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Agricultura
y la
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**MEASURING HUNGER AT SUB NATIONAL LEVELS FROM
HOUSEHOLD SURVEYS USING THE FAO APPROACH**

MANUAL

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March 2008

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ACRONYMS AND ABBREVIATIONS

BMI	Body Mass Index
BMR	Basal Metabolic Rate
COICOP	International Classification of Individual Consumption by Purpose
CPI	Consumer Price Index
CV	Coefficient Of Variation
DES	Dietary Energy Supply
DEC	Dietary Energy Consumption
DEI	Dietary Energy Intake
DHS	Demographic and Health Survey
ESS	FAO Statistics Division
ESSG	FAO Global Statistics Service
FAO	Food and Agriculture Organization
FAOSTAT	FAO Statistical Databases
FBS	Food Balance Sheets
FCT	Food Composition Tables
FIVIMS	Food Insecurity And Vulnerability Information And Mapping Systems
FPI	Food Price Index
FMV	Food Consumption In Monetary Values Expressed In The Local Currency
GDP	Gross Domestic Product
GIS	Geographical Information System
GNP	Gross National Product
HES	Household Expenditure Survey
HIES	Household Income and Expenditure Survey
IFPRI	International Food Policy Research Institute
IMR	Infant Mortality Rate
LSMS	Living Standards Measurement Study
MDG	Millennium Development Goals
MDER	Minimum Energy Requirement
MICS	Multiple Indicator Cluster
MIS	Management Information System
NCHS	National Center for Health Statistics
NGO	Non-Governmental Organization
NHANES	National Health and Nutrition
NHS	National Household Surveys (HIES/HBS/LSMS)
NSO	National Statistical Organization
OECD	Organisation for Economic Co-operation and Development
PAL	Physical Activity Level
SNA	System of National Accounts
SOFI	State of Food Insecurity
SPSS	Statistical Package for the Social Sciences
UNICEF	United Nations Children's Fund
USAID	United States Agency for
USDA	United States Department of
WB	World Bank
WFP	World Food Programme
WFS	World Food Summit

INTRODUCTION

1. This manual provides a set of guidelines to professionals involved in the estimation of food security statistics using food consumption data collected in National Household Surveys (NHS). It contains statistical procedures and tools to derive food security statistics, including the prevalence of food deprivation (hunger) at national and sub national levels. These sub national estimates allow the identification and locations of food insecure groups and likely underlying factors. The manual also includes suggestions on how to report on these subjects, having in mind policy makers and other stakeholders responsible for hunger reduction policies and programmes as final users.

2. The NHS quite often collects data on food quantities, which not always are processed and analysed due to scarcity of resources and appropriate skills. The national statistical organizations (NSO) conducting expenditure surveys give more emphasis to the process and analysis of the monetary value of the total household food expenditure. This manual introduces new procedures and concepts in order to make full utilization of the food consumption data for the estimation of a minimum set of food security statistics. It also contributes to the harmonization of the collection, processing and analysis of food consumption data from NHS and the standardization of food security indicators for comparison over time and between countries.

3. The manual introduces some concepts and definitions of food security statistics. It also describes systematic procedures for the derivation of a suite of food security statistics using data on food consumption and income (or proxy total expenditure or total consumption) collected in NHS such as household income and expenditure surveys (HIES), household budget Surveys (HBS), Living Standard Measurement Studies (LSMS) and other family expenditure surveys. The FAO Statistics Division has developed procedures and the corresponding computer programs using the Statistical Package for Social Science (SPSS) version 10.0 and Microsoft Office Excel to derive food security statistics at national and sub national level. Other available statistical packages can also implement these procedures.

4. The manual comprises three parts. The first part introduces the relevant concepts and definitions. The second part presents the Food Security Statistics Module software (FSSM) developed by FAO Statistic Division. The third part discusses the analysis of the derived food security statistics and provides guidelines for the preparation of a food security assessment report using the statistics derived from national household survey data.

PART A. CONCEPTS AND DEFINITIONS

5. This part presents the different concepts and definitions related to food security statistics. It also examines characteristics and limitations of data collected in NHS. It also addresses on how to improve NHS on implementing concepts.

A1. BACKGROUND

A1.1. *NEED FOR STATISTICS ON FOOD SECURITY*

6. International Summits such as the World Food Summit (WFS) and the Millennium Declaration have set goals and targets to reduce hunger by year 2015. The target of the WFS refers to halving the number of people suffering from hunger while the Millennium Development Goals (MDG) calls for halving the proportion of such people in the total population. Consequently, there is a need for information to monitor the progress towards these targets.

7. In addition to these demands, other initiatives such as the Poverty Reduction Strategies Papers (PRSP), Marketing Information Systems and Rural Development Strategies have increased the needs for food security statistics at national and sub-national levels (rural/urban, geographical regions, etc.) for monitoring, policy design and programme planning and evaluation.

Box 1. Use and application of food security statistics

1. Assess the magnitude of food deprivation at national or sub-national levels;
2. Assess the prevalence of food poverty and critical food poverty;
3. Estimate the level of food and nutrient consumption (energy, protein, fat and carbohydrate) among various population groups;
4. Measure access to food in national or sub-national groups;
5. Assess minimum dietary energy requirements;
6. Estimate food consumption from different food sources;
7. Assess the contribution of energy-yielding nutrients to total energy of different population groupings;
8. Provide inputs for determining poverty lines used in poverty assessments;
9. Provide information for the forecasting of long-term food consumption demand for different population groups;
10. Provide elements to monitor and evaluate effects over time of programmes with food security policy implications.

8. People whose dietary energy consumption is continuously below a minimum dietary energy requirement for maintaining a healthy life and carrying out a light physical activity is food deprived and food insecure. Food *security* refers to a condition for all people, at all times, having both physical, social and economic access to sufficient, safe and healthy variety of food, satisfying dietary needs and food preferences while having an active and healthy life in a sustainable manner. *Food insecurity* results when people have insufficient physical availability of food, limited economic and social access to adequate food and/or inadequate food utilization. Therefore, *food insecurity* is a concept wider than *food deprivation*.

9. The three components food availability, food access and food utilization help to understand food security in a country as a whole or at sub-national population groups such as geographical regions or functional population groups. *Food availability* relates to quantities of food from own production or business, commercial imports or donors available for human consumption. *Food access* refers to the adequate income or other means to acquire food quantities needed and depends on adequate purchasing power and market function. *Food utilization* refers to proper use, processing and

storage techniques; adequate food and nutrition knowledge and practices towards a better nutrient absorption and metabolic utilization.

10. Food security statistics are of interest to policy makers, economists, nutritionists, food programme planners, etc. in helping them to identify and locate the food insecure people. In addition, they are useful to evaluate the effectiveness of the intervention programs using trend analysis. Box 1 gives a sample of applications of food security statistics.

AI.2. SOURCES OF FOOD CONSUMPTION DATA

→ National Household Surveys (NHS)

11. Food consumption data include food consumed or acquired by households in terms of quantities and monetary values. National Household Survey (NHS) collects data on food consumption as an integral part of their broader enquiry on household consumption expenditures and focus on household consumption or acquisition of food and non-food items. NHS usually covers the whole country with a sample distributed over the year. Moreover, NHS enable analysis of change over time when conducted on a continuous basis. The food consumption data collected includes expenditure and quantities of food items acquired or consumed during the reporting household survey period from the different food sources in sufficient details to allow for the estimation of food dietary energy and nutrient consumption. Both quantity and monetary data collected in the NHS are useful to estimate average food prices for different products by different groups of household suitably for calculating price elasticities of demand. In addition, NHS provides data on household income and expenditure as well as a number of other socio-economic and demographic characteristics for purposes of analysis and classification. It is more useful to collect data on food consumption for food security purpose and food acquisition for national accounts and consumer price index.

→ Nutritional Dietary Surveys (NDS)

12. Other sources of food consumption data are the specialised Nutritional Dietary Surveys (NDS). The NDS surveys measure food intake in households and a few of them food intake by individuals. The NDS usually cover all members of the household or specific persons such as children, pregnant women among others for special studies. The NHS record the description and the quantity of every food item eaten during the last 24 hours. The interviewer records food intake using the 24-hour weighted method (24HWM) or the 24-hour recall method (24HRM) or the food frequency methods (FFM). The 24HWM requires the weights of food items on the plate or at the time of serving, thus leading to a high degree of response error. The household survey reference period is one day for 24HWM or 24HRM and seven days for the FFM and the NDS reference period is in general shorter than three months. The food intake data collected in the NDS are more precise than the data collected in the NHS. The NDS do not account for seasonal variations due to the short household survey reference period. The NDS usually do not capture food intake away from home, thus underestimating the total dietary energy intake. In addition, the NDS do not collect information on food expenditure, non-food expenditure and income, precluding estimating the inequality of food consumption due to income. The NDS are very complex, labour intensive and expensive to implement. They require highly trained enumerators and measuring equipment to collect food intake data. Normally due to these constraints, NDS sample sizes are small and limited to national coverage or to selected socio-economic or other population groups.

→ The Food Balance Sheets (FBS)

13. Another source of information on food consumption data in terms of quantity and nutritive values are the food balance sheets (FBS). The FBS estimate food for human consumption from agricultural and industrial production and trade data. The FBS provide information at the national level during a reference period and describe the current structure of the national diet in terms of single food items or major food commodity groups. The FBS estimate the country total food consumption i.e. the food consumed by

private households, public establishments such as hotels and residences, hospitals, military barracks and prisons.

14. The actual food consumed by the population may be different from the quantity of food as estimated by FBS or NHS. They do not take into account food losses and waste from household/establishment gate to actual intake. Food losses may occur mainly during storage, while waste mainly results from food preparation or plate-waste. Food losses and waste may feed animals (livestock or pets) or load trash deposits.

A2. FOOD SECURITY STATISTICS

15. Food security statistics refer to measures and indicators on food consumption using data obtained from FBS, NHS and DNS. NHS remain however, the main existing data source on food consumption at national and sub-national levels within a country.

16. The most commonly used food consumption statistics for assessing food security in this section refer to food consumption levels and patterns in terms of quantity, monetary and nutritional values at the national, and sub national levels according to available data on demographic and socio economic factors. The weighted estimates from NHS take into account the household survey sampling design. The household weights are the reciprocal of the overall probability of selection, and the non-response adjustment factor. In a few of NHS, the sampling design is with equal probability of selection of households (EPSEM) i.e. self-weighted sample design. In general, the sample size of NHS is sufficient to obtain reliable food security statistics at national levels; however, sub-national levels require a minimum number of household for point estimates (mean and medians) as well as for variation estimates of continuous variables to yield reliable estimates. The notations in box 2 will be used throughout the manual.

Box 2. Notations

- h refers to a particular household of the NHS
- H is the number of households in the survey
- k refers a particular region, income/expenditure class or other household functional group
- K is the number of classes ($K=10$ for deciles) or household groups
- H_k refers to the number of households of the k th fractile or household group
- i refers to a particular food item
- N is the number of food items collected in the survey
- N_h refers to the number of food items consumed by household h
- j refers to the number of food commodity groups ($j = 1, 2, \dots, 19$). See Annex 3.

A2.1. *FOOD CONSUMPTION AND EXPENDITURE*

→ *Average per person per day food consumption*

17. Food consumption, in quantity (FQTY), monetary value (FMV) or dietary energy (DEC), protein, fat and carbohydrate on per person per day basis remove variations due to household size and time-period of food data collection (usually 7 or 14 days or one month). FQTY, FMV and DEC are estimates for each food item in each household. For a single household, say h , FMV_h and DEC_h refer to values for the h th household.

18. The formula for estimating the average of food consumption in monetary terms for the country is as in Box 3 and for subnational levels in a similar manner.

19. The formula for estimating the average of food consumption in dietary energy, protein, fat and carbohydrate terms for the country is as in Box 4 and for subnational levels in a similar manner.

Box 3: Estimating the average of food consumption in monetary terms

$$\begin{aligned}
 & \sum_i^H hh_wgt_h FMV_h \\
 FMV &= \frac{\sum_i^H hh_wgt_h FMV_h}{\sum_i^H W_h} \quad \text{where,} \\
 & (local\ currency/person/day)
 \end{aligned}$$

$W_h = hh_size_h * hh_wgt_h * num_days_h$
 $FMV_h = \sum_i^{N_h} FMV_i$
 for $i=1$ to N_h food items consumed by all members (hh_size_h) during the surveyed period (num_days_h)

This formula is by extension for estimating the average total consumption expenditure and income (local currency-l.c./person/day)

→ **Dietary Energy Unit Cost**

20. The dietary energy unit cost (DEUC) is the monetary value of 1000 Kcal of edible food. This value does not include the cost of bringing the food from the state of edible to ready to eat food (cost of energy needed to prepare the food). The DEUC is the ratio of average food monetary value to average dietary energy value expressed on per 1000 Kcal basis. This ratio is useful in the evaluation of the dietary energy cost by income (or proxy total expenditure) levels and for deriving the prevalence of food poverty and the prevalence of critical food poverty. The DEUC at national level is the cost derived from household data as

$$DEUC = FMV / (DEC / 1000),$$

where FMV and DEC are as defined in Boxes 3 and 4.

Box 4: Estimating the average of dietary energy consumption (DEC)

$$\begin{aligned}
 & \sum_i^H hh_wgt_h DEC_h \\
 DEC &= \frac{\sum_i^H hh_wgt_h DEC_h}{\sum_i^H W_h} \quad \text{where,} \\
 & (Kcal./person/day)
 \end{aligned}$$

$W_h = hh_size_h * hh_wgt_h * num_days_h$
 $DEC_h = \sum_i^{N_h} DEC_i$
 for $i=1$ to N_h food items consumed by all members (hh_size_h) during the surveyed period (num_days_h)

This formula is by extension for estimating the average consumption of proteins, fats and carbohydrates (g/person/day)

21. In the same manner, the protein unit cost (PUC), the fat unit cost (FUC) and the carbohydrate unit cost (CUC) per 100 grams are the costs derived from food consumption data using the Food Composition Table for protein, fat and carbohydrate conversion factors. The PUC, FUC and CUC are useful in estimating the cost balanced-minimum dietary energy requirements (MDER). The cost of balanced-MDER is the poverty line for the estimation of the prevalence of critical food poverty.

→ Share of food consumption expenditure in total consumption expenditure (food expenditure ratio)

22. The food expenditure ratio (FER) corresponds to the share of food consumption expenditure (FMV) in monetary terms in total consumption expenditure (TCEXP) also known as Engel ratio. Food expenditure ratio at national and sub national levels and for any population groups as follows:

$$\text{FER (percent)} = 100 * \text{FMV} / \text{TCEXP},$$

where FMV and TCEXP are as defined in Box 3.

Poor or low-income households spend a large percentage of their total consumption expenditure on food. With higher income, the food ratio declines following the Engel's law.

→ Share of food consumption by food sources

23. Food consumption values FMV and DEC are broken down by different sources from which households usually obtain food such as purchases, own production, gifts, payments received as food, food consumed away from home, institutional food aid, etc.

24. The contribution of each source to total food consumption in both monetary and dietary energy terms may vary among different population groups. For instance spending in food consumed away from home is usually higher for high-income households compared to low-income households.

A2.2. ACCESS TO FOOD

25. Inequality indices measure access to food within populations. Inequality in dietary energy consumption is lower than that in food monetary expenditure due to the effect of energy price differences in selected food by households of different income levels. The most common inequality indices for both dietary energy value and food monetary value are the coefficient of variation (CV), the Gini's coefficient, dispersion ratios, and food-income elasticities.

