

Part 5.

# **How to enhance analysis of food security statistics**



# Longitudinal analysis using panel data for assessing seasonal effects on the food security situation in Tajikistan's HBS 2005

Mirgand Shabozov, Ihtier Ashurov and Seevalingum Ramasawmy<sup>24</sup>

## ABSTRACT

Household income and expenditure surveys (HIES) usually collect food data from households for only one period, which may be one or two weeks or one month. Most HIES extend the fieldwork over a period of one year to account for any seasonal effects on household expenditure, particularly food consumption. Survey estimates assume that seasonal effects are cancelled over large groups of households, but not at the level of the individual household. Thus, the inter-household variation estimated on the basis of such data would tend to include seasonal effects. The Tajikistan Household Budget Survey (HBS), on the other hand, has the particular characteristic of collecting expenditure and income data from the same households over a long period. The longitudinal survey design accounts for all variations, including seasonal effects, when analysed over the months of the yearly period. This paper presents some trend analysis of food security statistics derived from the 2005 Tajikistan Household Panel Monthly Food Consumption Data, collected from a sample of 925 households, and evaluates the impact of variability of the distribution of food consumption on food security statistics estimates.

**Keywords:** food consumption data, food security statistics, panel data, dietary energy consumption, food deprivation, critical food poverty, coefficient of variation.

## BACKGROUND

Tajikistan is a landlocked country, which is sparsely inhabited and largely (90 percent) mountainous. Its total area is split into four regions (Oblasts) and one independent city, the capital Dushanbe. Only seven percent of the land area is arable; cotton and wheat are the main crops. Aluminium is the country's major resource, together with other limited mineral deposits such as silver, gold, uranium and tungsten. With abundant water resources, Tajikistan possesses many hydropower facilities, but these are not well distributed among its population. The civil war from 1992 to 1997 severely damaged the already weak economic infrastructure and caused a sharp decline in industrial and agricultural production.

Although Tajikistan has experienced steady economic growth since 1997, nearly two-thirds of the population continues to live in poverty. Economic growth reached 10.6 percent in 2004, but dropped to eight percent in 2005 and seven percent in 2006. Tajikistan's economic situation remains fragile owing to uneven implementation of structural reforms, weak governance, widespread unemployment and the external debt burden. Unemployment is officially estimated at 30 percent, but the real figure is likely to be much higher. Lack of alternative sources of livelihoods continues to exacerbate household food insecurity and results in underemployment in the

<sup>24</sup> Chairman and Deputy Chairman, State Committee on Statistics, Dushanbe, Tajikistan (first authors); and, statistician, FAO Statistics Division, Rome.

agriculture sector. Large numbers of young men migrate seasonally or permanently for employment in other Commonwealth of Independent States (CIS) countries. There is high mobility of the working population to the Russian Federation, where more than 500000 Tajikistan people are currently working. In 2007, the total population of Tajikistan was about seven million; nearly 70 percent living in rural areas. Annual population growth is about two percent.

### **OBJECTIVES, METHODS AND DATA**

This paper analyses the trends of food security statistics derived from the monthly and quarterly food consumption data of Tajikistan's 2005 Household Budget Survey (HBS 2005). It also evaluates the variation trends of inequality measures of dietary energy consumption (DEC) due to such factors as income and area of residence, and their effects on the measurement of food deprivation.

The Tajikistan State Committee of Statistics (SCS) conducts HBS based on the Soviet methodology of collecting household consumption expenditure from a fixed sample of households over time. A nationally representative sample of 925 households was selected from the 2000 population census data frame using multi-stage stratification. Rural and urban areas were accounted for, together with criteria for mountains, valleys, uplands, lowlands and national borders to the north and south. Households were selected at the last stage using the available administrative data regarding household composition. Detailed household expenditure including food and income data have been collected through daily records from the same 925 households since January 2000. Each household receives a monthly incentive equivalent to US\$1 in local currency.

HBS 2005 collected consumption and expenditure data from 925 households over the year using eight types of questionnaire, which enabled the collection of complementary expenditure data on a daily, monthly and quarterly basis. Food data were recorded in detail: stock of each food item at the start of the month; daily purchases, own production and transfers (aid, gifts, etc.); and stock at the end of the month. Income was also collected by source on a daily and monthly basis. SCS used a detailed nutrient conversion table covering dietary energy, protein, fat and carbohydrate values to compute nutrient values.

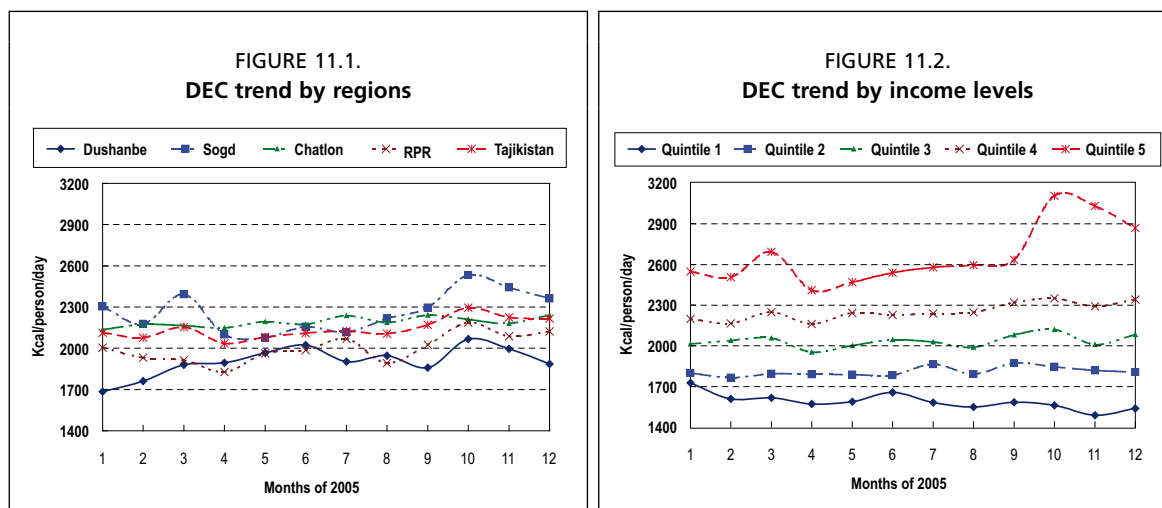
The HBS 2005 monthly food consumption data, together with household income, were analysed using the statistical procedures of the FAO Food Security Statistics Module (FSSM). This paper compares the food security statistics estimates from two sets of data from the 925 households: the 12 sets of monthly food consumption data, and the quarterly aggregated data. Food consumption in terms of dietary energy and expenditure are examined, together with dietary energy unit value at national level, for each of the four main regions - Dushanbe, RPR, Sogd and Chatlon - and by income quintile. The measure of inequality in food assess is examined in great detail to evaluate the variations due to area of residence and income over the months of 2005. Measures of prevalence of hunger, food deprivation and critical food poverty are also discussed. Food expenditure as a share of total consumption and diet diversity are compared for the two sets of data.

