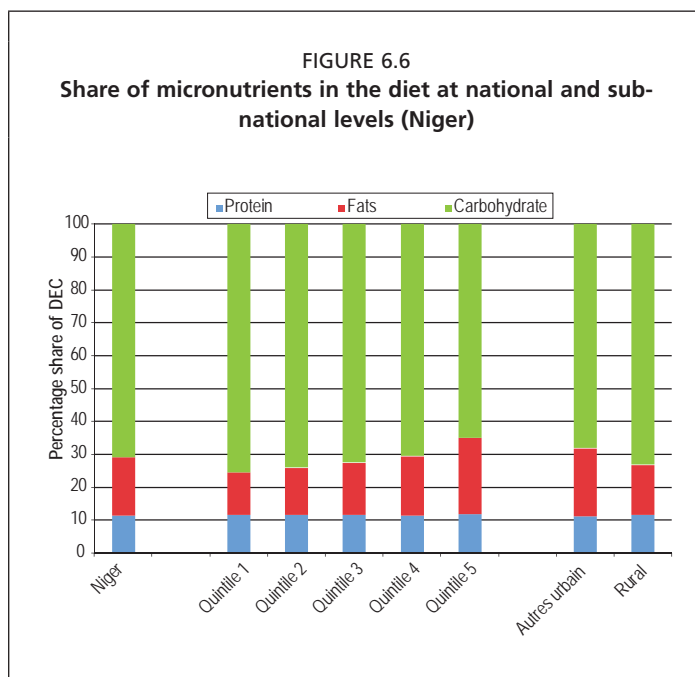
### Diet composition

The contribution of the main nutrients (proteins, fats and carbohydrates) to energy consumption is informative as it helps determine the composition and dietary balance of households. From a dietary point of view, and according to experts from WHO/FAO/UNU, a balanced diet should consist of 10 to 15 percent protein, 15 to 30 percent fat and 55 to 75 percent carbohydrate.

On average, the daily food diet of a Nigerien was composed of 11.5 percent protein, 17.7 percent fats and 70.8 percent carbohydrate. These statistics illustrate that

their diet was relatively balanced (see Figures 6.6 and 6.7). However, on the dietary scale, their fat and protein intakes were on the lower end of the recommended levels, while carbohydrate levels were nearer to the top end of recommended levels. These results would suggest a high intake of cereals such as millet, rice, maize, sorghum and wheat. In terms of quantities, these percentages would correspond to a daily consumption of 53.6 g of proteins, 317 g of carbohydrate and 36.1 g of fats.

Diets were relatively balanced in different population groups with values of average daily consumption of about 11 percent protein and 70 percent carbohydrate (Figures 6.6 and 6.7).



Food products of the survey were grouped into 19 food commodity groups. This grouping was done to analyse the diet according to the food commodities that were primarily consumed by the population. The most consumed food commodity group

was cereal. At the national level, cereal contributed over 80 percent of the diet in Niger. Other products such as oils, pulses, spices, roots and tubers, milk and meat made a marginal contribution to the diet (Table 6.1).

TABLE 6.1  
Share of contribution of macronutrients by groups of food products (Niger)