→ coefficient of variation of dietary energy consumption

26. The coefficient of variation of DEC under the assumption log-normality in the distribution of DEC is a non-linear function of the variance of DEC, i.e. $CV = \sqrt{e^{\sigma^2} - 1}$. The log-normal distribution is the best fitted and most parsimonious among several tested distributions of dietary energy consumption. Given the NHS sampling design, the means for large groups of households classified by income (or proxy total expenditure) provide reliable estimates of annual average of DEC and CV of DEC due to income (or proxy total expenditure). In addition, household survey data allow for estimating the CV of DEC due to non-income factors such as sex, age and physical activity level of household's members using attained-height data from anthropometric surveys and sex-age population structure data from the NHS or from national population censuses.

27. The coefficient of variation of dietary energy consumption (CV_x), as defined by FAO, comprises two main components; one reflecting the inequality of food consumption due to income ($CV_{x|v}$), and the other reflecting the inequality due to biological factors ($CV_{x|r}$). FAO defines the CV_x as follows:

$$CV(x) = \sqrt{CV^2(x|v) + CV^2(x|r)}$$

Where CV_x is the total CV of DEC as defined by FAO, $CV(x|v)$ is the CV of DEC due to income and $CV(x|r)$ is the CV of DEC due to biological (non-income) factors sex, age, body weight and physical activity¹.

28. For the purpose of estimation, $CV(x|v)$ is formulated as follows:

$$CV(x|v) = \frac{\sigma(x|v)}{\mu(x)}$$

The numerator of the ratio, i.e. the standard deviation of DEC due to income, is as

$$\sigma(x|v) = \sqrt{\left[\sum_{j=1}^k f_j (x|v)_j^2 - \frac{(\sum_{j=1}^k f_j (x|v)_j)^2}{\sum_{j=1}^k f_j} \right] / (\sum_{j=1}^k f_j - 1)}$$

and the denominator, i.e. the average of DEC, is as

$$\mu(x) = \sum_{j=1}^k f_j (x|v)_j / \sum_{j=1}^k f_j$$

where k is the number of income decile and f_j is the number of sampled households and $(x|v)_j$ is the average dietary energy consumption per person per day of the j th income or proxy total expenditure decile.

29. The data required for estimating $CV(x|v)$ are the average of DEC per person per day, the average household size by income decile (or proxy total expenditure) on per person per day basis as illustrated in Box 5 for a hypothetical country with a sample of 10000 households from a NHS.

Box 5. Example of calculation of DEC, $CV(x|v)$, $CV(x)$ using data on average dietary energy consumption by household per caput income deciles of a hypothetical country

income decil (\$/person/day)	average persons	average dietary energy consumption (Kcal/person/day)
1	6.5	1500
2	6.0	1600
3	5.5	1700
4	5.0	1800
5	4.5	1900
6	4.0	2000
7	3.5	2100
8	3.0	2200
9	2.5	2300
10	2.0	2400
all	4.3	1853
CV(due to income)	0.146	
CV(x)	0.248	
sigma	0.244	
mu	7.495	
mder	1750	exogenous
P(U)	45.5	percent

30. The observed variation of food consumption within the set of sampled households includes not only the variation to capture, differences due to income and biological factors, but also spurious

¹. The CV due to biological factors do not to vary significantly among population groups around 20 percent, but this value may be derived from height data available.

sources of variation such as short reference periods and the non-simple random sampling (non-SRS) design of most NHS. Therefore, a raw CVx overestimates CVx as defined by FAO.

31. Note also that within a class of income, inequality in access to food due to income variation is – by definition - null. Therefore, the CV of DEC of each income group measures only the variation due to the differences in energy requirement.

→ Gini coefficient

32. The most common inequality measure is the Gini’s coefficient. The Gini’s coefficient is explained in conjunction with the Lorenz curve. The Lorenz curve plots the cumulative share (percentage) of the variable of interest, say total income, against the cumulative share (percentage) of income receiving units (households or individuals). If income was equally distributed, all households or individuals would receive the same level of income, and the Lorenz curve would then fit the 45° straight diagonal line, called equality line. As the degree of inequality increases, income varies among households or individuals, so does the curvature of the Lorenz curve which departs from the line of equality. The Gini’s coefficient is the ratio of the area between the equality line and the Lorenz curve to the area below the equality line. The Gini’s coefficient ranges from 0 (perfect equality) to 1 (perfect inequality). The Gini’s coefficient may refer to the overall inequality, for example when depicting income (per cent) and income receiving units (per cent). However, when it depicts dietary energy consumption (per cent) and income receiving units (per cent), it refers to the inequality of energy consumption due to income.

33. The Gini’s coefficient under the assumption of log normality of the distribution of DEC is a non-linear function of the CV of DEC (CVx) as follows: $Gini = 2 * \phi \left(\frac{\sqrt{\ln(1 + CVx^2)}}{\sqrt{2}} \right) - 1$

where: ϕ is the standard normal cumulative distribution with a mean of 0 and a standard deviation of 1.

Under the assumption of free distribution, the Gini’s coefficient is often calculated with the absolute value of the Brown’s formula shown below:

$$Gini = \left| 1 - \sum_{k=1}^n (x_k - x_{k-1})(y_k + y_{k-1}) \right|$$

Where : x_k is the cumulated proportion of the variable of interest receiving units,

for $k = 0, \dots, n$, with $x_0 = 0, x_n = 1$

y_k is the cumulated proportion of the variable of interest,

for $k = 0, \dots, n$, with $y_0 = 0, y_n = 1$

The difference between the Gini’s coefficient estimated under the assumption of log normality and under free distribution is marginal.

→ Income elasticity of demand

34. The income elasticity of food demand (monetary or nutrient values) measures the responsiveness of the quantity demanded of food (in monetary or nutrient terms) to the income of the people who demand the food. This relative response of food demand to differences in income depicts the relationship between food (monetary or nutrient basis) that people acquire (for human consumption) and their income, described by Engel’s curve. Engel’s law states, that for a given set of tastes and preferences, with higher income, expenditure on food (monetary value) gets higher but at a slower rate than income. Hence, the share of food in total expenditure (Engel ratio) is lower as income is higher. In other words, the income elasticity of food demand (monetary terms) is less than one.

However, the elasticity of individual food items may be higher than one, in particular for food items with high prices.

35. The food demand with respect to income in semi-log form of the Engel function is as follows:

$$x_h = \alpha_0 + \alpha_1 \log(V)_h + u_h \quad (A)$$

Where,

- α_0 and α_1 are parameters of the equation
- x_h represent the demand of food expressed in monetary or in dietary energy terms of all food items included in the model by household h on per person basis.
- V_h stands for per person income (or proxy total expenditures i.e. food and non-food goods and services) by household h . Total expenditure is used as a proxy of income as income reported by households usually does not reflect real income.
- u_h is the random variation of households

36. The elasticity (η) of food demand with respect to income from the equation (A) above evaluated at the mean of DEC (or FMV) is as follows:

$$\eta = \alpha_1 / \mu(x|v).$$

The expression of elasticity above allows for estimating the elasticity at different values of DEC (or FMV), for example at the average DEC (or FMV) by income decile.

$$\eta_k = \left(\frac{\hat{\alpha}_1}{\hat{x}_k} \right) = \left(\frac{\hat{\alpha}_1}{\hat{\alpha}_0 + \hat{\alpha}_1 * \log(V_k)} \right)$$

Where,

- $\hat{\alpha}_1$ is the estimated slope of the Engel function (A)
- \hat{x}_k corresponds to the estimated fitted mean of DEC of the k_{th} income (or total expenditure) decile.

37. The expression of elasticity below allows for understanding the role of the inequality of income and the elasticity of energy with respect to income in the inequality of dietary energy due to income.

$$[\sigma(x|v)/\mu(x|v)] = CV(x|v) = [\alpha_1 / \mu(x)] \sigma[\log(V)] = \eta \sigma[\log(V)]$$

38. In general, the elasticity of food consumption with respect to income is higher for low-income groups of the population than for high-income groups. However, the elasticity of food in dietary energy terms with respect to income is lower than the elasticity of food in monetary terms with respect to income. The latter adds price variation in food consumed. In other words, with higher income the increase in dietary energy consumption is lower than the increase in the food monetary value.

39. The FSSM allows for the computation of elasticity of food demand with respect to income based on the Engel curve equation (A) using data on food consumption, in monetary and nutrient values. These estimates assume that substitution among food commodity occurs with different income levels and that food commodity *prices are constant*. A further analysis on the price elasticity of demand would require that food prices be included in the Engel equation. With the current version of the FSSM it is not yet possible to derive price elasticity of food demand.

→ **Dispersion ratios**

40. The dispersion ratios measure the inequality in food consumption (monetary or energy values) between the two extreme income groups i.e. the average food consumption in the highest (5th quintile) income group divided by the average food consumption in the lowest (1st quintile) income group.

$DEC \text{ or FMV ratio} = \frac{DEC \text{ or FMV of highest (5th quintile) income group}}{DEC \text{ or FMV of lowest (5th quintile) income group}}$

The dispersion ratio of food consumption distribution (monetary or dietary value) based on income quintile is obtained by dividing the FMV or DEC value of the highest income quintile by that of the lowest income quintile. The estimates of dispersion ratios of food consumption, total consumption expenditure and income are at national and within sub-national levels. A higher dispersion ratio of dietary energy food consumption indicates a higher inequality between households in the highest and households in the lowest income quintiles. For example, a dietary energy dispersion ratio of 2.0 indicates that households of the highest income quintile consume twice as much food as those in the lowest income quintile.

A2.3. FOOD DEPRIVATION

41. Food deprivation refers to the condition of people whose food consumption is continuously below body dietary energy needs. FAO’s measure of food deprivation is based on the distribution of food consumption expressed in terms of dietary energy. The distribution of dietary energy consumption is specified by the mean and the variance under the assumption of log normality. The variance of dietary energy consumption under this assumption is expressed as a function of the CV_(x) (see below). Both the mean and the CV_(x) are derived from NHS data. In a specific age and sex category, the minimum dietary energy requirement (MDER) is the energy requirement for a minimum acceptable body weight (5th percentile) for attained height and minimum light physical activity of a healthy population.

42. The estimation of the prevalence of food deprivation (P_U) at the country level as defined under the FAO methodology is formulated using a probability distribution framework as follows:

$$P_U = P(x < r_L) = \int_{x < r_L} f_x(x) dx = F_x(x_{r_L})$$

- where, P_U represents the proportion of individuals undernourished in total population;
- x represents individual dietary energy consumption (DEC) ;
- r_L is the minimum per person dietary energy requirements (MDER) ;
- f(x) the frequency distribution of x assumed lognormal, specified by parameters μ and σ.

Thus, given μ, σ and r_L, P_U is evaluated as

$$P_U = \phi \left(\frac{\log_e r_L - \mu_x}{\sigma_x} \right)$$

Where, φ is the cumulative of the normal standard distribution.

Under the assumption of log normality for f(x),

$$\mu = \log_e \bar{\mu}_x - \frac{\sigma_x^2}{2} \quad \text{and} \quad \sigma_x = [\log_e (CV_x^2 + 1)]^{0.5}$$

Where: $\bar{\mu}_x$ and CV_x refer respectively to the mean and coefficient of variation of DEC.

43. The parameter of MDER (r_L) is a weighted estimate of sex and age minimum dietary energy requirements using by the proportion of population in the corresponding sex and age groups as

weights. The parameter $\bar{\mu}_x$ is estimated as the daily per person dietary energy consumption (DEC) of the NHS reference period expressed in kilocalories. As discussed above, $CV_{(x/y)}$ is derived from DEC means of households grouped by income (or total expenditure) deciles and $CV_{(x/r)}$ is set as constant to 20 percent or estimated from height data available using normative energy requirements.

A2.4. INTENSITY OF FOOD INADEQUACY (DEPTH OF HUNGER)

44. The intensity of food inadequacy indicates how far food consumption of food-deprived people falls short of minimum food needs. The depth of hunger is measured by the difference between the average dietary energy intake of the undernourished population and the minimum dietary energy requirement (MDER). Where the undernourished lack 400 kilocalories a day, the situation is more critical than in a country where the average shortage is 100 kilocalories. The greater the deficit, the greater the susceptibility for health risks related to nutrition.

45. The depth of hunger refers to the dietary energy deficit of the undernourished population with respect to the MDER. It is as follows:

$$absolute_food_deficit = MDER - m_u$$

where

$$m_u = \int_{x < r_L} x f_x(x) dx / \int_{x < r_L} f_x(x) dx = \int_{x < r_L} x f_x(x) dx / P_u$$

The numerator is evaluated by integrating the log-normal density up to MDER.

Box 6	
Notations:	
-	MDER = Minimum Dietary Energy Requirement (Kcal/person/day)
-	DEC = Dietary Energy Consumption in total population (Kcal/person/day)
-	m_u = DEC of the undernourished population (Kcal/person/day)
-	N = total Population
-	N_u = number of individuals with inadequate DEC
-	N*MDER = total minimum requirement of the population
-	N*DEC = total DEC
-	N_u*MDER = total minimum energy requirement of undernourished people
-	N_u*m_u = total DEC in the undernourished population

46. The relative total depth of hunger is the gap of dietary energy in the food deprived population divided by the current dietary energy consumption in the total population, expressed as follows using notations defined in box 6 :

$$Relative_inadequacy = \frac{TotalDietaryEnergyDeficit}{TotalDietaryEnergyConsumption} = \frac{N_u * (MDER - m_u)}{N * DEC} = \frac{P_u * (MDER - m_u)}{DEC}$$

Where, P_u is the prevalence of food deprivation, N_u is the number of food deprived and N is the total population.

The relative depth of hunger is the gap of dietary energy in the food deprived population expressed on per person basis with respect to MDER.

A2.5. FOOD POVERTY

47. Food poverty as measured by the prevalence of food poverty and the prevalence of critical food poverty refers to income deprivation. The prevalence of food poverty (P_FP) is the proportion of

population living on less than the cost of the balanced² average dietary energy requirement (ADER) while the prevalence of critical poverty (P_{CFP}) refers to the proportion of the population living on less than the cost of the balanced minimum dietary energy requirement (MDER). The ADER is the energy requirement for a median body weight (50th percentile) for attained-height and moderate physical activity associated to a specific sex and age category of the population. The MDER is the minimum dietary energy requirement used by FAO for deriving the prevalence of undernourishment (food deprivation) and corresponds to the energy requirement for a minimum body weight (5th percentile) for attained-height and minimum sedentary physical activity by sex and age groups. Annex 1 gives details of the estimation of the balanced MDER and ADER. The food costs for balanced ADER and balanced MDER, correspond to macronutrient costs of protein providing 12.5 percent of energy, fat providing 22.5 percent of energy and carbohydrate providing 65 percent of energy. The costs of protein, fat and carbohydrate are valued as in households of the lowest income quintile.

48. The prevalence of critical food poverty, P_{CFP} , is defined within a probability distribution framework as follows:

$$P_{CFP} = P(v < r_L) = \int_{v < r_L} f(v) dv = F_v(r_L)$$

where

- P_{CFP} is the proportion of population with critical food poverty
- (v) refers to income
- r_L is a cut-off value reflecting the *cost of the balanced minimum dietary energy requirement*
- $f(v)$ is the density function of income
- F_v is the cumulative distribution function of income.

49. The estimation of parameters mean and variance of $f(v)$ are based on the assumption of log normality of income. The mean expressed as a function of income, μ_v , as $\mu = \log_e \mu_v - 0.5 \sigma^2$ and the variance, σ^2 , is derived from the coefficient of variation of income, $CV(v)$, or from Gini coefficient of income, $G(v)$. The variance $\sigma^2 = \log_e(CV^2(v) + 1)$ and Gini coefficient of income

$$G(v) = 2 * \phi\left(\frac{\sigma}{\sqrt{2}}\right) - 1,$$

where ϕ is the standard normal cumulative distribution with a mean of 0 and a standard deviation of 1.