### **FOOD SECURITY STATISTICS DERIVED USING THE LONGITUDINAL APPROACH**

#### **Dietary energy consumption**

Average daily dietary energy consumption (DEC) was 2150 kcal in 2005. By region and income level, DEC showed wide fluctuations over the months of 2005, as illustrated in Figures 11.1 and 11.2. The population of Dushanbe and RPR regions had lower than national DEC levels in all months. These two regions had low food production because Dushanbe is the capital city and RPR is the region of aluminium ore, so both have to

rely on food imports from other regions or neighbouring countries. Sogd, the industrial region and Chatlon, the cotton and wheat growing region, had higher DEC than national level in almost all months. These two regions have good food availability because they contain the largest cultivation areas for such crops as potatoes, barley and melons.



Daily per person DEC according to income quintile showed gradual increases in the monthly totals from the lowest to the highest-income population group. The population of the three lowest quintiles had DEC below national minimum dietary energy requirement (MDER) of 1880 kcal/person/day in all months. Those of the two highest quintiles had DEC well above national average.

Fluctuations in the DEC of the four lowest income groups over the months were small, and more regular than those observed among regions. The highest-income group had more pronounced fluctuations, with peaks in March and October.

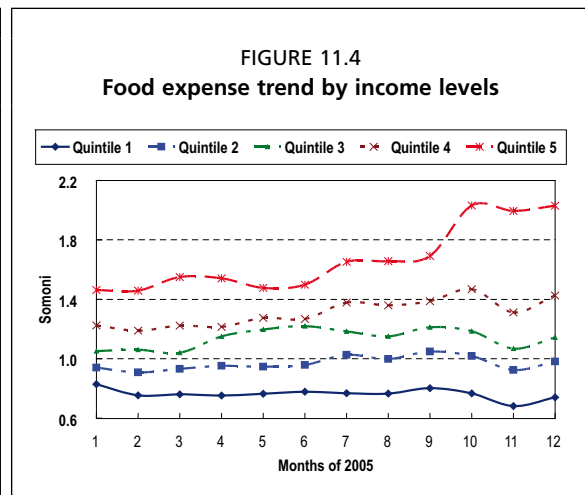
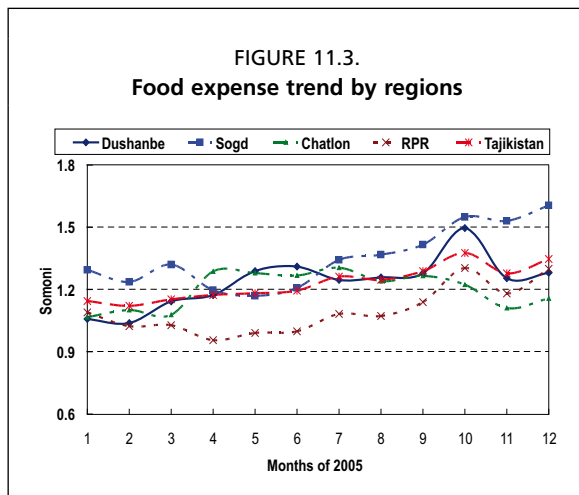
DEC varied more according to income level than to place of residence. DEC levels in the first four income quintiles did not differ greatly in magnitude. The average daily incomes per person ranged from 0.91 somoni for the lowest quintile to 1.91 somoni for the fourth; the highest quintile had a much higher average of 3.20 somoni. This high-income population group was present in all four regions, and may influence the observed regional fluctuations. The months of March and October 2005 registered high peaks in DEC, probably linked to national socio-cultural or religious events. More than 90 percent of Tajikistani people are Sunni Moslems and were probably fasting in October 2005, which was the month of Ramadan. It is well known that during this special religious month, food acquisition and consumption are high, in terms of both quality and quantity, particularly among high-income households. In addition, there is much sharing of food within the community, with a large part of food given away by some households and received by others. Data on such food transfers were not recorded, however, so the overall effect of this is not known.

### Food expenditure

National average daily per person food expenditure fluctuated from month to month, with the lowest value (1.12 somoni) in February and the highest (1.68 somoni) in October, when there was a high level of overall consumption. Analysis by region showed that although the population of Dushanbe had relatively low DEC, its food expenditure was higher than national level, indicating that prices in the capital city were higher than in other parts of Tajikistan, probably owing to the high importation of food products from other regions or countries. The industrial region of Sogd also had a high level of food expenditure, ranging from 1.17 to 1.61 somoni, which was

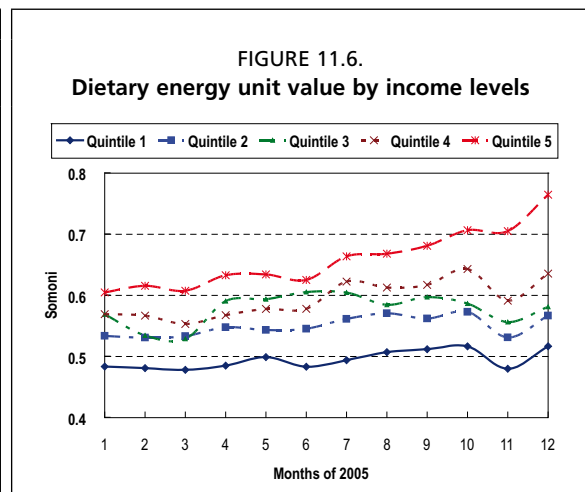
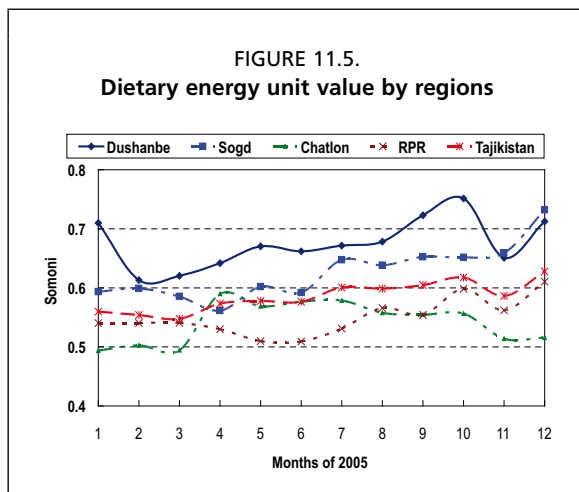
slightly higher than the average in Dushanbe. The population of RPR had the lowest food expenditure (Figure 11.3).

Figure 11.4 shows the monthly trends of food expenditure by income level. Again, there are clear differences between the highest and the lowest income quintiles. Food expenditures for the three lowest income quintiles were lower than national level in all months. For most of the year, food expenditure in these quintiles remained almost constant, but there was an increase in October followed by a decrease in November and another increase in December, probably owing to end-of-year celebrations. The population of the highest income quintile had increasingly high food expenditures, with peaks in the three last months of 2005.