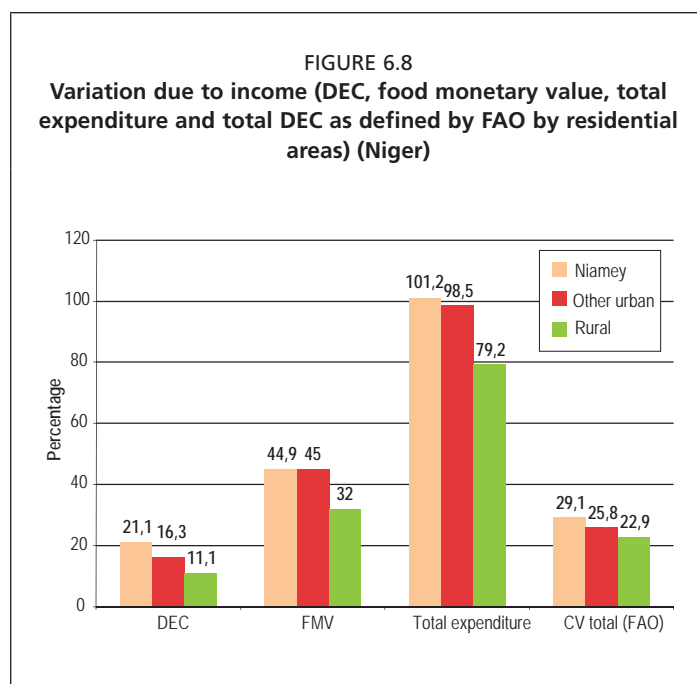
Food commodity groups	Share contribution in total DEC	Share contribution in total protein	Share contribution in total fat	Share contribution in total carbohydrate
Cereals	80.9	74.9	89.0	49.8
Vegetable oil	4.6	1.4	0.1	27.1
Pulse	4.0	9.2	3.8	1.2
Spices	2.5	4.9	1.3	4.7
Miscellaneous	2.4	1.8	1.4	7.4
Roots and tubers	1.2	0.4	1.7	0.3
Milk and cheese	1.2	2.1	0.5	3.5
Meat	1.1	3.5	0.0	4.1
Sugar	1.0	0.0	1.4	0.0
Vegetables	0.8	1.1	0.7	0.9
Tree nuts	0.2	0.2	0.0	0.6
Fruits	0.1	0.0	0.0	0.0
Fish	0.1	0.5	0.0	0.1
Animal oil	0.1	0.0	0.0	0.3
Eggs	0.0	0.0	0.0	0.0
Stimulants	0.0	0.0	0.0	0.0
Non alcoholic beverages	0.0	0.0	0.0	0.0
Oil crops	0.0	0.0	0.0	0.0
Alcoholic beverages	0.0	0.0	0.0	0.0

Consumption of foods rich in protein (meat, fish, milk products and eggs) constituted a marginal share of about 10 percent of of people's dietary energy intake (DEI). The low consumption of protein-rich food was due to the scarcity of such products in Niger. This protein scarcity was particularly apparent in rural areas because of lack of availability and prohibitive prices. Farmers in rural areas were producing meat and dairy products not for their own consumption, but as sources of livelihood.

### HOW INEQUALITY OF FOOD ACCESS IS MEASURED

Inequality measures can be estimated from several indicators such as the Gini coefficient, dispersion ratios and CV. FAO defines the total CV of DEC as the inequalities of DEC due to income, and that induced by dietary energy requirement which is influenced by individual body requirements for an active, social and healthy lifestyle. The CV of dietary energy requirement was estimated at a fixed value of 20 percent. The CV of the DEC due to income, measures the disparity of DEC between individuals, taking into consideration variations due to household income.

The CV of DEC due to income was estimated for Niamey, other urban and rural areas whose values were 21.1 percent, 16.3 percent and 11.1 percent, respectively. These figures reveal an inequality of access to reasonable consumption due to moderate DEC based on subsistence agriculture with low incomes (Figure 6.8). The CV of food consumption in monetary value was higher because it included the effects of prices.



The total CV, as defined by FAO, is one of three key parameters for estimating the proportion of food-deprived people in a sample. In Niamey, other urban, and rural areas, the total CVs were 29.1 percent, 25.8 percent and 22.9 percent, respectively.

### Minimum dietary energy requirement (MDER)

The MDER refers to sufficient amounts of energy needed to meet the energy needs for normative minimum acceptable weight corresponding to a certain size while maintaining the practice of light physical activity and good health. The MDER was estimated using the demographic data of sex and age of household members of ENBC. The values obtained for the Niamey, other urban, and rural areas were 1 743 kcal/person/day, 1 701 kcal/person/day and 1 618 kcal/person/day, respectively.

### CONCLUSIONS

The analysis of the food security by the ENBC in 2007/08 derived a set of food indicators to measure the three components of food security. These values helped to determine the location and identify the food insecure people that can benefit from food policies and programmes aiming to reduce hunger in Niger. The analysis showed that there are considerable problems of food distribution within the country even in the Niamey capital. This analysis also made it possible to better understand the quality of the food that is consumed by the population of Niger. These foods are primarily cereal products, which have resulted in a high carbohydrate contribution to the diet and a deficiency of other nutrients such as proteins and fats. These results provide useful guidance for policy-makers who seek to improve food security both in the urban and rural areas of Niger, and to meet the MDGs of reducing hunger by half by 2015.

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