The estimation of the cost of the balanced minimum dietary energy requirement *per person* per day, r_L is

$$r_L = \text{MDER} * P$$

where, **MDER** = minimum dietary energy requirement per person per day as defined by FAO

P = balanced-dietary energy cost at local currency (LCS) prices per kilo-calorie derived from protein cost yielding 12.5 percent of energy, fat cost yielding 22.5 percent of energy and carbohydrate cost yielding 65 percent of energy in food consumed by households in the lowest income quintile.

2.6. DIET COMPOSITION

50. The diet composition refers to the consumption patterns of macronutrients by food commodity groups at national and sub national levels and for socio-economic population groups. It also refers to the share of energy from energy-yielding nutrients (proteins, fats and carbohydrates) to total energy within ranges in the WHO/FAO dietary guidelines mentioned in para 49. Such information is useful for policy makers and nutritionists for formulating effective nutrition policies targeting specific population groups.

². According to the FAO/WHO experts in a balanced diet the contribution of energy-yielding nutrients total energy should range from 10 to 15 percent for proteins, from 15 to 30 percent for fats and from 55 to 75 percent for carbohydrates.

A3. FOOD CONSUMPTION DATA COLLECTED IN NHS

51. National household surveys are primarily concerned with the construction and periodic revision of the Consumer Price Index (CPI) basket of goods and services and its corresponding system of weights. They also provide detailed data on household consumer expenditures and total income to be used either to investigate the economic behaviour of consumers or for other purposes, such as estimates on private household consumption expenditure for the System of National Accounts (SNA) and distribution of income.

52. The NHS represents an important source of data on private household consumption expenditure of which food constitutes a major component. In many countries, food quantity data are collected along with the monetary value of the food items, but are not always processed or presented in the NHS reports. Food consumption data, which are appropriately collected in terms of commodities, food sources, quantity and monetary values, are useful for assessing the food security situation and providing elements for food security policies. Box 7 below gives some properties of NHS for obtaining consistent and reliable food security statistics including food deprivation. The National Household Capability Programme (NHCP) and handbooks on household sample surveys of the UN Statistics Division are proper reference materials.

Box 7. Properties of NHS for obtaining reliable food security statistics

1. *Coverage of national or urban/rural areas as well as other geographical regions;*
2. *Probability selection of households using appropriate sampling designs;*
3. *Survey period of a full year or rounds in a year to take into account seasonal or other related variations in income and expenditure and hence in food consumption;*
4. *Collection of food consumption data in addition to food expenditure on quantities of food commodities bought and acquired from different food sources;*
5. *Use of appropriate simple collection instruments such as account books (diaries) and interviews for accurate recording the food information.*
6. *Food items collected should be well specified in terms of names and description together with their corresponding units of quantity measurement and identified by unique food codes.*
7. *The household reference collection period of consumption data should be a practical period of preferably one month, allocated evenly over the one-year survey period (shorter reference period of fortnight or week may require larger number of households);*
8. *Availability of information on a wide range of socio-economic variables on households and their members to determine the profile of the food insecure population;*
9. *Consistency with international standards and recommendations as laid down by the Statistics Division of the United Nations (UNSD) and International Labour Office (ILO);*
10. *Existence of regular on-going NHS program for monitoring purposes*

53. The concepts of household expenditure as collected in most NHS were, according to ILO resolutions on household income and expenditure surveys, revised at the Seventeenth International Conference of Labour Statisticians, ILO, Geneva, 2003. Household consumption expenditure (HCE) is the value of consumer goods and services that were acquired (used or paid for) by a household for the direct satisfaction of the needs and wants of its members:

- (a) through direct monetary purchases in the market, or
- (b) through the market-place but without using money as a means of payment (income in kind), barter, etc), or
- (c) obtained as gifts or donations received from other households or as institutional aid, or
- (d) from production within the household (own-account production).

54. NHS collects household data on food items and non-food items over a reference period, which sometimes varies among the type of household expenses (Box 8). Food items data usually refers to a short period such as day, week or month while non-food items may be over longer period such as month, quarter or year. However, in estimating the different consumption aggregates, all food items data, quantities and values, refer to a common reference period, their values are imputed when not available. The household food consumption is a sub-aggregate obtained through (i) food purchased

including food consumed from stock (ii) food from own production, (iii) food from other sources including gifts, remittances, in-kind payment as wages, food aid, etc. and (iv) food purchased and consumed away from home. The total value of all goods and services (food and non-food consumption sub aggregates) acquired and consumed by a household, including those not bought, is referred as actual final consumption of the household.

55. Households also acquire goods or services such as transfers made to institutions, government and other households not for direct satisfaction of their own needs. These refer to non-consumption expenditure of households. Total household expenditure is the sum of the actual final consumption and the non-consumption expenditures of the household. Food given away to workers as payment and to non-family members must be recorded as non-consumption for better estimates of final food consumption by household members.

Box 8. Components of household expenditures				
HOUSEHOLD EXPENDITURE				
FOOD			NON-FOOD	
ACQUISITION	UTILIZATION *		UTILIZATION	
	<u>CONSUMPTION</u>	<u>NON CONSUMPTION</u>	<u>CONSUMPTION</u>	<u>NON CONSUMPTION</u>
<u>PURCHASE</u> - household - away from home	<u>PURCHASE</u>	- HH food industry - given to workers & guests - resale - given to pets & livestock ** - losses - waste	- durable and non durable goods - services (ed. health, transport, housing & utilities) - recreation & culture (including feed for pets) *** - etc...	- direct taxes, insurance premiums, contributions (pensions & other social)
<u>NON PURCHASE</u> - own production - received free (gift, transfer, etc.) - received as payment - received as institutional aid	<u>NON PURCHASE</u>			

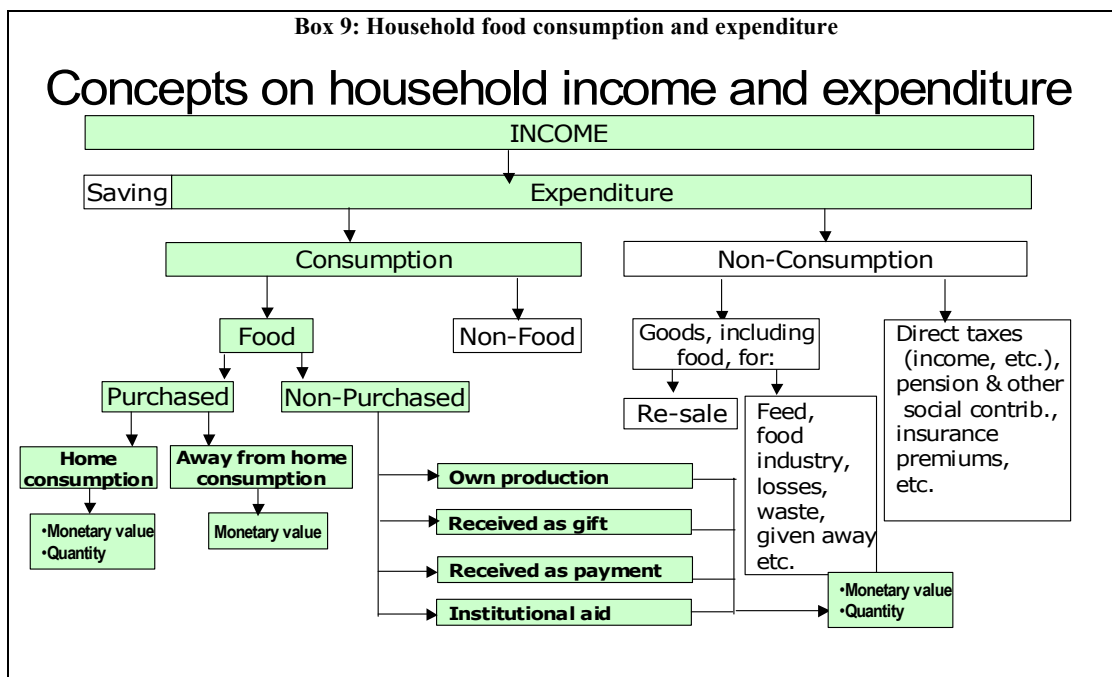
* May be from stocks from bulk acquisitions
 ** Food given to animals from prepared food or raw food items meant for human consumption such as maize, rice etc.
 *** Expenditures to feed pets are coded as recreation and culture household expenditure, while livestock feeding items (for hens, pigs, ducks, cows, fish, horse, etc) are not considered as household expenditure but as agricultural expenditures.

A3.1. COLLECTION OF FOOD CONSUMPTION EXPENDITURE DATA

56. The collection of food data in NHS refers to food acquired for consumption (intake) by the sampled household members during a given reference period. Food acquired for non-household members or other purposes must not be included. Food stocks are food items acquired as purchase, received as payment, barter or on credit not consumed during the reference period. Food items consumed during the reference period may be from stocks from own-production or other sources. Households usually consume food are acquired from the different following food sources (Box 9):

1. Food purchased:
 - 1a.) for inside household consumption and
 - 1b.) away from home food consumption,
2. Food non purchased
 - 2a.) own production
 - 2b.) received free as gifts, donations or transfers (including long-term food loan),
 - 3b.) received as payment (including prepared food at workplaces),
 - 4b.) received as institutional food aid.

57. Households frequently give away acquired food. It may or may not be for human consumption and not consumed by the members of households. For example, food given to household workers and guests, donations, transfers to other households or institutions, long-term food loans frequent in rural areas. Other non-consumption of food (not consumed by household members) are food to feed pets, small household food industry (bakery, etc.) or business (small food vendor, etc.), food resale, food losses and waste. Food given away and other non-consumption of food by households should **not** be accounted in the household food consumption expenditure (Box 9).



58. Household food consumption includes all food items, non-alcoholic and alcoholic beverages. Food prices correspond to food data collected during the survey reference period at community levels for the valuation of food for consumption or non-consumption. Household food consumption, quantity and monetary values, are estimated subtracting non-consumption of food from household food acquisition. Most NHS questionnaire designs collect data on food acquisition only; however, they should identify household food acquisition by other food sources as well as food utilization for all food items. New NHS questionnaire designs collect data on food acquisition and consumption during the same reference period.

59. Household members usually acquire their food through direct purchase or non-purchase. Food can be prepared and taken inside the household or purchased outside home from food vendors such as restaurants, snacks, work canteens, shops, etc. Box 9 depicts the different components of the household expenditure as collected in NHS.

A3.1.1. Food Acquisition

60. Households acquire food from various sources as shown in Boxes 8 and 9 above. Data on food sources are very useful to determine the consumption pattern of food dietary energy besides food expenditure of different groups of population based on socio-economic factors. Food can be purchased in markets, shops, food courts, restaurants, work canteens, hawkers, etc. or not purchased when it comes from own production, fishing, gathering, hunting, or as gifts from relatives and friends or institutional food aid, or from household own stock, business, or trade and can also be received as income payment.

→ ***Purchased food***

61. Purchased food items involve a payment that can be in either cash or credit or barter (food or non-food is given in exchange of food). The measurement of such food purchases is usually the acquisition approach, irrespective of the mode of payment. Food purchases may be on a daily, weekly, or monthly basis depending on the type of food. Perishables food items such as bread, milk, fresh fruits and vegetables are usually purchased at shorter intervals (daily or weekly), while non-perishables are purchased on either weekly or monthly basis in relation to their consumption, availability and the wage cycles of the income earners in the households. Sometimes households purchase some food items in relation to the harvest cycles and in bulk quantities.

62. Food items purchased for consumption of household members are different from food items for pets, livestock or some small food business or industry. Food expenditures for pets are in the food classification coding system as “Pet food”. For example in the UN international commodity classification of individual expenditure of household by purpose (COICOP), it is in the group 09.3.4. Food items purchased to feed livestock such as hens, pigs, cows (salt), etc. are not household expenditures but agricultural expenditures and are not in the scope of the NHS.

63. Food purchases comprise two components, food bought for consumption inside household and food consumed away from home. Food consumed inside the house refers to all purchases of food items used, prepared and consumed inside or taken outside the domicile by members of the household. Food consumed away from home corresponds to purchases of ready prepared meals and drinks from vendors, restaurants, food courts, school or work canteens, etc.

→ ***Non purchased food***

64. Households acquire some food commodities such as cereals, roots and tubers, vegetables, fruits, milk, meat, etc., from their own production. This food acquisition is commonly known as ***own production or own consumption or self-production*** and does not involve monetary transactions. Own production may constitute an important source of food for particular household groups. The records of these food items are in actual quantities consumed as no monetary transaction takes place. The monetary value of food consumed is estimated using local market retail prices.

65. Households running retail shops or involved in large-scale production of food items such as food crop cultivation, livestock production or food processing, usually draw some food items from their business or production stocks for their own consumption. The monetary value of food consumed may be estimated using wholesale prices that must be however re-valued at prevailing market retail prices. The retail prices correspond to local or regional markets or local food shops or from other surveyed households valid for the reference period.

66. Households may also consume food items obtained free such as gifts, donations, or transfers from relatives and friends. Fishing, hunting or gathering provide substantial amount of food to certain groups of the population in some countries. Some international or national institutions give some basic and essential food items to individuals or households as food aid on a regular or ad hoc basis. Households also receive food as part of payment (income in kind) by employers, especially persons working in food activities such as food vendors, vegetables cultivation, farming, livestock and food processing. These food items may constitute an important part of food consumption and questionnaire must collect them. Again, monetary values are from information on local market food prices supplied by households.

A3.1.2. Food Utilization

67. All food items acquired by households are for consumption or non-consumption. Households consume food from their purchases or non-purchases or both. Non-consumption of acquired food

items may be for the following purposes: household food business or industry (selling prepared or processed food), given to workers and guests, donations and transfers, re-sale, feeding for pets (cat, dog, etc.) and livestock (hen, pig, etc.), losses in storage and during processing as well as waste resulting from servings, leftovers or plate waste.

68. Household food consumption excludes non-consumption utilization of acquired food.

$$\text{Food consumption} = \text{Food acquisition} - \text{Non-consumption of food}$$

Household food acquisition may include that from the stocks accumulated from acquisition of food from different food sources over time such as bulk purchases, large-scale production, etc. Food drawn from stocks for consumption is part of food consumption data collected during the household reference period.

A3.2. MEASUREMENT OF FOOD CONSUMPTION DATA

69. NHS should collect food consumption data in both monetary and quantity value terms by detailed food item level. Food purchased for inside home consumption relates to specific food items available in the market using well-specified standard units of weight or volume. The details related to these purchases of food are in terms of units, quantities, and values.

70. However, sometimes the units and quantities of food acquired are specific to countries or regions and are usually in local units of measurement. Examples of these local units are bag, basket, cup, glass, heap, ladle, loaf, plate, tin, unit, etc. and their equivalent gram weight or volume has to be determined in relation to specific food items. These local units of measurement are common in many countries and very often differ in weight and volume for the same food item and within regions in countries. *It is important to estimate the gram equivalent for those local units of measurement for each food item at the community level, based on a sample of food items of those types of units of measurement.* In some countries, price collectors of the consumer price index unit of the National Statistical Office record gram weight equivalences of those local units of measurement.

71. Household members also purchase and consume food and drinks in bars, restaurants, food courts, work canteen, from street vendors, etc. These later are consumed either at the place of purchase or brought home for consumption. The food quantity value of this type of food cannot be collected for practical reasons, except for some types of food such as prepared standardized meals. Prepared meals can take the form of “take away” or “ordered” meals.

72. The “take away” meals such as burgers, fritters, baked maize, fish or meatballs, pizza, etc. correspond to food items available and purchased in standard local units such as portion, plate, pack, cup and glass, etc. These standard or local units of measurement are converted to their respective grams or millilitres equivalent. The corresponding grams or millilitres equivalent are obtained from a sample of observations of different types of food sellers of different regions. Usually these “take away” food are coded with their corresponding quantity and monetary values in the group 01.09 “Food n.e.c” of the COICOP international coding system.