**Dietary unit value**

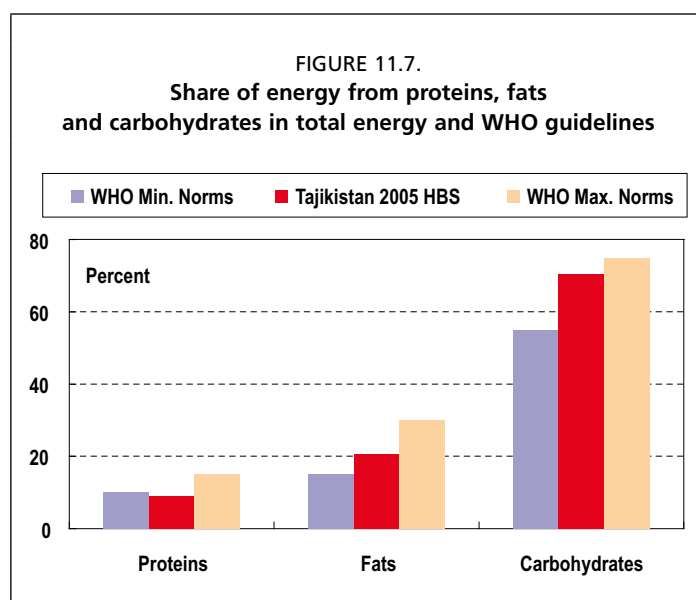
National average dietary unit value was 0.57 somoni per 1000 kcal. This value varied from 0.55 somoni for the months of February and March, to 0.63 somoni in December. The population of Dushanbe had the highest dietary energy unit value over all months of 2005, paying abnormally high values in January (0.71 somoni) and October (0.75 somoni). Sogd also had a high overall dietary energy unit value, which increased slowly over the months of 2005 (Figure 11.5). It is surprising that the dietary unit value fell in all regions in November, before rising again in December. This could be due to a fall in food prices resulting from a surplus of food items on the market at the end of the religious month of October.



The dietary energy unit value by income quintile showed markedly increasing patterns over the months, again with a drop in November followed by an increase in December. The lowest quintile had an overall yearly dietary energy unit value of 0.49 somoni, compared with 0.66 somoni for the highest income quintile.

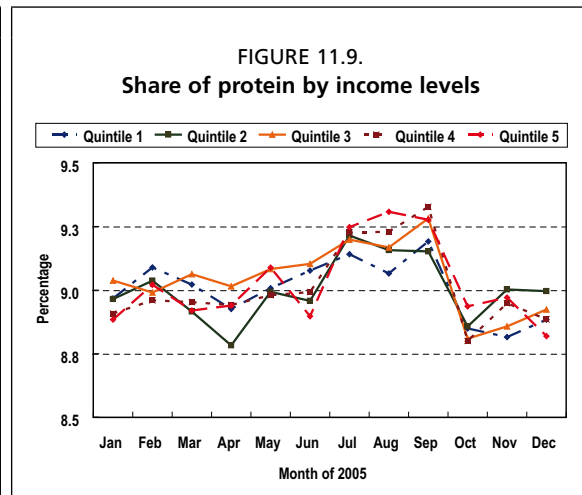
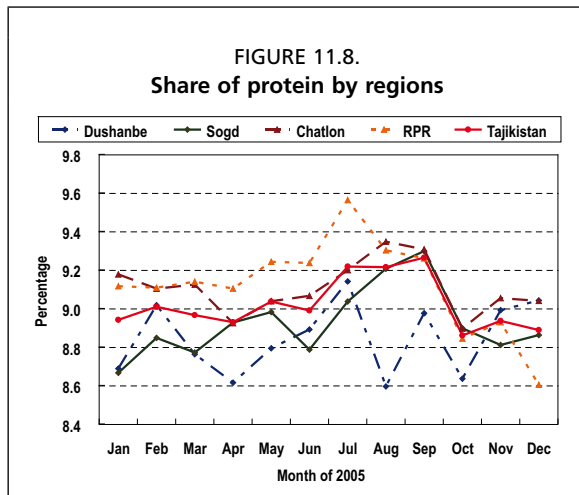
### Diet diversity

The contributions of energy-yielding nutrients in total dietary energy showed that the consumed diet was deficient in proteins compared with World Health Organization (WHO) norms (Figure 11.7). The share of energy from proteins was about nine percent, which was less than the WHO minimum of ten percent. The share of energy from fats was within WHO norms, but the share of energy from carbohydrates (70 percent) was towards the WHO maximum of 75 percent. Consumption of protein food sources such as pulses, fish, meat or dairy products was very low.



Regional analysis of the share of energy from proteins in total energy is given in Figure 11.8, which shows large and uneven variations among regions over the months of 2005. The population of Dushanbe were more protein-deficient (at less than nine percent in all months except July to September) than other regions, while the population of RPR had higher, but still deficient, protein consumption. In the two months of July and September there was increased protein consumption in all regions, probably due to the availability of protein-rich food products in the harvest seasons.

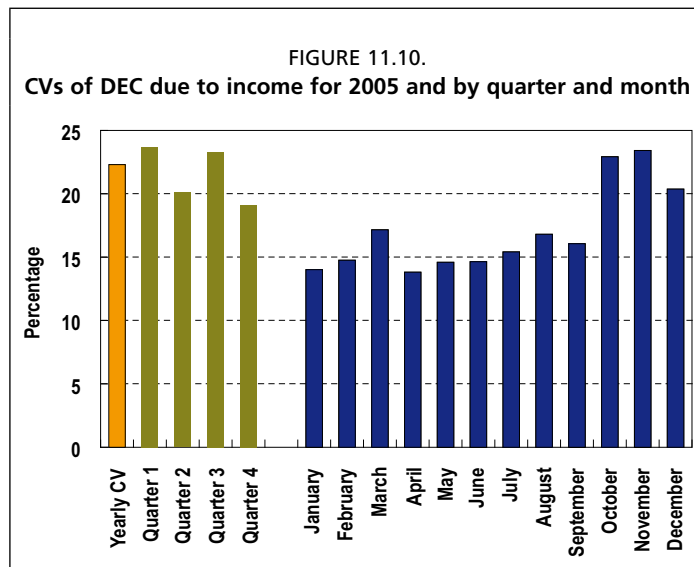
There were no clear differences in the levels of protein consumption among different income levels over the months (Figure 11.9); all income groups showed the same increasing patterns over the months of July and September, before dropping in October. This situation could be due to the scarcity of high-protein food products on the markets and the prohibitive prices of those that are available.



**Inequality**

The distribution of DEC is assumed to be log-normal and its variance is a function of the coefficient of variation (CV). The CV includes income and biological sources of variations of DEC and is a measure of access to food. The biological CV accounts for factors such as sex-age composition, body weight and physical activity of household members. It is estimated at 20 percent.

Figure 11.10 gives the inequality of food access due to income computed for groups of households classified according to income deciles. National CV of DEC over the year was 30 percent, which included 22 percent corresponding to the CV due to income. The CVs estimated for quarterly data differed marginally from the yearly CV. The estimated monthly CVs were lower than the yearly CV, except for in October and November.



A striking observation is that the monthly inequality measures of DEC due to income were usually (except for the last three months) less than the quarterly or yearly values, which are inflated by other variations owing to inter-household, seasonal (within the quarter) and other non-random factors.

These variations were analysed using the available 2005 longitudinal food data, with inter-household factors of area of residence and income level, using a linear



model of the log of DEC with repeated measures (months). The analysis of variance results are shown in Table 11.1. The variation estimates in the right-hand column have been converted to the original DEC scale for better understanding.

As shown in the top part of table 11.1, area of residence (rural or urban) and income levels (decile) were significant sources of inter-household variation with standard deviation of 2062 kcal/person/day. This variation does not reflect sources that are excluded in the model, random variation and undesirable variation due to sampling design and instrumental errors. The within-factors as sources of variation were significant in terms of time (months), in time within area of residence and in time within income levels.

TABLE 11.1  
Analysis of variation of dietary energy consumption  
considering effects of area of residence, income levels and trend

Source of variation	F	Sig.	E(MS)	$\sigma_i$
<i>Between Effects</i>				
Area of residence	102.160	0.000	8.73	
Income	30.552	0.000	4.77	
Area of residence & Income	0.934	0.494	0.83	
Residual - Error (between)	0.000	0.000	0.86	2062
<i>Within Effects</i>				
Month	7.631	0.000	0.84	13
Month & Area	2.294	0.008	0.46	71
Month & Income	2.734	0.000	0.50	138
Month & Area & Income	1.116	0.204	0.32	448
Residual - Error (within)	0.000	0.000	0.30	608

Intra-household variation (standard deviation of 608 kcal/person/day) was smaller than inter-household variation, but a significant source of variation was seasonality. The possibility that inter-household variation estimates may be overestimated as a result of the sampling design should be taken into account. This study does not address this design effect on the variation among households.

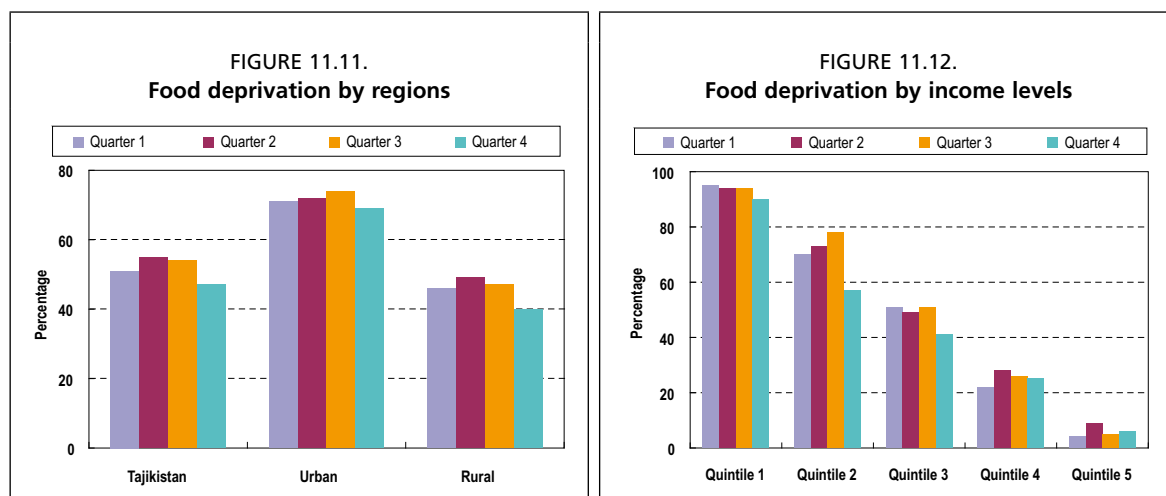
In commonly used household survey design, where the reference period is one month or less and households are allocated over a one-year survey period, the sources of variation (month, month within area, month within income and error) are added to the survey estimates. By considering random allocation throughout the year, these surveys add variation to the inter-household CV and hence overestimate the prevalence of food deprivation.

### Food deprivation

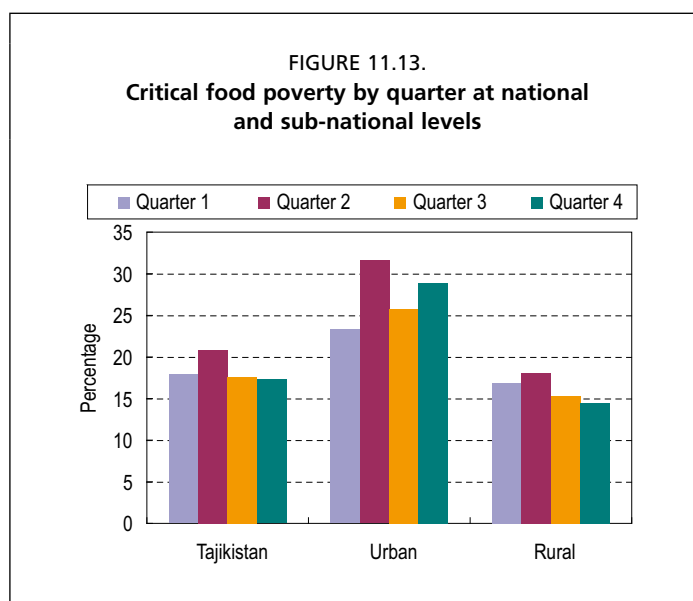
The longitudinal data of HBS 2005 were also analysed by comparing food deprivation over the four quarters to study food consumption distribution and any improvement in the level of undernourishment over the year. During 2005, four percent of the population moved out of the food-deprived category, owing to a two percent increase in the average daily DEC and a three percentage points decrease in the CV due to income, from 31 to 28 percent.

The MDER of 1880 kcal/person/day was the same for both quarters. Movements of population out of the food-deprived category were observed in both urban and rural areas, where the food-deprived decreased by two and six percent, respectively. Marginal increases in DEC were noted in both urban and rural areas, but rural areas also registered a significant five percentage point decrease in CV due to income. While there were significant improvements among the population of the three lowest income

quintiles, there were small setbacks for the population of the two highest quintiles, due mainly to a fall of about two percent in their DEC (Figures 11.11 and 11.12).



The prevalence of critical food poverty, which measures food income deprivation, showed a marginal fall of one percentage point at national level between the first and fourth quarters of 2005 (Figure 11.13).