73. The “ordered meals” are those consumed in bars, restaurants or work canteens. These food items are ordered and prepared for on-site consumption. These prepared meals are mostly mixing food ingredients according to a recipe that may not be similar among the different food outlets. In addition, this type of consumption usually consists in a combination of several dishes, sometimes accompanied with beverages, either non-alcoholic or alcoholic or even both. There is no specific standard measurement unit for these types of ordered meals. However, the total expenses incurred at the place of consumption, bars/restaurant, etc., and they are known and in some cases details of the consumption in terms of drinks and dishes served may be available. As regards the consumption of drinks in bars or restaurants, the quantity and type of drinks consumed in terms of tots or bottle of spirits are most often

easily available. Those food expenses should be recoded and entered appropriately in the Division 11 “Restaurants and hotels” of the COICOP.

74. Tobacco expenditures are not food expenditures. The amount spent on cigarettes or tobacco in bars or restaurants should be recorded in the group ‘Tobacco’ of the household expenditure classification. The amount of money paid as tips and taxes (VAT, tourism, etc), if applicable, should also be coded separately in the class “Restaurants, cafés and the like” of the COICOP coding system.

75. Box 10 summarizes the availability of information on quantity and monetary values of food products as consumed or acquired by household from all the various possible food sources, as well as the estimation procedures for the collection of the appropriate food details³.

Box 10. Availability of quantity and monetary values for food items by food sources				
Food Source		Quantity Details	Value details	Limitations & corrective procedures
Purchases for inside household food consumption (including stocked food)		yes	yes	Conversion of local units of measurement to gram or millilitres equivalent
<u>Food purchased and consumed away from home.</u>	(1) Prepared standard take-away meals acquired outside home	yes (Standard portions collected from food providers)	yes	The standard portions have to be converted to gram weigh or millilitres
	(2) Prepared meals acquired and eaten away from home (Ordered meals consumed in bars, restaurants, hotels, food courts, schools, workplaces, street vendors, etc.)	no	yes	Quantity details are unlikely to be available, but total expenditure in monetary value is available. An attempt should be made to obtain rough estimates of proportion spent on food and beverages separately.
Food from own production; Food received free; Food received as payment; Food from production stocked; Food obtained from institutional aid;		no (have to be estimated & supplied by respondents)	no	Prices have to be estimated at the local market prevailing retail prices or obtained from other surveyed households in the region.

³. Note that water from bottles consumed by households for drinking must be recorded in the COICOP Class 01.2.2 “Mineral waters, soft drinks, fruit and vegetable juices.”

PART B: FOOD SECURITY STATISTICS MODULE (FSSM)

76. The FAO Statistics Division has developed the Food Security Statistics Module (FSSM) software to help National Statistical Organizations (NSO) to estimate food consumption statistics derived from food consumption data collected in National Household Surveys (NHS). One of the uses of these statistics is the assessment and monitoring of the national and sub-national food security situation in the context of the World Food Summit and Millennium Development Goals targets on hunger reduction. The outputs of the FSSM are inputs for the national decision-making processes in the economic and social policy analysis and programme implementation.

77. The FSSM software aims at improving the quality, consistency and availability of food security statistics useful for assessing and monitoring food deprivation and other relevant statistics at the national and sub national levels. It also provides a suite of harmonized food indicators for the global community to measure the progress towards the MDG goal 1, target 2, indicator 5 (prevalence of undernourishment) and inputs for countries Poverty Reduction Strategy Papers (PRSP).

78. The FSSM software consists in a set of programs developed to process food consumption, income and other relevant data, implement statistical procedures for estimating food security statistics, integrate results in standard tables and prepare charts and graphs ready for publication.

79. The SPSS software implements all statistical procedures and algorithms using other statistical packages such as SAS or STATA. Excel of Microsoft office produces final tables for country reports on food insecurity.

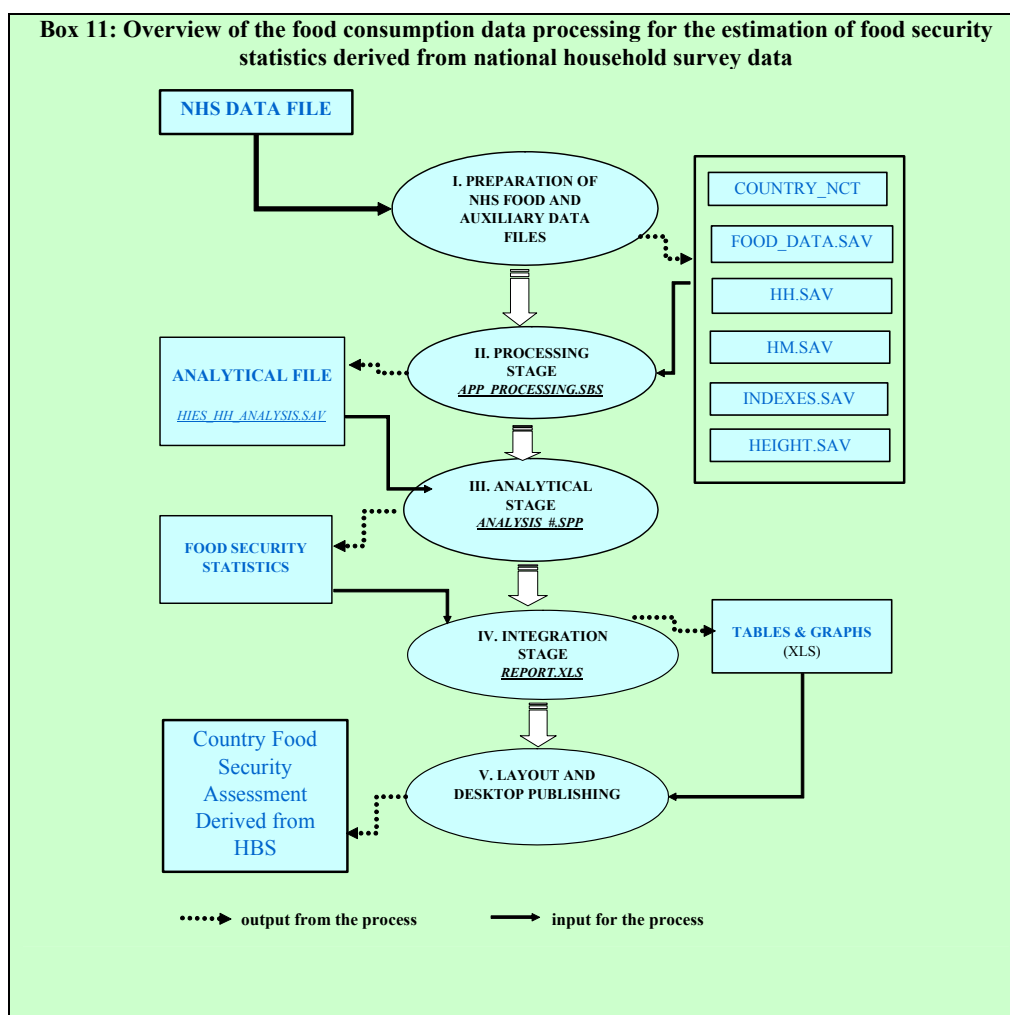
80. The Box 11 below presents an overview of the procedures of the FSSM software from the original country NHS data file to the final production of a technical report on food insecurity assessment derived from NHS data.

B1. PREPARATION OF THE NHS BASIC DATA FILES FOR DERIVING FOOD CONSUMPTION STATISTICS

81. NHS data files contain all information collected from each household during the household reference period sampled over the NHS reference period. They usually contain a large number of records, given the number of sampled households and the number variables related to each household, its members and the numbers of items in household consumption (including food) and expenditure. The NHS data file is usually country specific due to the wide-spread use of electronic computers and availability of several program platforms for data entry and editing on the markets. The NHS data file structure is not a simple flat data file with records (rows) and variables (columns), but a complex one with information on three hierarchies of statistical units: households, household's members and expenditure items.

82. The FSSM uses the NHS detailed data on food consumption and income together with other variables related to household and member characteristics, particularly household's head, for cross sectional analysis in the SPSS format. It is therefore important to extract the required basic data files from the NHS data base according to the respective standardized SPSS data files format as defined in the tables presented in Annex 2. It is of utmost important that all basic data files have the same data filename and contain the same characteristics for standard variables (name, definition, type, length and position) as defined in each data file format. Each file must contain the same identification key,

usually the serial household number or food code used for linking files during the processing stage of the FSSM (Box 12).



Box 12: List of Data Files

Data File 1: **FOOD.SAV**;

Data File 2: **HH.SAV** with basic characteristics of households;

Data File 3: **HM.SAV** with basic characteristics of household members;

Data File 4: **COUNTRY_NCT.SAV** with the NHS list of food items with corresponding macro nutrients values, refuse factors, density coefficients and gram equivalents by measurement unit;

Data File 5: **INDEXES.SAV** with monthly consumer price index (CPI) and food price index (FPI) for the survey year (optional, only for NHS collecting food consumption data over one year survey period)

Data File 6: **HEIGHT.SAV** with height by age group and sex at country level, region level or urban/rural level. The distribution of population by age group and sex is taken into consideration by the program from all the household members in HM.sav.

83. The FOOD.sav is the main data file containing food consumption details in quantity and values for each reported food item identified with a unique food item code as defined by national or international household coding systems. The most commonly used international commodity classification is the International Classification of Individual Consumption by Purpose (COICOP) which has been developed more recently replacing the previously widely used System of National Accounts (SNA). In any adopted commodity classifications, the food commodity group should include food, non-alcoholic and alcoholic beverages as well as food consumed away from home with specific and easily identified food codes. Many country NHS data files identify the food data in both quantity

and monetary values according to the source of acquisition (purchases, own consumption, away from home or from other sources such as gifts, remittances, in-kind payment, aid, etc.). However, food purchased and consumed away from home in restaurants, street vendors or food courts is a separate expenditure food code in monetary values only.

84. The household data file (HH.sav) contains relevant information on geographical description and characteristics of households, which are for building up sub-national population groups for comparative analysis of food consumption patterns and levels. The household member data file (HM.sav) has variables such as gender, age, attained-height, education level and occupation are useful to determine the profiles of food insecure population groups. Annex 2 gives the list (as well as their mnemonic) of compulsory variables that must be included in those input files.

1.1.1. PREPARATION OF THE NUTRIENT CONVERSION TABLE (country_NCT.SAV)

85. The nutrient conversion table (NCT) data file contains nutrient conversion factors for the list of food items in the NHS expressed in standard gram equivalent quantities. The preparation of the NCT is a challenging step that requires external data on nutrient values from food composition tables. The NCT data file contains a detailed list of all food items identified in the NHS together with the corresponding food codes, food group to which the food item belongs and units of quantity measurement expressed in gram or millilitre values (fugmml). The nutrient values per 100 gms edible portion for each food item as well as their density coefficient and refuse factor are included in the data file. This manual provides some basic guidelines for preparing the country NCT, which should however be performed in consultation with nutritionists in the health sector. The NCT can be used for future NHS with some marginal amendments.

86. The energy is expressed in terms of kilo-calories (Kcal) and energy-yielding nutrients (proteins, fats, carbohydrates and alcohol) in grams (g) for each NHS food item. These values are from available country, or regional or international food composition tables (FCT). The dietary energy value uses the Atwater general factor system (based on heats of combustion of proteins, fats, carbohydrates and alcohol), corrected for losses in digestion, absorption and urinary excretion of urea. It uses a single factor for each of the energy-yielding substrates (proteins, fats, carbohydrates and alcohol), regardless of the type of food. The energy values are 4 Kcal/g for proteins, 9 Kcal/g for fats, 4 Kcal/g for carbohydrates and 7 Kcal/g for alcohol. This system has been extended to also include fibre with conversion factor of 2 Kcal/g. Using these conversion factors, the energy value of food can be derived as follows :

$\text{Kcal} = \text{proteins} * 4 + \text{fats} * 9 + \text{carbohydrates} * 4 + \text{alcohol} * 7 + \text{fiber} * 2$
--

87. The FCT gives the values of macronutrients and micronutrients (minerals and vitamins) per 100 grams edible portion together with the corresponding values of refuse portion. The values of the FCT are from laboratory analysis of all food items available in the country and are very costly. Only few countries have FCT and some institutions have compiled FCT at the regional and international levels, which are available in the International Network of Food Data Systems Project (INFOODS) accessible on the internet at www.fao.org/infoods/.

88. The density coefficients convert millilitre volume measures of liquid and semi liquid food items into gram equivalent. Water has a density coefficient of one and most of liquids and semi-liquids food items have a density coefficient higher or lower than one, depending on their viscosity. For operational procedures, the density coefficient of all solid food items in the data file is of value one. Annex 4 gives the density coefficients for a selected list of common liquid and semi-liquid food items.

89. The reported quantity value of each food item is usually in number of units of measurement such as kilograms, packets, litres, bottles, pieces, etc. However, the quantity values of food data in the NHS file may be either units of collected quantities (kg, litres, packets, etc.) or simply grams and

millilitres. In the latter case, the unit variable in the COUNTRY_NCT data file is one as all quantity values of the food items in the FOOD data file are in grams and millilitres. In cases with units of collected quantities (Kg, packets, bottles, pieces, etc.), the quantities are converted to gram-equivalents for each unit of quantity measurement as defined for each food item under variable ‘fugmml’. Sometimes, one food item has more than one unit of measurement, e.g. “long grain Rice” may have quantity recorded as packet and kilogram. In such a case, both units of measurement have to be specified for that food item “long grain Rice” with two separate entries. All local units of measurement (cup, bag, heap, plate, tin, bundle, etc.) are standardized into their gram-equivalents.

→ *edible weight and refuse portion*

90. Most FCTs give nutrient values in “as per 100 gram edible portion” of food items. Edible portions are parts of food items ready to eat after removing, if any, portions not suitable for eating. Most acquired food items are not eaten raw as such, for example, fish, meat, fresh fruits and vegetables, etc. and they have to be cleaned, peeled, unpacked, washed or even cooked before being eaten. During these processes, the food portion lost is commonly known as non-edible or “*refuse*” portion. Thus, consumed or “*edible*” weights of acquired food items are obtained as the difference between total weight minus non-edible or refuse portion. These refuse portion varies by type of food. Food items such as milk, butter, oil, bread, rice, sugar, etc. have zero refuse portions. Refuse factors for some selected food items are given in Annex 5.

91. All collected data on acquired food quantities in NHS are in “as purchased” weights. These “purchased” weights are converted to edible weights taking into account of the non-edible portions before converting them to nutrient values. The available refuse or edible portions in most FCT standardize all acquired food quantities into edible quantities.

$$\text{Edible food quantity weight} = \text{Acquired/Purchased weight} * (1 - \text{refused proportion})$$

or

$$\text{Edible food quantity weight} = \text{Acquired/Purchased weight} * (\text{edible proportion}).$$

→ *Nutritive conversion factor (NCF)*

92. Countries that do not have their own FCT can use representative nutrient values from regional or international available FCTs to prepare the national nutritive conversion factors (NCF). Local or regional FCTs are preferred for their large number of similar food items. Mixed prepared meals differ among places and their nutritive values are usually not found in available FCTs. A rough estimation is obtained utilizing nutrient values of food items used in the preparation and recipe.

93. Data on food consumption may refer to food item groups such as other vegetables, other fruits etc. Nutrient values for food item groups are derived as a weighted average of nutrient values, using (when available) the share of consumption in total consumption of all food items in the group as weight. However, such types of food item groups should be avoided as the estimated nutrients composition values are over or underestimated.

94. The final Nutrient Conversion Table (NCT) contains all information on nutrient composition of all food items in the NHS. The final NCT results from a matching exercise between food items in the food data file and food items in the FCT. Merging the final NCT to the food data file requires both files have the same food code.

95. Volumetric measurement units (litres/bottles) or kilograms or non-standard local measures (cup, heap, bundle, plate, cans, boxes, etc.) must be converted to grams. Liquid or semi-liquid food items measured mostly in volumetric units must be converted to gram using appropriate density factors.