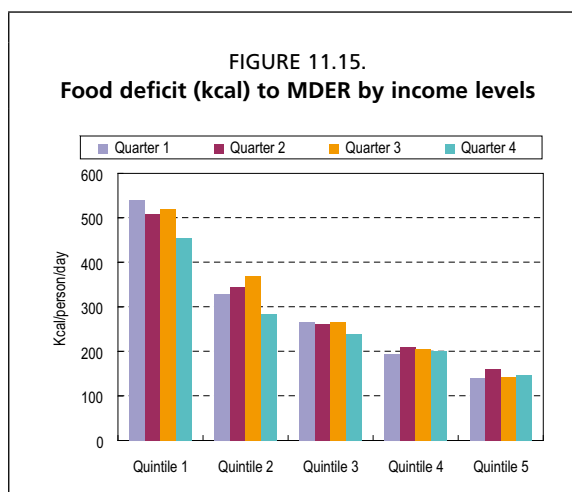
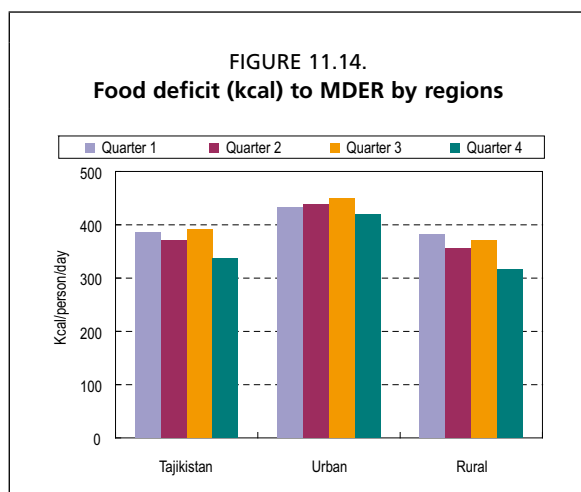


The prevalence of critical food poverty fluctuated over the four quarters of the year, and was high in the second quarter at national and sub-national levels. It then fell in the following quarters. Critical food poverty was higher in urban than rural areas owing to the availability of food at lower prices in rural areas.

### Intensity of food inadequacy

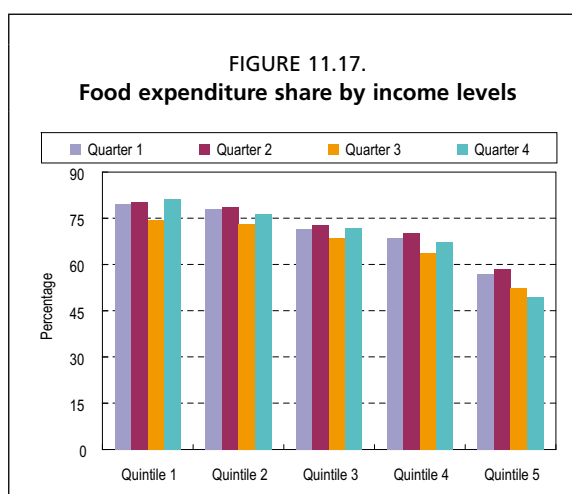
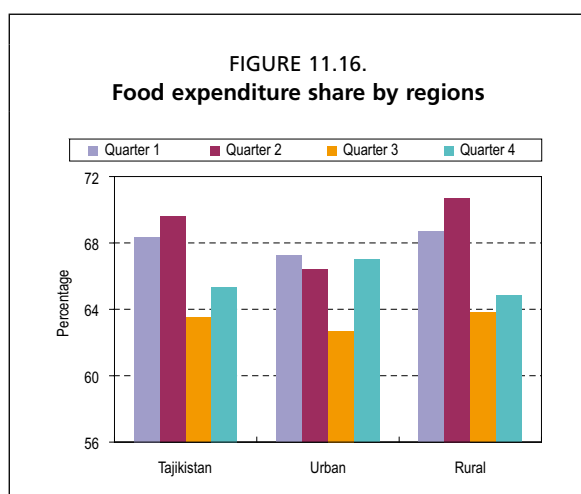
Figures 11.14 and 11.15 show the intensity of food poverty in relation to MDER over the four quarters of 2005, at national and sub-national levels and by income level, respectively. The figures show that urban areas with low DEC had higher food deficits than rural areas and national average.

The food deficit was less in the fourth quarter at national level and in both urban and rural areas. This was also true of the different income levels, owing to the higher DEC observed from October 2005. There was a general high food deficit during the third quarter in almost all the regional and economic population groupings, with the highest-income group witnessing a food deficit of about 150 kcal/person/day.



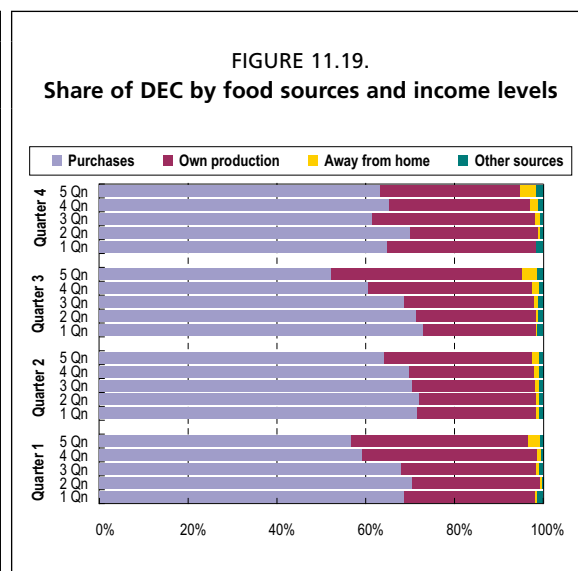
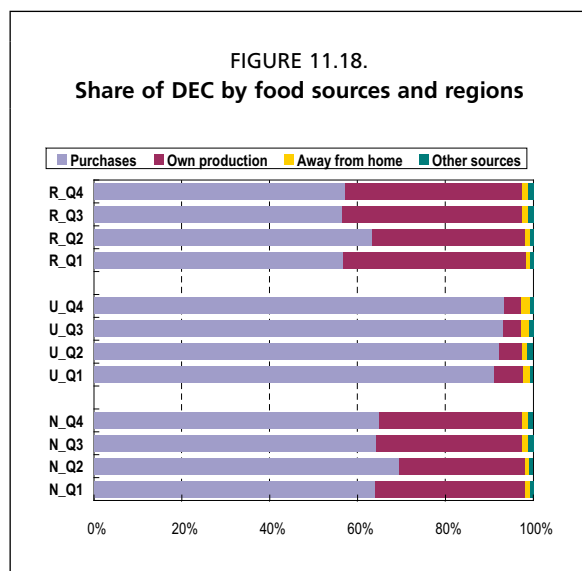
### Food share

The share of food expenditure to total consumption expenditure estimated from annual household data at national level was 69 percent. This share at national level showed an erratic trend over the four quarters of 2005. From 68.4 percent in the first quarter, it increased to 69.6 percent in the second, fell to 65 percent in the third and rose again to 65.3 percent in the last. The same patterns occurred in urban and rural areas, but with higher magnitudes in rural than urban areas (Figure 11.16). However, the food share showed a decreasing trend with increasing income levels over the four quarters, with a high food share (80 percent) among the population of the lowest income group falling to about 50 percent for those of the highest income group. The second quarter registered the highest food share for most population groupings (Figure 11.17); this is a harvest period for some food crops.



Figures 11.18 and 11.19 illustrate the shares of DEC by food source at national and sub-national levels and by income level, respectively, for the four quarters of 2005. Purchases were almost the only source of DEC for the population of urban regions,

while own-produced food constituted a significant share of DEC, of about 40 percent, in most of the other population groupings. There was little variation in own production contribution among the quarters, apart from some high shares in the first and fourth quarters for the high-income groups, probably due to the harvesting season.



## CONCLUSIONS

Analysis of the longitudinal food consumption data of Tajikistan's HBS 2005 provides some useful characteristics of food security statistics:

- Food deprivation differed by season and by income level.
- Food consumption was seasonal and was influenced by national socio-religious events.
- Food demand was high in high-income groups during specific periods.
- Dietary energy unit value differed among seasons and among income levels.
- Diet consumption of nutrients varied over the seasons.
- Food consumption from purchases did not vary over the seasons, while that from own production varied over the months.
- There was a seasonal affect on the diet consumption of nutrients.
- Food inequality or access measures were low when estimated with monthly data; the use of more aggregated data caused overestimations.
- The intensity of hunger differed by season and income level.
- The share of food in total expenditure varied with season and level of income.

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# Deriving better estimates of food security statistics at sub-national levels by integrating Georgia's IHS and MICS data

George Kvinikadze, Grigol Pantsulaia and Ricardo Sibrian<sup>25</sup>

## ABSTRACT

The Department of Statistics (DS) of Georgia has conducted a regular National Household Survey (NHS) since 1996. NHS started as an income and expenditure survey, until 2002, when it started to incorporate elements of the labour force survey to become the Integrated Household Survey (IHS). IHS data collection is spread over a period of one year. DS also collaborated with the Centre of Medical Statistics and Information (CMSI), national Centre of Disease Control (NCDC) and the United Nations Children's Fund (UNICEF) to conduct Multi-Indicator Cluster Surveys (MICS) in 2002 and 2005. MICS collected complementary data on child nutritional status for food security analysis.

The FAO Food Security Statistics Module (FSSM) applied to the IHS 2005 food consumption data enabled the derivation of food security statistics. These statistics enhanced the assessment of food insecurity in the country at national and sub-national levels, by providing information on the nutritional status of children. This additional and complementary information proved useful in differentiating the food security situations of different population groups. This paper discusses the results of the food security statistics derived from the food consumption data of IHS 2005, using complementary data from MICS on the nutritional status of children under five.

**Keywords:** food security statistics, food deprivation, child undernutrition, policy implications

## BACKGROUND

In 2000, the Department of Statistics (DS) of Georgia, with financial and technical support from the EC-FAO Food Security Programme, established a Food Security Observatory (FSO), which provides users with information about the food security situation of the population. FSO has published 29 issues of the *Food Security Bulletin*, which covers all dimensions of food security (availability, access, utilization). The FAO Statistics Division developed the Food Security Statistics Module (FSSM) software to help national statistics organizations to optimize the analysis of existing data. The food consumption data collected in national household surveys (NHS) is useful for estimating the prevalence of undernourishment and a suite of food security indicators at national and sub-national levels. The software provides harmonized methodological procedures and recommendations on the compilation of food security statistics for comparability purposes at national, regional and global levels.

This paper uses results derived from the first application of FSSM software to the data of Georgia's Integrated Household Survey (IHS). In the future, FSO plans to use this software to derive the food security statistics it publishes in the *Food Security Bulletin*. The analysis incorporates results from the Multi-Indicator Cluster Survey (MICS).

<sup>25</sup> Head of Food Security Observatory and Chairman of Department of Statistics, Ministry of Economic Development, Tbilisi, Georgia (first authors); and Senior Statistician, FAO Statistics Division, Rome.

## OBJECTIVES

The main objective of this study is to show how the integration of food security-related data from different sources can allow a more thorough analysis of the food security situation. In this case, the data in question are the food acquisition data from the 2005 round of the ongoing IHS and child undernutrition data from the MICS conducted in 2005. The prevalence of food deprivation and critical food poverty are compared and linked to the prevalence of undernutrition in children under five, measured by stunting.

## METHODS AND DATA

The food acquisition data collected in IHS 2005 refer to a seven-day household reference period. Households used diaries to record all types of expenditure, as well as non-purchased commodities (own production, humanitarian aid, gifts from friends and kin) that entered the household during a particular week.

As food acquisition data do not reflect real food consumption, especially for the lowest and highest income groups, this study uses supplementary survey data from an NHS conducted in 2000/20001, which measured actual food consumption by households. The food acquisition and consumption data for 2000/2001 permitted the development of a function for estimating consumption from acquisition in IHS 2005. The ratio of standard deviation of energy consumption due to income (SD1), to standard deviation of energy acquisition due to income (SD2), permitted the estimation of the coefficient of variation (CV) of consumption due to income for the IHS 2005 data. The child undernutrition (stunting) data collected in MICS 2005 measured undernutrition of children under five years of age.

## FOOD SECURITY STATISTICS FROM IHS 2005 AND MICS 2005

The three dimensions of income deprivation, food deprivation and child undernutrition link causes and effects in a causal-analytical framework. Income deprivation is a cause of lack of food; the latter is a cause of child undernutrition. Growth retardation (undernutrition) in children is the result of food deprivation and other immediate causes relating to child care, poor health and hostile environment. Food deprivation is the result of income deprivation and other immediate causes relating to lack of human capital, natural resources and assets. These links illustrate one of the causal paths of food insecurity. As these dimensions are structural in nature, their estimates from different surveys may be useful for making comparisons among population groups.

The food security statistics were derived from data collected in IHS 2005 and MICS 2005. At national and sub-national levels, these statistics relate to the prevalence of food deprivation as a measure of lack of food, the prevalence of critical food poverty as a measure of income deprivation, and the proportion of stunting in preschool-age children as a measure of undernutrition.

### Links among income deprivation, food deprivation and child undernutrition in the total population

Population groups in Georgia have different conditions in all these dimensions, as shown in Figure 12.1 for national level, urban and rural populations, and regions.