→ **Conversion from non-standard measurement units to gram or millilitres**

96. Local and non-standard measurement units should be standardized using samples by type of local units from different local markets. A food conversion factor *fugmml* may be estimated for more than one non-standard measurement unit, for example eggs, fruits or vegetables collected in grams, pieces or dozens. The conversion factor *fugmml* will refer to the weight of one piece (i.e. one tomato may be around 123 grams, one egg is 50 grams but one dozen weighs 50*12).

Food quantity of food item <i>(fd_gm_ml)</i>	=	Food item quantity in measurement unit <i>(fd_qty)</i>	*	gram per unit of measurement <i>(fugmml)</i>
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→ **conversion from millilitres to grams**

Food gram equivalent <i>(fdqtyge)</i>	=	Food quantity <i>(fd_gm_ml)</i>	*	density factors <i>(density)</i>
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97. Liquid or semi-liquid food items in volume units must be converted to gram equivalent using their corresponding density factors. The density or specific gravity coefficients are available on the USDA Nutrition webpage. Only liquid or semi-liquid food items have density values that may be greater or less than one. A density factor of one is for non-liquid food items, with values recorded in grams, so that their gram values are unaltered during this conversion process.

B1.2. CONVERSION FROM FOOD QUANTITY TO DIETARY ENERGY

→ **when quantities of food consumed are available**

98. This conversion is performed for all food items in gram or gram equivalent quantities for all food sources, except for food consumed away from home which have only in monetary values.

Dietary Energy Value (kcal) <i>fd_e_kcal</i>	=	Food gram equivalent (grams)* (kcal/100grams) <i>fd_qtyge/100</i>	*	Dietary energy value <i>fd_kcal</i>
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→ **when only monetary value of the food consumed is available**

99. The food items consumed away from home are quite often given in monetary values only, and direct estimation of dietary energy consumption is not possible due to the unavailability of the corresponding gram quantity values. An indirect method is used to estimate the equivalent dietary energy at the household level using its dietary energy unit cost, which is obtained from the corresponding household aggregation of monetary and dietary values of food coming from other sources than away from home.

100. The household dietary energy unit cost is obtained as the ratio of total household food monetary value to total household dietary energy value from food items that were purchased, own produced or from other sources than away from home. Dietary energy and monetary values are aggregated over food items for each household to derive one dietary energy cost for each household.

$$\text{Household dietary energy unit cost (l.c./1000kcal)} = \frac{\text{Total household food monetary value from other sources than away from home (l.c.)}}{\text{Total household dietary energy consumption from other sources than away from home (kcal)}} = \frac{fpot_hmv}{fpot_hkc} * 1000$$

(uval_kca)

101. An estimate of dietary energy consumed away from home is obtained using the monetary value of food consumption away from home and the estimated household dietary energy unit cost. This dietary energy value may be underestimated because those food items consumed away from home are mostly ready made or prepared food different from those used to estimate the dietary unit cost.

$$\text{Dietary energy value away from home (kcal)} = \frac{\text{household monetary value of food away from home (l.c.)}}{\text{household dietary energy unit cost (l.c./1000kcal)}} = \frac{fdaw_hmv}{uval_kcal}$$

fdaw_hkc

B1.3. SPATIAL AND TEMPORAL ADJUSTMENT OF FOOD PRICES FOR ONE-YEAR SURVEY

102. The period covered by NHS is usually of one year to account for the seasonal variations of food consumption. Data on food consumption at household level is collected weekly, fortnightly or monthly. The collected food prices vary with time and among regions. The variations in food prices by region indicate the disparity in prices due to some extra costs added to make the food items available to all consumers in the country and these have to be accounted for when costing food. The seasonal fluctuations of food prices, usually due to the availability of food items such as seasonal crops, have to be adjusted. It is important to remove price changes due to inflation/deflation of food expenditure, total consumption, total expenditure and income at national or regional levels to avoid any misclassification of households when grouping them by income or total expenditure or total consumption.

103. Changes in food prices are adjusted using as reference the mid-point of the survey period. Monthly food expenditure values are then adjusted using the corresponding monthly deflator obtained as the ratio of the monthly Food Price Index (FPI) to the survey mid-period FPI. While the total household consumption, total expenditure or income are adjusted over the one-year period using the Consumer Price Index (CPI). When available, regional price indexes are used, in addition, to remove the spatial variations.

104. The monthly FPI factors are then used to inflate or deflate all aggregated food monetary values at household level. A similar procedure is performed using CPI for total household consumption, total household expenditure and income on the assumption that they also follow the price change trends. This method is implemented using the data file *INDEXES.SAV* with the Consumer Price Index and Food Price Indexes.

B1.4. FINAL ANALYTICAL FILE

105. The output file *HH_ANALYSIS_DATA.sav* is obtained after processing the five NHS input files discussed above. This file will serve as input to implement the analytical SPSS programs. It contains adjusted aggregated monetary and energy values by each food source and weighted aggregated values of total consumption income and expenditure at household level. The variations due to household size, difference in household collection periods and other random errors due to sampling and non-sampling factors have been partially removed by averaging household values on per person per day basis. The variables household size and number of days of food data collection standardize all values in the household food file on daily per person basis.

B2. PROCEDURES AND INTEGRATION SOFTWARE TO DERIVE FOOD SECURITY STATISTICS

106. The resulting household food analytical file from the original NHS file contains a large number of derived variables on food, suitable to compute a wide range of food security statistics. The basic household descriptive food consumption estimates are in terms of monetary and dietary energy values.

107. Those estimates are at national and sub national level. Regions, geographical locations, household composition, size or economic and socio characteristics of the head of the household, etc. are classificatory variables for categories with a number of households large enough to yield reliable estimates. Further statistical analysis on food inequality and food deprivation is at national and sub-national levels.

B2.1. HOUSEHOLD LEVEL ANALYSIS

108. The food security statistics are computed at national level and for fractiles of population grouped according to the household income or expenditure. These are two closely related economic variables, each having some limitations regarding the concept and data collection procedures.

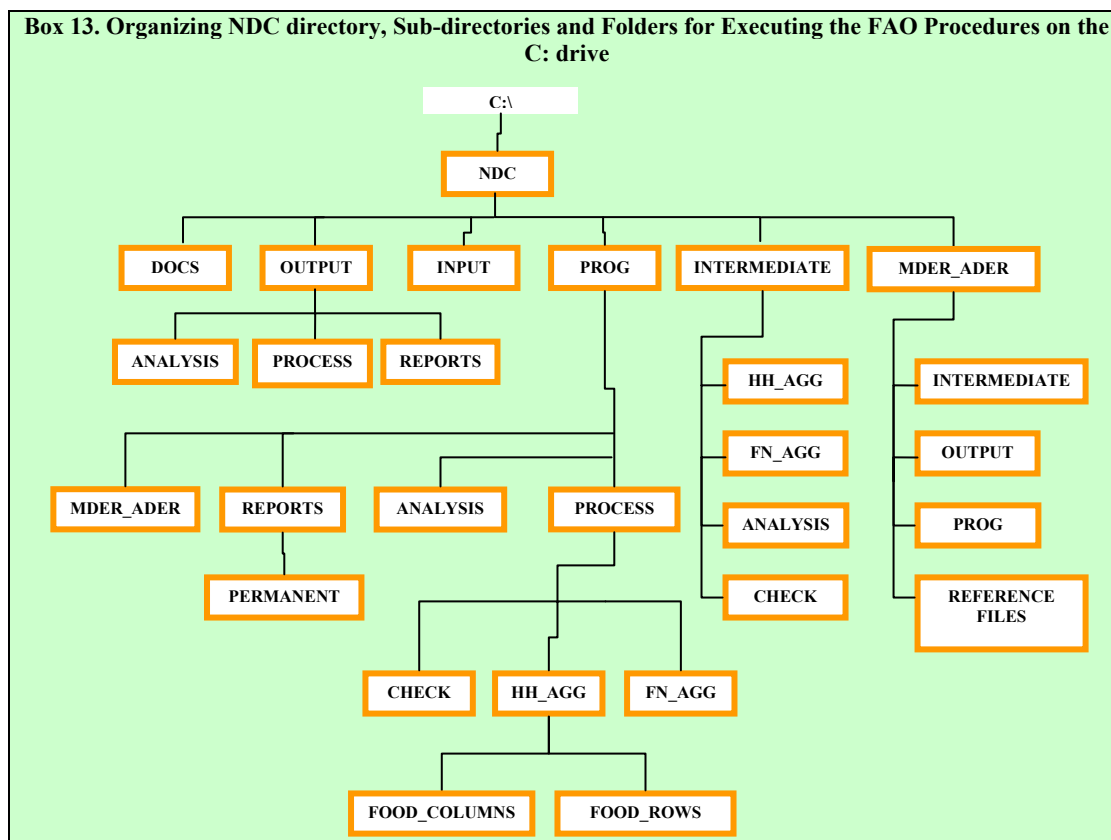
109. Household income data as collected in the NHS relates to different concepts of income (actual, usual or current) which further varies within the different sources (gross income, net income after taxes, net profit, etc.). In addition, it is well known about the reluctance of income earners to reveal their true income especially, those earning self-employment income. Households are more willing to recall and report their details of expenditure items, which can be closely checked and edited during the collection process so that errors are minimized. When household income data are unreliable, household consumption expenditure data are used as the economic classificatory variable.

110. The classification of households by fractiles (decile, quintile or tertile) of daily per person income/expenditure is widely used because all variations due to measurement units of the economic classificatory variable have been removed. It also dampens some non-sampling errors arising from the different collection periods of food data consumption. The fractile classes are obtained using a sampling weighted aggregation of the daily per person household total income and expenditure. Estimates of food security statistics are obtained for fractiles based on the weighted economic variable using household sampling weight and number of persons at national or sub national or even other population groups.

111. Deciles of income or total expenditure classify households in groups containing ten percent of the total population. The first lowest ten percent grouping which relates to those households with the smallest income or total expenditure is called the first decile. The next lowest ten percent is the second decile and so forth. The last ten percent decile is called the tenth or highest decile. Quintiles group ordered household on weighted daily per person household income or expenditure respectively into five groups. Those fractile groups are chosen such that the groups contain sufficient number of households for estimating reliable statistics. Food consumption statistics are estimated for each fractile group.

B2.2. ORGANISATION OF THE FILES WITHIN THE WORKING DIRECTORY

112. Processing and analyzing NHS food data files involve the production and management of several types of files that need to be organised by specific folders as depicted in box 13. The structure and content of the main folders are described in the box 14. These folders are automatically created when inserting the FSSM CD-ROM.



Box 14. Content of the main folders of the working directory

- The folder DOCS contains all the necessary documentation.
- The folder INPUT contains the six basic input files (i.e. *FOOD.sav*, *HH.sav*, *HM.sav*, *COUNTRY_NCT.sa*, *INDEXES.sa* and *HEIGHT.sav*);
- The folder PROG contains all the programs and scripts. This folder has four sub-folders, MDER_ADER, PROCESS, ANALYSIS and REPORT. The sub-folder MDER_ADER contains the production facility programs #_MDER_ADER.SPP used to estimate the energy requirements for different levels or groupings. The sub-folder PROCESS contains the program to prepare the analytical file APP_PROCESSING.sbs. The sub-folder ANALYSIS contains the production facility programs ANALYSIS_#.SPP used to implement the analysis for different levels or groupings. And the sub-folder REPORT contains the macro REPORT.xls to be executed in excel to obtain output tables and graphs;
- The folder OUTPUT contains final data files with estimated food security statistics
- The folder INTERMEDIATE contains archives and data files generated during the implementation of the Food Security Statistics Module Software.

B2.3. ESTIMATING FOOD SECURITY STATISTICS

113. The implementation of the statistical procedures relies on a single SPS program file that defines and computes all the different food consumption statistics. This program refers to internal parameters, obtained from the country food analytical data file, and few external parameters such as values of population, minimum energy requirement, etc., which are available in the FAO Food Security Statistics web page. These parameters may also be computed using age and sex population structure together with height information, if available. To each category of the population groupings corresponds a facility program. Manuals for the PROCESS, ANALYSIS and REPORT programs are available in the folder DOCS.

B2.4. PREPARATION OF CHARTS AND TABLES FOR TECHNICAL REPORT

114. This part deals with the production of charts and final tables for the elaboration of final technical country report on food security assessment from NHS. It is derived from the output files *Di.xls*, *Ni.xls* and *Qi.xls* produced in the ANALYSIS stage. Tables and charts are produced using the macro *REPORT.xls* in EXCEL. The procedures are given in box 15. It should be noted that the macro will run as default on the C:\NDC platform. If more than one survey is available, tables and graphs can be produced automatically using the same procedure.

Box 15. Basic steps to follow for creation of final tables and graphs

Open and run the program “*REPORT.xls*” and follow the three specific instructions

- Choose the language
- Choose the country name and insert the date of the survey.
- Once the execution is over close the program.

These charts and tables are in EXCEL ready to be inserted in the report template.

PART C. OUTPUT ANALYSIS

115. Several tables and graphs are produced and the user must select according to the needs. This section provides with guidelines on the content and design of the final technical report. Before dealing with the analysis on food security in the country it is essential to check the consistency of the food security statistics derived from the above processes.

C1. CONSISTENCY CHECK

116. If the data files contain all required information then the programs can be executed and provide with a set of tables and graphs. To make sure the information contained in output tables is valid, consistency checks must be performed. The table below provides with suggestions on how to assess quickly the relevancy of some food security statistics.

<i>Output Food Security Statistics</i>	<i>Test to perform</i>
Number of sampled households	should be the same in each fractile
Average number of persons in household	usually decreases as income quintile increases
Total number of persons in sampled households	expanded total should be close to national population (refer to UN population estimate)
Average dietary energy consumption (Kcal/person/day)	should range from 1000 to 4000 Kcal whichever decile and should be higher as income is higher
Average monetary value of food consumed (LCS/person/day)	should be higher as income is higher
Average dietary energy unit value (LCS/1000Kcal)	should be higher with income as higher income group of population is buying higher quality food (more expensive with a lower content of calorie)
Average total consumption (LCS/person/day)	should be higher as income is higher
Average total income (LCS/person/day)	should not be lower than consumption, if this is the case use total expenditures or total consumption expenditures as a proxy of income.
Share of dietary energy eaten away from home to total food consumption	usually higher for higher income (but this rule widely depends on the eating habits of the country)
Share of dietary energy from own production to total food consumption	should be higher for lower income deciles and higher in rural areas than urban areas
Share of dietary energy from other sources to total food consumption	usually is higher for lower income deciles (as this mainly corresponds to food receive in kind, as gifts, aid, etc...)
Share of proteins in DEC (%)	Should belong to the WHO/FAO/UNU recommended norms that is between 10 and 15 percent of DEC. A share lower or higher than that could reveal a problem with the nutrient values of the NCT table and require further investigations.
Share of fats in DEC (%)	Should belong to the WHO/FAO/UNU recommended norms that is between 15 and 30 percent of DEC. A share lower or higher than that could reveal a problem with the nutrient values of the NCT table and require further investigations.
Share of carbohydrates in DEC (%)	Should belong to the WHO/FAO/UNU recommended norms that is between 55 and 75 percent of DEC. A share lower or higher than that could reveal a problem with the nutrient values of the NCT table and require further investigations.