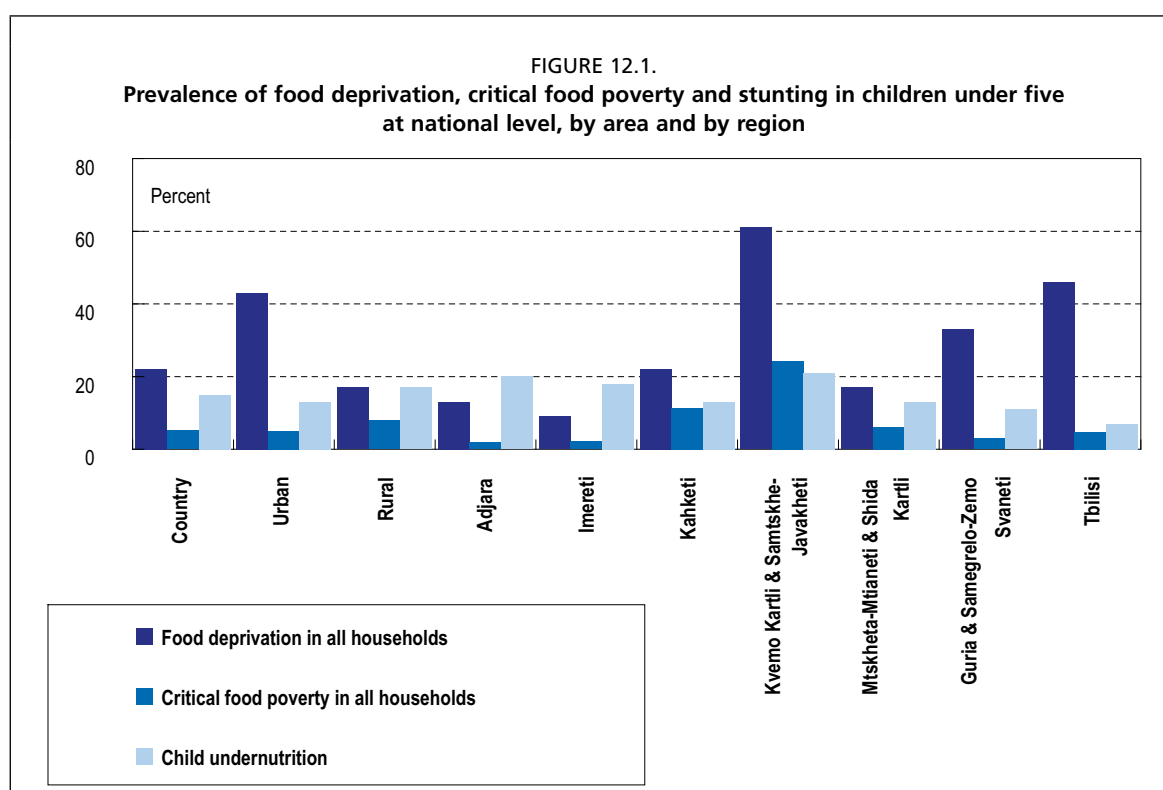
**Food deprivation:** More than one in five Georgians suffered from food deprivation in 2005 (Figure 12.1), with food deprivation being higher in urban than in rural areas. At regional level, food deprivation ranged from 13 percent in Imereti and Kvemo to 61 percent in Kartli and Samtskhe-Javakheti. Although population groups differed in minimum dietary energy requirement (MDER) - owing to differences in weights for attained height, sex-age population structures and how food was distributed within each population - the main reason for different magnitudes of food deprivation was the amount of food consumed.

**Income deprivation:** One out of 20 Georgians suffered from critical food poverty (Figure 12.1), meaning their income was not enough to acquire food to meet the MDER used in estimating food deprivation. The prevalence of critical food poverty was slightly higher in rural than urban areas, while the reverse was true of food deprivation. At regional level, critical food poverty ranged from two percent in Imereti and Adjara to 24 percent in Kvemo Kartli and Samtskhe-Javakheti. Although the critical food poverty line differed among different population groups, a low income as measured by proxy total consumption expenditure was the main factor affecting critical food poverty for the same level of income inequality.

**Growth retardation:** One in seven children aged under five was stunted (Figure 12.1). The nutritional status of these children, as assessed by the prevalence of height retardation, indicates that stunting was higher in rural than urban areas. At regional level it ranged from about seven percent in Guria and Tbilisi to 21 percent in Kvemo Kartli and Samtskhe-Javakheti.

**Summary:** Food deprivation was higher in urban than rural areas, but critical food poverty and child undernutrition were higher in rural than urban areas. The levels of food deprivation and child stunting were similar in rural areas, while the level of food deprivation was three times that of child stunting in urban areas. At regional level, in Kvemo Kartli and Samtskhe-Javakheti all three hunger indicators were higher than national level, while other patterns occurred in other regions. In Tbilisi and Guria and Samegrelo-Zemo Svaneti, only food deprivation was higher than national level, but the causes for this may be different in the two regions, because Tbilisi relied mostly on food purchases, while in Guria and Samegrelo-Zemo Svaneti an important share of food was from own production.

In the other regions, compared with nationwide estimates, food deprivation was lower, but critical income deprivation was higher in Kakheti, and child stunting was higher in all regions except for Kakheti.

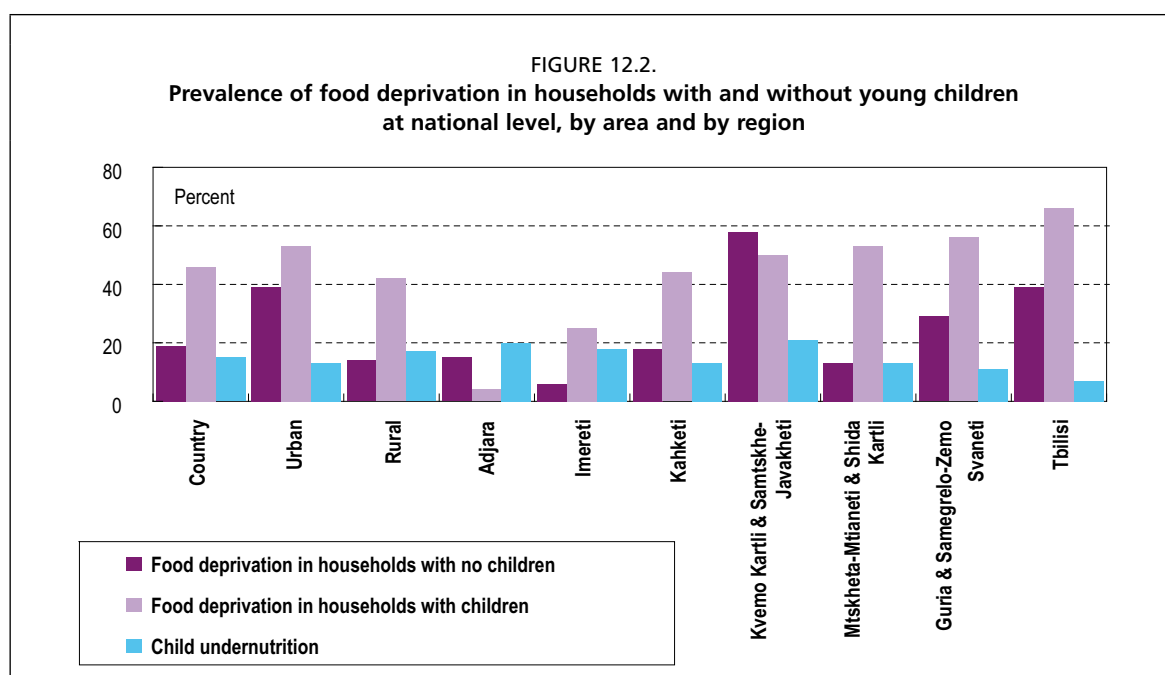


### Links among income deprivation, food deprivation and child undernutrition in the population with young children

Household groups with young children aged less than five had different causal links than those of the general population of all households, as shown in Figure 12.2. Note that estimates of food deprivation and critical food poverty were different, but the prevalence of child stunting was based on the same households with children.

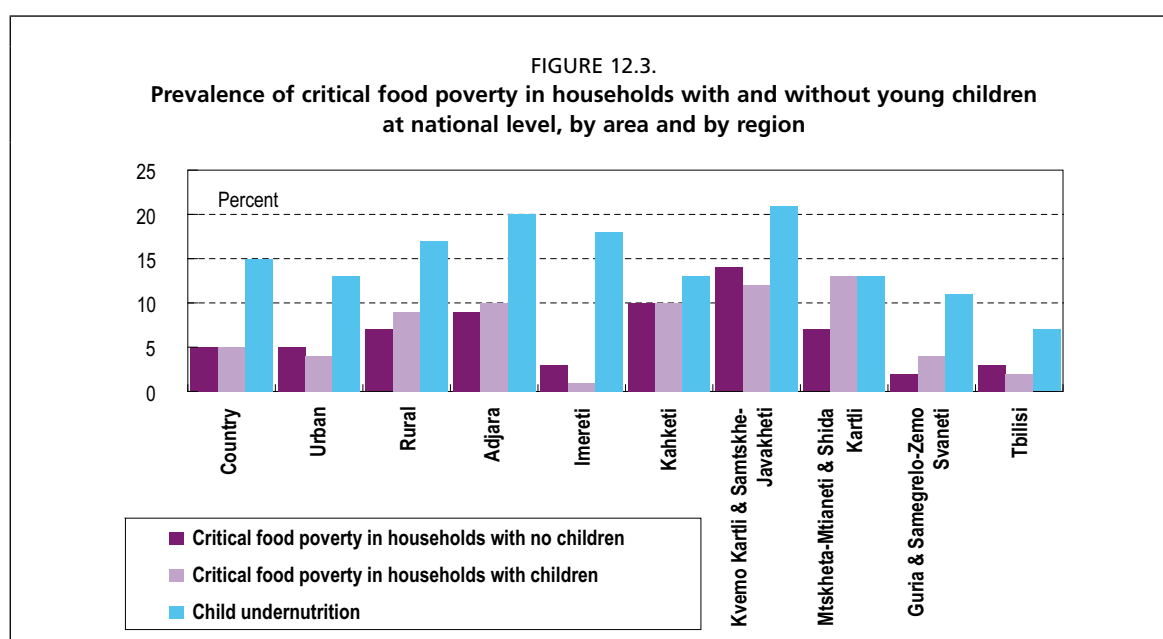
**Food deprivation:** The prevalence of food deprivation was higher in households with young children than in all households in general at national level and in urban and rural areas (Figure 12.2).

The difference in prevalence of food deprivation between households with and without young children was higher in rural than urban populations. In households with children, two-fifths of the population was food-deprived in all regions, except Adjara and Imereti. In Kvemo-Kartli and Samtskhe-Javakheti, food deprivation was very high in both households with and those without young children. Food deprivation in the total population was higher than child undernutrition, except in Adjara. This was the only region where households with young children had a larger average number of members and higher energy consumption than households without young children. In general, on a per person basis, households with young children had lower energy requirements and lower energy consumption than households without young children.



**Income deprivation:** The prevalence of critical food poverty was similar in households with and without young children at national level, but in rural areas it was higher in households with young children than in those without, while the reverse occurred in urban areas (Figure 12.3).





Critical food poverty was higher in households with young children than in households without in Adjara, Mtskheta-Mtianeti and Shida Kartli, and Guria and Samegrelo-Zemo Svaneti; however the opposite occurred in Kvemo-Kartli and Samtskhe-Javakheti, and in Tbilisi. In Kakheti, critical food poverty was high in all households. In general, critical food poverty was lower than child undernutrition.

**Policy implications:** Table 12.1 summarizes the different patterns of the hunger indicators income deprivation, food deprivation and undernutrition for households with preschool-age children, at national level and for sub-national population groups.

The pattern of highest priority is number five. The differences among patterns result from the nature of policies and actions promoted in each population group. For example, in pattern number five (Kvemo-Kartli and Samtskhe-Javakheti), all sectors relating to income, food and health are responsible for taking action to decrease income deprivation, food deprivation and child undernutrition. In pattern six (Tbilisi), the actions called for relate more to food access for low-income groups, even if income deprivation was low.

**TABLE 12.1**  
**Hunger indicators in households with preschool-age children**

Population group	Pattern	Income deprivation	Food deprivation	Under-nutrition
Country	1	Low	High	Moderate
Urban	1	Low	Very high	Moderate
Rural	1	Low	High	Moderate
Regions:				
Adjara	2	Moderate	Moderate	High
Imereti	3	Low	Moderate	Moderate
Kakheti	4	Moderate	High	Moderate
Kvemo-Kartli and Samtskhe-Javakheti	5	Moderate	Very high	High
Mtskheta-Mtianeti and Shida Kartli	4	Moderate	High	Moderate
Guria and Samegrelo-Zemo Svaneti	1	Low	Very high	Moderate
Tbilisi	6	Low	Very high	Low

Very high = 35 percent and more;  
High = 20 to 34 percent;  
Moderate = 10 to 19 percent;  
Low = less than 10 percent.

An important point shown in this study is that hunger indicators may be interpreted differently depending on the study population being looked at. When the indicators on income and food deprivation refer to the total population, as is the standard procedure, the conclusions will be different from when they refer to the population of households with young children.

At national level, there was no difference in critical food poverty between households with and those without young children, but the prevalence of food deprivation in households with young children was almost twice that of households without. This difference in food deprivation occurred in rural populations, but the prevalence of critical food poverty in rural areas was lower in households with than in those without young children. Regarding differences among regions, the indicators of critical food poverty and food deprivation pointed in both directions.

Because of this variation, the food insecurity situation has different implications for policies and actions for the public and private sectors and civil society, depending on the sub-national population group (urban or rural) and region concerned.

The economic sector, including agriculture, commerce and infrastructure, responsible for food supply for human consumption requires policies that aim to increase the size of urban markets, particularly in Tbilisi. This would allow food of low energy cost, such as dairy products, which provide high-quality protein and are locally produced, processed and preserved, to be distributed to costumers in low-income households.

The productive sectors should also implement food production strategies that aim for high productivity, with low-cost transportation and distribution schemes. In population groups where child undernutrition is high, the health sector plays a key role in promoting and protecting health in young children.

## CONCLUSIONS AND REMARKS

Analysis of the three indicators across the entire population is useful for demonstrating the relevance of the food insecurity problem at national level, while analysis across the population of households with young children is useful for the purpose of targeting food-insecure populations. The analysis should distinguish between these two contexts, however, to enable a better understanding of the food insecurity situation and to highlight the relevant policy implications that are needed to help to resolve the situation.

It is clear that the indicators on poverty and hunger, as measured by the prevalence of critical food poverty, food deprivation and stunting in children aged under five, depict different food insecurity situations in different population groups within a country.

In some population groups, these indicators illustrate that poverty and hunger may develop together, while in others, the main factor may be either critical food poverty or food deprivation. The nature of household livelihoods in the different population groups may explain these differences.

The different scenarios identified by the indicators on poverty and hunger provide inputs for tailored coordinated action in different geographical areas and sectors.

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