CV (%) of dietary energy consumption (Kcal/person/day) - FULL as defined by FAO	should be higher than 20 percent and lower than 35 percent (maximum acceptable)
Minimum dietary energy requirement (Kcal/person/day) as defined by FAO	exogenous variable
Proportion of food deprivation in total population (%) as defined by FAO	should be reasonable compared to FAO estimate
Depth of hunger or food deficit	measured by comparing the average amount of dietary energy that undernourished people get from the foods they eat with the minimum amount of dietary energy they need to maintain body weight and undertake light activity. Usually is within the range of 100-400 kilocalories per day.
Income elasticity of dietary energy consumption	lower than the income elasticity of food demand in monetary value. Should lower as income is higher and should be higher for low income than for high income groups.
Share of food monetary value to total consumption (%)	Engel's law, it is lower as income is higher (should be higher for low income deciles compared to higher income deciles). Close to 80 percent for low income levels and around 20 percent for high income levels
Dispersion ratio of dietary energy consumption (80/20)	expected to be higher than 1 with lowest income quintile as reference
Dispersion ratio of monetary value of food consumed (80/20)	expected to be higher than 1 with lowest income quintile as reference
Dispersion ratio of total consumption (80/20)	expected to be higher than 1 with lowest income quintile as reference
Dispersion ratio of income (80/20)	expected to be higher than 1 with lowest income quintile as reference
GINI coefficient of dietary energy consumption DUE TO income (%)	Gini derived from Brown formula (free distribution). Value should range from 0 to 100 percent and should be lower than Gini of food monetary value due to income.
GINI coefficient of food monetary value DUE TO income (%)	Gini derived from Brown formula (free distribution). Value should range from 0 and 100 percent and should be lower than Gini of total consumption due to income
GINI coefficient of total consumption DUE TO income (%)	Gini derived from Brown formula (free distribution). Value should range from 0 and 100 percent and lower than value of full gini of income.
GINI coefficient of income - FULL (%)	Gini derived from Brown formula (free distribution). Value should range from 0 and 100 percent. If expenditure is used as grouping variable then gini of total consumption due to expenditure equals full Gini of income.
GINI coefficient of dietary energy consumption - FULL (%)	Gini derived from Brown formula (free distribution). Gini coefficient of dietary energy consumption for population grouped by class of dietary energy consumption. Higher than Gini coefficient of dietary energy consumption due to income.
GINI coefficient of food monetary value - FULL (%)	Gini derived from Brown formula (free distribution). Gini of food monetary value for population grouped by class of food monetary value. Higher than Gini of food monetary value due to income.
GINI coefficient of dietary energy consumption - FULL as defined by FAO (%)	Gini as derived from CV-FULL under log normal assumption
CV of dietary energy consumption DUE TO income (%)	Value should range from 0 and 100 percent and should be lower than CV of food monetary value due to income.
CV of food monetary value DUE TO income (%)	Value should range from 0 and 100 percent and should be lower than CV of total consumption due to income
CV of total consumption DUE TO income (%)	Value should range from 0 and 100 percent and lower than value of full CV.
CV of income - FULL (%)	Value should range from 0 and 100 percent. If expenditure is used as grouping variable then CV of total consumption due to income (expenditure) equals CV of income (expenditure) full.

CV of dietary energy consumption - FULL (%)	CV of dietary energy consumption for population grouped by class of dietary energy consumption.
CV of food monetary value - FULL (%)	CV of food monetary value for population grouped by class of food monetary value
CV of dietary energy consumption - FULL as defined by FAO (%)	CV derived as the square root of the sum of the squared CV of dietary energy consumption due to income and the squared CV dietary energy consumption due to biological factors (set to 20 percent if it is not available and derived from attained height data and normative energy requirements)

This list is not exhaustive and some inconsistencies can also be found when looking at statistics derived for different groups of population.

C2. REPORT ON FOOD SECURITY ANALYSIS

117. The final report must be short as its main objective is to assess the food insecurity situation in the country in terms of severity. Its main objective is to address major questions such as : what is the prevalence of food deprivation? What are the major elements related to the severity of the food situation? Who are the food insecure population groups? The answer to these questions will provide tools to policy makers to take the necessary measures and actions in fighting against hunger.

118. In terms of structure, the report should contain a brief summary to present the main findings, the analysis of some food security indicators at national level or for sub groups of population will be further developed to identify pockets of food insecure people. Of course based on the main findings, recommendations should be addressed to policy makers involved in food security. It is important also to provide information about the household survey and the nature of food consumption data collected, in particular if it refers to food acquisition or consumption.

119. The report content is in four parts (Box 16). The first part would describe briefly the country

<p style="text-align: center;">Box 16. Basic structure of the mock up of the summary report on: “FOOD INSECURITY ASSESSMENT BASED ON FOOD CONSUMPTION STATISTICS DERIVED FROM HOUSEHOLD INCOME AND EXPENDITURE SURVEYS”</p> <p>FOREWARD EXECUTIVE SUMMARY I. BACKGROUND II. THE SURVEY (A) Scope and purpose of the survey (B) Sample design and selection (C) Survey operations and main contents (D) Food data and their limitations III. FINDINGS (A) Magnitude of food deprivation (B) Depth of hunger (C) Food poverty (D) Food consumption and expenditures 1. Dietary energy consumption 2. Dietary Energy Unit Value 3. Monetary value of food consumed and share of food consumption in total consumption expenditure (Engel ratio) 4. Share of food consumption from different sources in total consumption (E) Diet Composition (F) Inequality in income and food consumption 1. Inequality in access to food 2. Income inequality 3. Food demand elasticity with respect to income (G) Towards the WFS and MDG targets IV. CONCLUSIONS 1. Limitations 2. Recommendations REFERENCES GLOSSARY OF TERMS ANNEX TABLES</p>
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background; the second part would provide a brief description of the household survey and the nature of food consumption data. The third part would describe the magnitude of food deprivation and

income deprivation as well as the main components determining this magnitude such as availability of food for human consumption and accessibility of food at national and sub national levels and progress in hunger reduction if more than one household surveys have been analyzed. The fourth part would address some methodological recommendations for improving food security statistics in future household surveys and if possible to policy makers. The content of the third part is discussed below.

120. The degree of severity of food insecurity depends on the level of food deprivation. A country is considered food secure when the proportion of people suffering from hunger is very low (less than 5 percent), on reverse when this proportion is higher than 35 percent then hunger in the country is of real concern. See box 17 for the correspondence of severity of food deprivation.

Box 17. Severity of undernourishment according to the level of food deprivation

Level of food deprivation (%)	Severity of undernourishment
<2.5	negligible
2.5-4	very low
5-9	low
10-19	moderate
20-34	high
>35	very high

121. Food deprivation increases when food is scarce and not properly distributed amongst individuals in the population versus a minimum level of food consumption as measured in terms of dietary energy consumption. The food insecurity assessment should start reporting the prevalence of food deprivation based on private food consumption (households) at national and sub national levels; these sub national estimates are based on geographical criteria (for example urban and rural, mountains and coasts , etc..) or functional criteria (for example agricultural and non-agricultural, main economic activity, etc..).

122. The next sections should explain the level of food deprivation at different sub national levels in terms of levels of dietary energy consumption and the inequality in accessing these levels of consumption. Complementary food security statistics to explain the magnitude of food deprivation are the share of food monetary value to total consumption, the dietary energy consumption by income levels, the share of food sources in energy value to total energy and the share of food sources in monetary value to total food monetary value. It also complement the analysis of the elasticities of energy consumption, food monetary value and main food items with respect to income.

123. Intensity of food inadequacy indicates to what degree the food available is inadequate to the undernourished population and its severity in terms of absolute terms at a certain point in time and is likely to change with population growth and maturation (in general from young to old populations) and increased food consumption and better access to food due to income (less inequality).

124. The prevalence of critical poverty gives estimates the proportion of people living respectively on less than the monetary value for the minimum dietary energy requirement taking into account the average income and the inequality of income.

125. Analysis of the dietary energy cost : how much money has to be spent to buy one unit of kilocalorie? As food can be purchased or non purchased this unit value of dietary energy enables to evaluate the true cost of food in dietary energy as it includes both the purchased and non purchased food.

126. Analysis of the share of food consumption by food source : households with a high reliance on food purchased are more vulnerable than others to price fluctuations of food. Households whose

consumption is mainly derived from own production are also more vulnerable to variations in weather conditions and availability of resources such as land, water, seeds, etc..

127. Food accessibility is measured by inequality indicators as discussed above. The FSSM module computes data on Gini coefficient, CV, dispersion ratio and elasticities. As the first three differ in terms of scale but give the same pattern of inequality, the analysis can concentrate mainly on CV and elasticity. The coefficient of variation measures the dispersion of food consumption in the population. A high value of CV (as defined by FAO) means that food is not equally distributed amongst people due to income (or total expenditure). The maximum value can be as high as 35 per cent with a maximum CV due to income of around 30 percent and a value of CV of around 20 per cent due to biological factors. A low value means that the CV due to income would be around 20 percent, mainly the CV due to biological factors and a minimum value of CV due to income of near zero.

128. The elasticity of food (in dietary and monetary value) due to income variation provides with a good estimate of the households food consumption response to income fluctuation. The higher is the elasticity the more sensitive to income are the households, in such case, a small increase in the income of poor households could improve considerably their level of food consumption and have a huge impact on level of food consumption of this category of households. Economic changes, improvements or deteriorations may exchange food item consumption behaviour to cope with dietary energy needs. These changes have implications in food security policies.

129. Food consumption in terms of quantities and macronutrients are depicted by main food commodity groups and other functional groups. The diet diversity in terms of consumption of protein, fats and carbohydrate may be elaborated and compared in terms of food demand and food supply.

130. Food security statistics derived from NHS are usually subject to certain weaknesses of the collected food consumption data and are important to be spelled out. These will help policy makers to cautiously use those statistics in the implementation and design policies. Moreover, these limitations will contribute to improve future NHS for in making available more reliable, concise food consumption data for better assessment and monitoring of the food situation.

131. Information on food security statistics are used for building public awareness of hunger and support political and the civil society for actions. These issues should be appropriated by all stakeholders having interest in the fight of hunger to make recommendations in line with the national poverty reduction strategy process

C3. OUTPUT TABLES AND GRAPHS

132. About 29 tables and one hundred graphs in EXCEL format are generated by the program. Tables and graphs report on all the food security indicators available at national and sub national levels by quintiles or deciles of income and for the 19 groups of food products (list of food group in Annex).

The list of tables and graphs is given below followed by an example of output table and graphs.

C3.1. LIST OF EXCEL OUTPUT TABLE

• *table1.xls: Selective statistics of food consumption*

1. Categories and Groupings
2. Number of sampled households
3. Average number of people in household
4. Average food consumption in dietary energy value (kcal/person/day)
5. Average food consumption in monetary value (LC\$/person/day)
6. Average dietary energy unit value (LC\$/1000kcal)
7. Average total consumption (LC\$/person/day)

- *table2.xls: Share of food consumption to total consumption in monetary value and by food sources*
 1. Categories and Groupings
 2. Number of sampled households
 3. Share of food consumption in monetary value to total consumption (%)
 4. Share of food consumption in monetary value from purchased to total food consumption (%)
 5. Share of food consumption in monetary value from own production to total food consumption (%)
 6. Share of food consumption in monetary value eaten away from home to total food consumption (%)
 7. Share of food consumption in monetary value from other sources to total food consumption (%)
- *table3.xls: Inequality measures (Dispersion Ratios) of food consumption, total consumption and income*
 1. Categories and Groupings
 2. Dispersion ratio of Food consumption in dietary energy (80/20)
 3. Dispersion ratio of Food consumption in monetary value (80/20)
 4. Dispersion ratio of total consumption (80/20)
 5. Dispersion ratio of income (80/20)
- *table4.xls: Inequality measures (Dispersion Ratios) of food consumption and total consumption by income quintile and population groupings*
 1. Categories and Groupings
 2. Quintile of income
 3. Average number of people in household
 4. Average food dietary energy consumption (kcal/person/day)
 5. Ratio FIRST reference group
 6. Ratio LAST reference group
 7. Average food consumption in monetary value (LC\$/person/day)
 8. Ratio FIRST reference group
 9. Ratio LAST reference group
 10. Average total consumption (LC\$/person/day)
 11. Ratio FIRST reference group
 12. Ratio LAST reference group
- *table5.xls: Inequality measures (Dispersion Ratios) of food dietary energy unit value, total income and Engle ratio by income quintile and population groupings*
 1. Categories and Groupings
 2. Quintile of income
 3. Income (LC\$/person/day)
 4. Ratio FIRST reference group
 5. Ratio LAST reference group
 6. Proportion of food deprivation in total population as defined by FAO (%)
 7. Relative FIRST reference group
 8. Relative LAST reference group
 9. Share of food monetary value to total consumption (%)
 10. Average food dietary energy unit value (LC\$/1000kcal)
 11. Ratio FIRST reference group
 12. Ratio LAST reference group
- *table6.xls: Inequality measures (Dispersion Ratios) of share of food consumption in monetary value by food sources by income quintile and population groupings*
 1. Categories and Groupings
 2. Quintile of income
 3. Share of food consumption from purchased to total food consumption in monetary value (%)
 4. Ratio FIRST reference group

5. Ratio LAST reference group
6. Share of food consumption from own production to total food consumption in monetary value (%)
7. Ratio FIRST reference group
8. Ratio LAST reference group
9. Share of food consumption away from home to total food consumption in monetary value (%)
10. Relative FIRST reference group
11. Relative LAST reference group
12. Share of food consumption from other sources to total food consumption in monetary value (%)
13. Ratio FIRST reference group
14. Ratio LAST reference group

• *table7.xls: Inequality measures (Dispersion Ratios) of share of food dietary energy consumption by food sources by income quintile and population groupings*

1. Categories and Groupings
2. Quintile of income
3. Share of food dietary energy consumption from purchases to total food consumption (%)
4. Relative FIRST reference group
5. Relative LAST reference group
6. Share of food dietary energy consumption from own production to total food consumption (%)
7. Ratio FIRST reference group
8. Ratio LAST reference group
9. Share of food dietary energy consumption from eaten away from home to total food consumption (%)
10. Relative FIRST reference group
11. Relative LAST reference group
12. Share of food dietary energy consumption from other sources to total food consumption (%)
13. Relative FIRST reference group
14. Relative LAST reference group

• *table8.xls: Inequality measures (GINI coefficients – Log normal assumption) of food consumption, total consumption and income by population groupings*

1. Categories and Groupings
2. Number of sampled households
3. Average number of people in household
4. GINI of dietary energy Consumption DUE TO income (Log Normal assumption) (%)
5. GINI of Food Consumption in monetary value DUE TO income (Log Normal assumption) (%)
6. GINI of total consumption DUE TO income (Log Normal assumption) (%)
7. GINI of Income - FULL (Log Normal assumption) (%)
8. GINI of dietary energy Consumption – FULL (Log Normal assumption) (%)
9. GINI of Food Consumption in monetary value - FULL (Log Normal assumption) (%)
10. GINI of dietary energy consumption - FULL as defined by FAO (%)

• *table9.xls: Inequality measures (CV – Coefficient of variation - Log normal assumption) of food consumption, total consumption and income by population groupings*

1. Categories and Groupings
2. Number of sampled households
3. Average number of people in household
4. CV of dietary energy consumption DUE TO income (%)
5. CV of food consumption in monetary value DUE TO income (%)

6. CV of total consumption DUE TO income (%)
 7. CV of Income - FULL (%)
 8. CV of dietary energy consumption FULL (%)
 9. CV of food consumption in monetary value FULL (%)
 10. CV of dietary energy consumption - FULL as defined by FAO (%)
- table10.xls: Food deprivation and parameters by population groupings
 1. Categories and Groupings
 2. Number of sampled households
 3. Average number of people in household
 4. CV (%) of food dietary energy consumption (kcal/person/day) -FULL as defined by FAO
 5. Minimum dietary energy requirement (kcal/person/day) as defined by FAO
 6. Average of food dietary energy consumption (kcal/person/day)
 7. Proportion of food deprivation in total population (%) as defined by FAO
 - table11.xls: Selective statistics of food consumption by income deciles and population groupings
 1. Categories and Groupings
 2. Decile of grouping variable
 3. Number of sampled households
 4. Average number of people in household
 5. Total number of people in sampled households
 6. Average food dietary energy consumption (kcal/person/day)
 7. Average food dietary energy unit value (LC\$/1000kcal)
 8. Average food consumption in monetary value (LC\$/person/day)
 9. Average total consumption (LC\$/person/day)
 10. Average total income (LC\$/person/day)
 - table12.xls: Share of food consumption to total consumption in monetary value and by food sources by Income deciles and population groupings
 1. Categories and Groupings
 2. Decile of grouping variable
 3. Average total income (LC\$/person/day)
 4. Share of food consumption in monetary value to total consumption (%)
 5. Share of food consumption in monetary value from purchased to total food consumption(%)
 6. Share of food consumption in monetary value from own production to total food consumption (%)
 7. Share of food consumption in monetary value of eaten away from home to total food consumption (%)
 8. Share of food consumption in monetary value from other sources to total food consumption (%)
 - table13.xls: Share of food dietary energy consumption to total food dietary energy consumption and by food sources by Income deciles and population groupings
 1. Categories and Groupings
 2. Decile of grouping variable
 3. Average total income (LC\$/person/day)
 4. Share of food dietary energy consumption from purchased to total food consumption (%)
 5. Share of food dietary energy consumption from own production to total food consumption (%)
 6. Share of food dietary energy consumption from eaten away from home to total food consumption (%)
 7. Share of food dietary energy consumption from other sources to total food consumption (%)
 - table14.xls: Share of food dietary energy by food sources to total food dietary energy consumption

1. Categories and Groupings
 2. Number of sampled households
 3. Share of food dietary energy from purchased to total food dietary energy consumption (%)
 4. Share of food dietary energy consumption from own production to total food dietary energy consumption (%)
 5. Share of food dietary energy consumption eaten away from home to total food dietary energy consumption (%)
 6. Share of food dietary energy from other sources to total food dietary energy consumption (%)
- *table15.xls: FAO indicators on hunger based on total consumption expenditure and the first quintile*
 1. Categories and Groupings
 2. Prevalence of food deprivation (%)
 3. CV of dietary energy consumption FULL as FAO (%)
 4. Average food consumption in dietary energy value (kcal/person/day)
 5. Minimum dietary energy requirement (kcal/person/day)
 6. Balanced dietary energy unit value of the first quintile (LC\$/1000kcal)
 7. Critical food poverty line of the 1st quintile
 8. Total consumption expenditure (LC\$/person/day)
 9. CV of total consumption expenditure -FULL (%)
 10. Critical Food Poverty (%)
 11. Income quintile having better balance nutritional diet
 - *table16.xls: Demand elasticity with respect to income and population groupings*
 1. Categories and Groupings
 2. Income deciles
 3. Income (LC\$/person/day)
 4. Demand elasticity of dietary energy consumption (DEC) respect to income (%)
 5. Demand elasticity of food consumption in monetary value (FMV) respect to income (%)
 6. Demand elasticity of Engle ratio respect to income (%)
 - *table17.xls: Inequality measures (GINI coefficients – free distribution) of food consumption, total consumption and income by population groupings*
 1. Categories and Groupings
 2. Number of sampled households
 3. Average number of people in household
 4. GINI of Food Dietary Energy Consumption DUE TO income (%)
 5. GINI of Food Consumption in Monetary value) DUE TO income(%)
 6. GINI of total consumption DUE TO income (%)
 7. GINI of Income - FULL (%)
 8. GINI of Food Dietary Energy Consumption – FULL (%)
 9. GINI of Food Consumption in Monetary value) - (%)
 10. GINI of Food Dietary Energy Consumption - FULL as defined by FAO (%)
 - *table18.xls: Food consumption in monetary and nutrient values by national, sub national and population groupings.*
 1. Categories and Groupings
 2. Average food dietary energy consumption (kcal/person/day)
 3. Average food consumption in monetary value (LC\$/person/day)
 4. Average food protein consumption (g/person/day)
 5. Average food carbohydrates consumption (g/person/day)
 6. Average food fat consumption (g/person/day)
 - *table19.xls: Food consumption in quantity equivalent, monetary and nutrient values by food commodity groups.*
 1. Food commodity group
 2. Average food quantity consumed (g/person/day)

3. Average food consumption in monetary value (LC\$/person/day)
 4. Average food dietary energy consumption (kcal/person/day)
 5. Average food proteins consumption (g/person/day)
 6. Average food carbohydrates consumption (g/person/day)
 7. Average food fats consumption (g/person/day)
- Table20.xls: Nutrient costs by food commodity groups
 1. Food commodity group
 2. Average Dietary Energy Unit Value (LC\$/1000kcal)
 3. Proteins Unit Value (LC\$/100g)
 4. Carbohydrates Unit Value (LC\$/100g)
 5. Fats Unit Value (LC\$/100g)
 - Table21.xls: Nutrient density per 1000 kcal
 1. Food commodity group
 2. Average food dietary energy consumption (kcal/person/day)
 3. Protein consumption (g/1000kcal)
 4. Carbohydrates consumption (g/1000kcal)
 5. Fats consumption (g/1000kcal)
 - Table22.xls: Share of food consumption in quantity equivalent, monetary and nutrient values by food commodity groups.
 1. Food commodity group
 2. Share of dietary energy consumption in Total Energy Consumption (%)
 3. Share of protein consumption in Total Protein Consumption (%)
 4. Share of carbohydrates Consumption in Total Carbohydrates Consumption (%)
 5. Share of Fats Consumption in Total Fats Consumption (%)
 - Table23.xls: Food consumption in quantity equivalent, monetary and nutrient values by food commodity groups and income quintile.
 1. Food commodity group
 2. Quintile of Income
 3. Average food quantity consumed (g/person/day)
 4. Average food consumption in monetary value (LC\$/person/day)
 5. Average food dietary energy consumption (kcal/person/day)
 6. Average food proteins consumption (g/person/day)
 7. Average food carbohydrates consumption (g/person/day)
 8. Average food fats consumption (g/person/day)
 - Table24.xls: Food consumption in quantity equivalent, monetary and nutrient values by food commodity groups and region
 1. Food commodity group
 2. Region
 3. Average food quantity consumed (g/person/day)
 4. Average food consumption in monetary value (LC\$/person/day)
 5. Average food dietary energy consumption (kcal/person/day)
 6. Average food proteins consumption (g/person/day)
 7. Average food carbohydrates consumption (g/person/day)
 8. Average food fats consumption (g/person/day)
 - Table25.xls: Food consumption in quantity equivalent, monetary and nutrient values by food commodity groups and regions for the first quintile
 1. Food commodity group
 2. Region
 3. Quintile of Income
 4. Average food quantity consumed (g/person/day)
 5. Average food consumption in monetary value (LC\$/person/day)
 6. Average food dietary energy consumption (kcal/person/day)
 7. Average food proteins consumption (g/person/day)
 8. Average food carbohydrates consumption (g/person/day)

9. Average food fats consumption (g/person/day)

• Table26.xls: Food baskets

1. Food commodity group
2. Region
3. Average dietary energy requirement at regional level (kcal/person/day)
4. Total quantity consumed (g/person/day)
5. Total quantity needed (g/person/day)
6. Total quantity difference (g/person/day)
7. Dietary energy consumption needed (kcal/person/day)
8. Proteins needed (g/person/day)
9. Carbohydrates needed (g/person/day)
10. Fats needed (g/person/day)

• Table27.xls: FAO indicators on hunger based on income and the first quintile

1. Categories and Groupings
2. Prevalence of food deprivation (%)
3. CV of dietary energy consumption FULL as FAO (%)
4. Average food consumption in dietary energy value (kcal/person/day)
5. Minimum dietary energy requirement (kcal/person/day)
6. Balanced dietary energy unit value of the first quintile (LC\$/1000kcal)
7. Critical food poverty line of the first quintile
8. Income (LC\$/person/day)
9. CV of income -FULL (%)
10. Critical Food Poverty (%)
11. Income quintile having better balance nutritional diet

• Table28.xls: Nutrient's contribution to dietary energy consumption

1. Categories and Groupings
2. Average food dietary energy consumption (kcal/person/day)
3. Share of DEC in total DEC coming from proteins (%)
4. Share of DEC in total DEC coming from fats (%)
5. Share of DEC in total DEC coming from carbohydrates (%)

C3.2. LIST OF EXCEL OUTPUT CHARTS

• chart1

Represents the average number of people in household by categories and groups

• chart2

Represents the average dietary energy consumption by categories and groups

• chart3

Represents the average monetary value of food consumption by categories and groups

• chart4

Represents the average dietary energy unit monetary value of food by categories and groups

• chart5

Represents the share of food monetary value to total consumption by categories and groups

• chart6

Represents the share of food monetary value from own production to total food value by categories and groups

• chart7

Represents the share of food monetary value eaten away from home to total food value by categories and groups

• chart8

Represents the average dietary energy consumption by income and categories and groups

• chart9

Represents the monetary value of food consumption by income and categories and groups

• chart10

Represents the dietary energy unit monetary value of food consumed by income and categories and groups

• chart11

Represents the share of food monetary value to total consumption by income and categories and groups

• chart12

Represents the share of food monetary value from own production to total food consumption by income and categories and groups

• chart13

Represents the Gini's coefficients of dietary energy consumption due to income by categories and groups

• chart14

Represents the Gini's coefficients of monetary value of total consumption due to income by categories and groups

• chart15

Represents the Gini's coefficients of dietary energy consumption and food monetary value due to income by categories and groups

• chart16

Represents the Gini's coefficients of dietary energy consumption due to income under lognormal and free distribution assumption by categories and groups

• chart17

Represents the full Gini's coefficients of dietary energy consumption (FAO), food monetary value and income by categories and groups

• chart18

Represents the nationwide coefficients of variation of dietary energy consumption, food monetary value and income by categories and groups

• chart19

Represents the proportion of food deprivation in total population by categories and groups

• chart20_x (x represents a sub-category)

Represents the Inequality as measured by quintile dispersion ratio of:

Dietary energy consumption (80/20)

Monetary value of food consumed (80/20)

Total consumption (80/20)

Income (80/20)

• chart21_x (x=number from 1 to 12)

Represents the ratios of (by category):

chart21_1 Dietary energy consumption (80/20)

chart21_2 Monetary value of food consumed (80/20)

chart21_3 Total consumption (80/20)

chart21_4 Income (80/20)

chart21_5 Proportion of food deprivation in total population as defined by FAO (80/20)

chart21_6 Dietary energy unit value (80/20)

chart21_7 Food monetary value consumed away from home in total food value (80/20)

chart21_8 Food monetary value from own production in total food value (80/20)

chart21_9 Food monetary value from other sources in total food value (80/20)

chart21_10 Food monetary value from purchased in total food value (80/20)

chart21_11 Dietary energy eaten away from home in total food consumption (80/20)

chart21_12 Dietary energy from own production in total food consumption (80/20)

chart21_13 Dietary energy from other sources in total food consumption (80/20)

chart21_14 Dietary energy from purchased in total food consumption (80/20)

• chart22

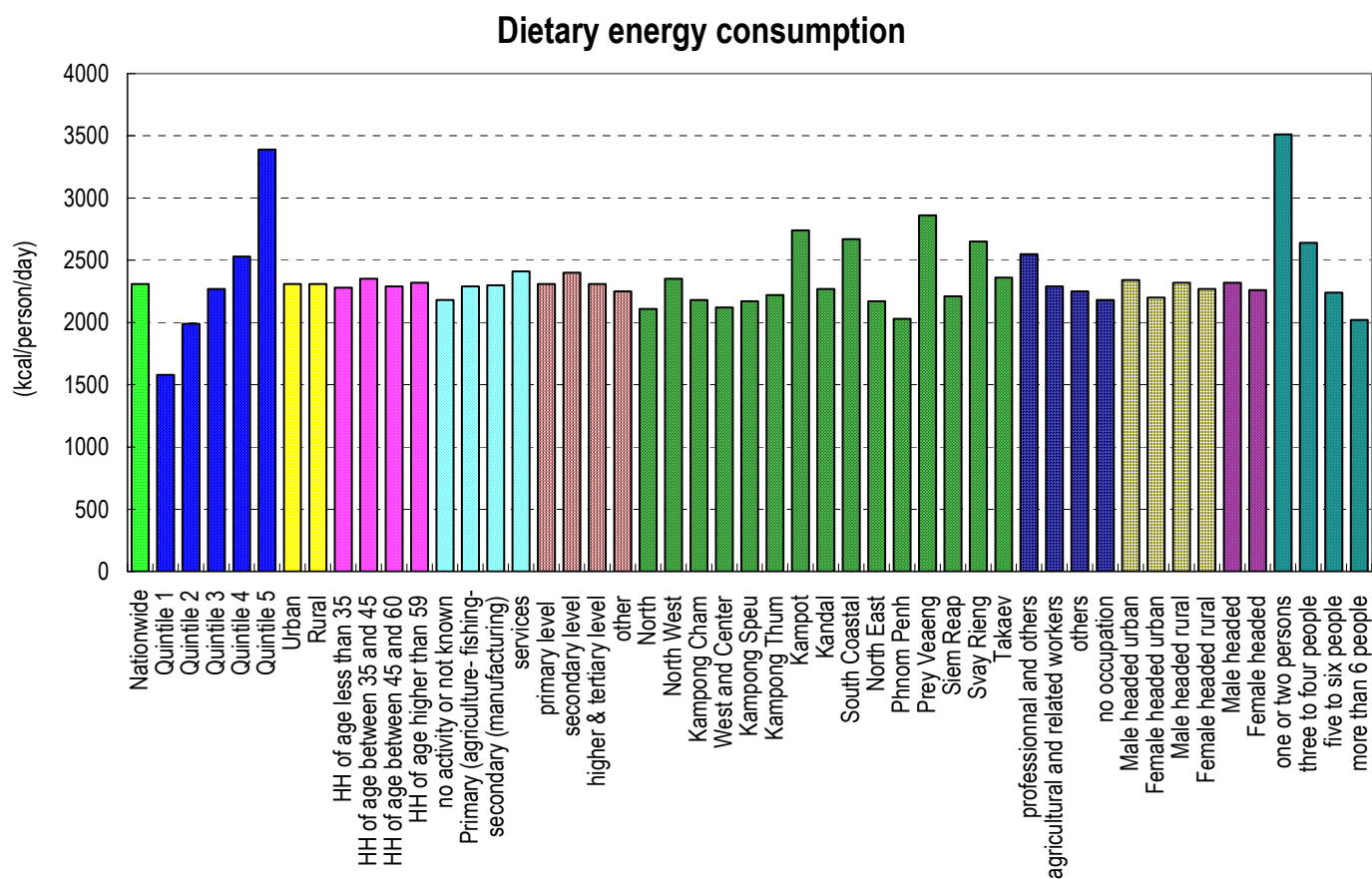
Represents the share of food monetary value from other sources to total food value by categories and groups

- chart23
Represents the share of food monetary value from own production to total food value by income and categories and groups
- chart24
Represents the share of food monetary value from other sources to total food value by income and categories and groups
- chart25
Represents the share of food monetary value purchased to total food value by income and categories and groups
- chart26
Represents the share of dietary energy from own production to total food consumption by income and categories and groups
- chart27
Represents the share of dietary energy eaten away from home to total food consumption by income and categories and groups
- chart28
Represents the share of dietary energy from other sources to total food consumption by income and categories and groups
- chart29
Represents the share of dietary energy purchased to total food consumption by income and categories and groups
- chart30
Represents the share of food monetary value from purchased to total food value by income and categories and groups
- chart31
Represents FAO indicators on hunger (food deprivation and critical food poverty), using CV of Total Consumption Expenditure-FULL, by categories and groups
- chart32 *X (X=number)*
Represents the demand elasticity (FMV, DEC, ShareFMW) with respect to income
- chart33 *X (X=number)*
Represents FAO indicators on hunger (food deprivation and critical food poverty), using CV of Income-FULL, by categories and groups
- chart1 decileX (X = number)
Represents the dietary energy consumption (kcal/person/day) by income
- chart2 decileX (X = number)
Represents the monetary value of food consumed (LC\$/person/day) by income
- chart3 decileX (X = number)
Represents the dietary energy unit value (LC\$/1000kcal) by income
- chart4 decileX (X = number)
Represents the share of food monetary value to total consumption (%) by income
- chart5 decileX (X = number)
Represents the share of food monetary value eaten away from home to total food value (%) by Income
- chart6 decileX (X = number)
Represents the share of food monetary value from own production to total food value (%) by Income
- chart7 decileX (X = number)
Represents the share of food monetary value from other sources to total food value (%) by Income
- chart8 decileX (X = number)
Represents the share of food monetary value from purchased to total food value (%) by Income
- chart9 decileX (X = number)
Represents the share of dietary energy eaten away from home to total food consumption (%) by Income

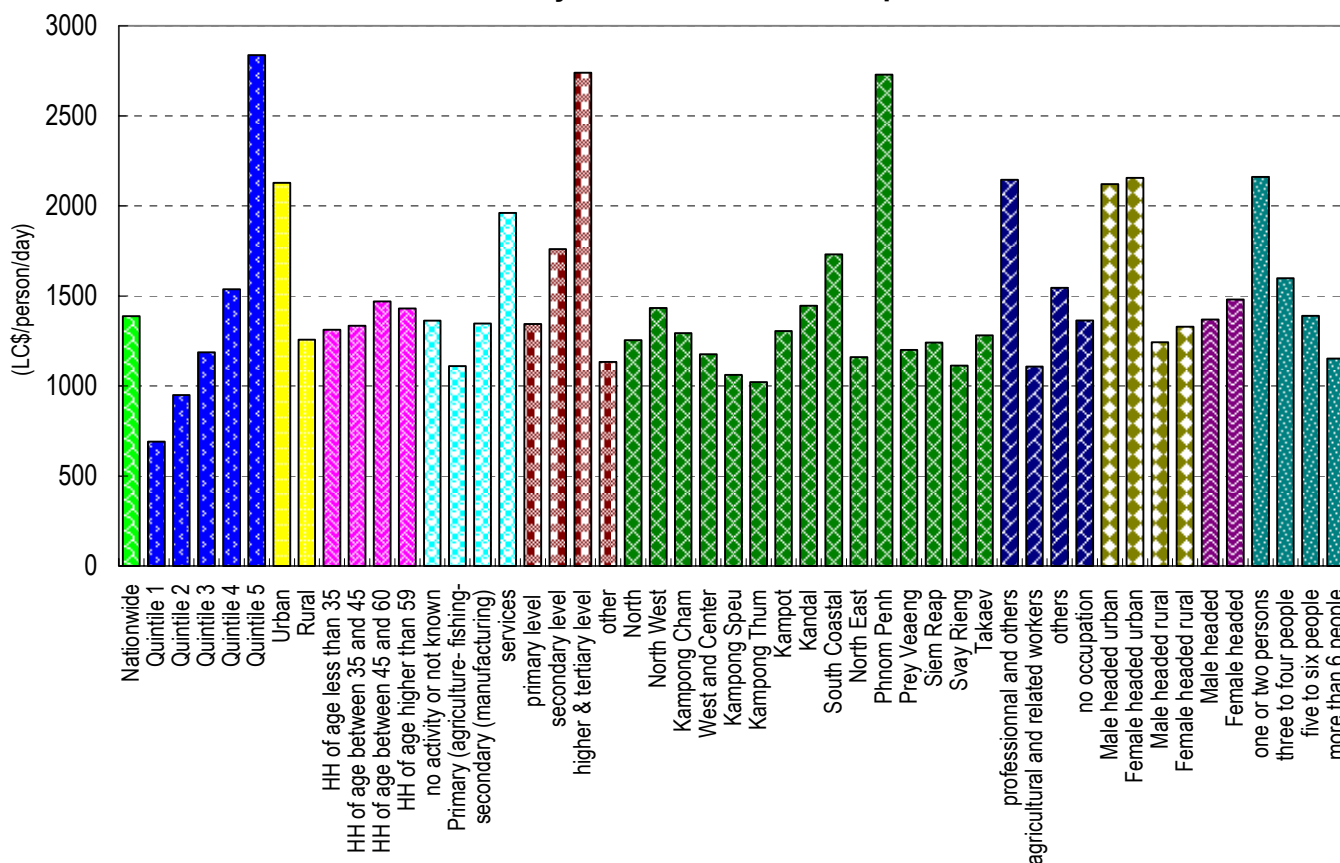
- chart10_decileX (X = number)
Represents the share of dietary energy from own production to total food consumption (%) by Income
- chart11_decileX (X = number)
Represents the share of dietary energy from other sources to total food consumption (%) by Income
- chart12_decileX (X = number)
Represents the share of dietary energy from purchased to total food consumption (%) by Income

C3.3. EXAMPLES OF TABLES AND GRAPHS

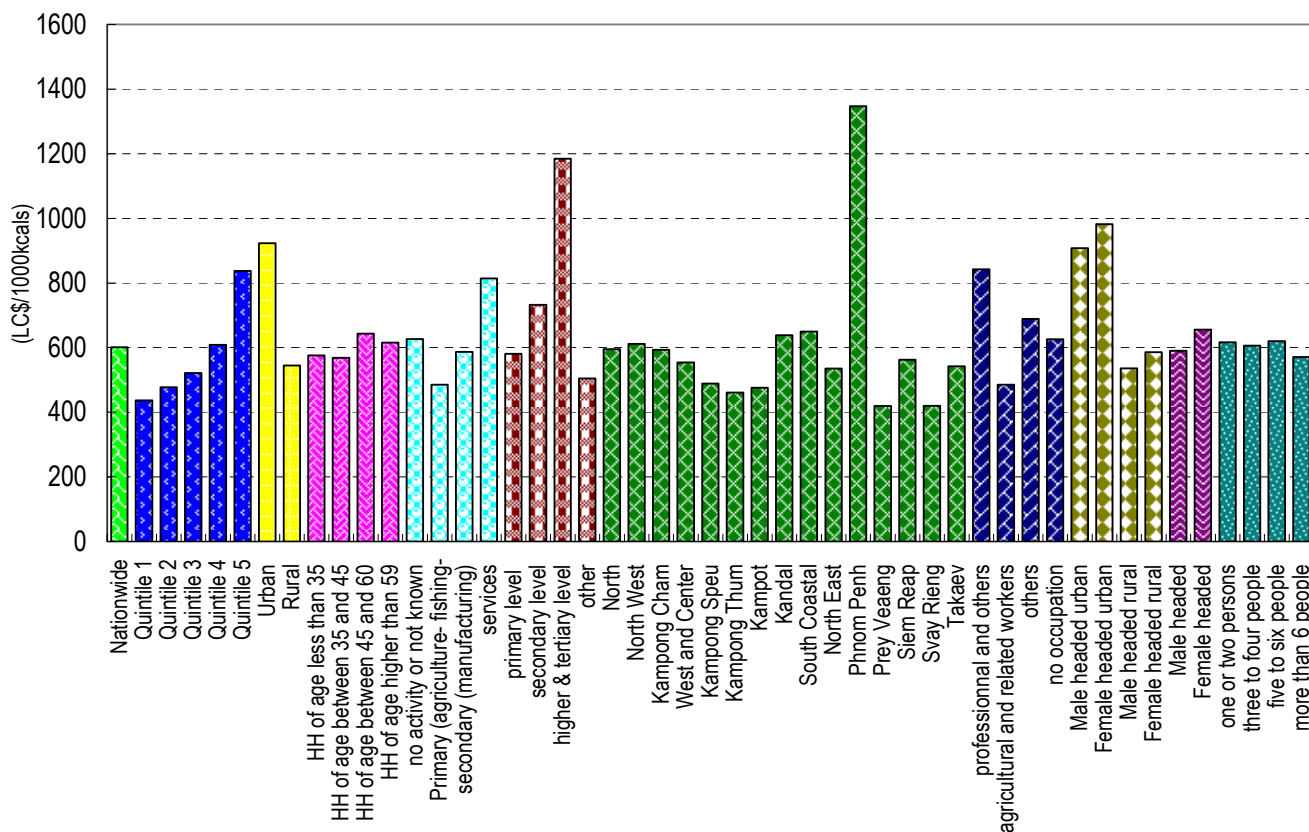
133. The following graphs and table are extracted from “Summary report on food insecurity assessment in Cambodia based on Cambodian Socio-economic Survey 2003/04, National Institute of Statistics, Phnom Penh, Cambodia, September 2007”.



Monetary value of food consumption



Dietary energy unit monetary value of food



Selective statistics of food consumption						
Region: Asia Country: Cambodia Year: 2003/04						
Categories and Groupings	Number of sampled households	Average number of people in household	Average food consumption in dietary energy value (kcal/person/day)	Average food consumption in monetary value (LC\$/person/day)	Average dietary energy unit value (LC\$/1000kcal)	Average total consumption (LC\$/person/day)
Nationwide	14981	5.0	2310	1388.13	601.09	1943.93
Income level						
Quintile 1	2996	6.0	1580	691.08	436.45	814.26
Quintile 2	2996	5.4	1990	948.88	476.97	1152.10
Quintile 3	2997	4.9	2270	1186.03	521.47	1488.90
Quintile 4	2996	4.5	2530	1537.50	608.15	2032.29
Quintile 5	2996	4.3	3390	2837.99	837.04	4693.50
Area						
Urban	2993	5.1	2310	2128.66	922.59	3128.45
Rural	11988	5.0	2310	1256.79	544.14	1733.85
Age of head of HH						
HH of age less than 35	3770	4.2	2280	1311.56	575.37	1895.02
HH of age between 35 and 45	4164	5.5	2350	1335.21	568.34	1843.88
HH of age between 45 and 60	4563	5.5	2290	1469.43	642.74	2071.03
HH of age higher than 60	2484	4.3	2320	1430.09	615.80	1939.25
Economic activity of head of HH						
no activity or not known	1813	4.7	2180	1363.25	626.16	1909.28
Primary (agriculture- fishing- hunting- mining)	7495	5.0	2290	1110.87	485.16	1512.49
secondary (manufacturing)	1419	4.9	2300	1346.81	586.82	1938.58
services	4254	5.0	2410	1961.19	814.18	2813.00
Education						
primary level	7567	5.1	2310	1343.96	580.76	1871.93
secondary level	2525	5.0	2400	1759.77	732.49	2588.77
higher & tertiary level	439	5.0	2310	2739.95	1184.48	4253.05
other	4450	4.7	2250	1133.41	504.64	1496.68
Region						
North	870	4.8	2110	1255.05	595.08	1637.55
North West	1057	5.0	2350	1433.68	611.24	1997.22
Kampong Cham	2040	4.8	2180	1292.89	593.18	1683.94
West and Center	1030	4.9	2120	1176.51	553.89	1659.32
Kampong Speu	768	5.0	2170	1061.28	488.65	1451.34
Kampong Thum	740	5.2	2220	1021.83	460.81	1413.36
Kampot	697	4.7	2740	1305.95	475.76	1717.98
Kandal	1349	5.3	2270	1445.69	638.07	2046.23
South Coastal	480	5.3	2670	1731.19	649.51	2412.91
North East	739	5.1	2170	1160.13	534.72	1551.15
Phnom Penh	1394	5.2	2030	2729.40	1346.73	4082.16
Prey Veaeng	1277	4.5	2860	1200.06	419.15	1727.80
Siem Reap	870	5.4	2210	1241.69	562.92	1716.86
Svay Rieng	640	4.7	2650	1113.88	419.67	1599.51
Takaev	1030	4.9	2360	1280.82	542.50	1904.94
Occupation						
professional and others	2652	5.0	2550	2145.81	842.05	3112.77
agricultural and related workers	7646	5.0	2290	1108.22	484.82	1508.11
others	2882	5.0	2250	1545.51	688.41	2196.43
no occupation	1801	4.7	2180	1363.48	625.61	1909.06
Gender and area						
Male headed urban	2261	5.3	2340	2121.43	907.99	3108.41
Female headed urban	732	4.4	2200	2155.99	981.25	3204.22
Male headed rural	9392	5.3	2320	1242.03	535.92	1729.68
Female headed rural	2596	3.8	2270	1329.95	585.70	1754.53
Gender						
Male headed	11653	5.3	2320	1368.87	589.96	1928.53
Female headed	3328	3.9	2260	1479.49	655.40	2016.97
Household size						
one or two persons	1377	1.8	3510	2161.61	615.96	2901.77
three to four people	5214	3.6	2640	1598.14	605.92	2265.89
five to six people	5208	5.4	2240	1389.56	619.90	1949.83
more than 6 people	3182	7.9	2020	1151.45	570.39	1600.11

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- FAO Food Security Statistics Module (2006). Step 3 – Reports User Manual. Statistics Division. Rome.

ANNEXES

ANNEX 1. PROCEDURES TO ESTIMATE THE MINIMUM DIETARY ENERGY REQUIREMENT

A. CONCEPTS AND DEFINITIONS:

- ***Dietary energy requirement:***

“The energy requirement was defined as the amount of calories needed to maintain health, growth, and an *appropriate* level of physical activity”

- ***Minimum dietary energy requirement (MDER) per person per day:***

The minimum *per person per day* dietary energy requirement, which is used as the cut-off point for estimating the prevalence of undernourishment, is derived by aggregating the estimated sex-age specific minimum dietary energy requirements using the relative proportion of the population in the corresponding sex-age groups as weights. Thus, as the sex-age distribution of the population changes over time, the cut-off point has to be adjusted to reflect this change in demographic structure.

- ***Minimum dietary energy requirement by sex-age groups:***

- For a given height, there is a range of body-weights that are consistent with good health. Similarly, there is a range of physical activity levels (PAL) that are consistent with performance of economically necessary and socially desirable activity and may therefore be considered to be acceptable

- The sex-age specific minimum energy requirements have been derived considering the energy expenditure corresponding to the minimum acceptable weight-for-height (5th percentile) and the minimum acceptable physical activity level (sedentary).

- ***Statistical procedures for estimating MDER by sex and age groups:***

→ Children below 10 years of age

The body weight values correspond to the 50th percentile (median) of the range of weight-for-height on the basis of the Body Mass Index (BMI) of the WHO reference population data. The energy requirement is estimated on basis of linear or second degree equations using this weight and the data on weight gain for age and the energy per kilogramme of weight gain at the 50th percentile. The equations are based on the recommendations of the FAO/WHO/UNU expert meeting held in October 2001 in Roma and published in the 2004 FAO/WHO/UNU expert report.

→ Children 10 and above, adolescents and adults

The body weight values for children and adolescents up to 18 years of age have been specified on the basis of the lowest acceptable body-weight on the basis of the fifth percentile of the Body Mass Index (BMI) and the second degree TEE equations. For adults 18 years of age and above the lowest acceptable body-weight for given height has been estimated on the basis of the fifth percentile of the BMI and the PAL index corresponding to sedentary activity has been taken to reflect the lowest acceptable activity level.

In all sex and age groups the attained height figures used for determining the minimum body-weight are from James and Schofield (1990) and more recent sources.

B. TOTAL ENERGY EXPENDITURE EQUATION:

Estimations are different according to the age and the sex of the population

→ *Age: less than 1 year :*

<u>Male/female</u>	TEE= (-99.4+88.6*KG) +	$\begin{cases} 2*WG * ERwg & \text{if U5MR}>10 \\ WG * ERwg & \text{if U5MR}\leq 10 \end{cases}$
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where: - U5MR : Under 5 mortality rate
 - KG : weight for attained height (50th percentile) from BMI distribution
 - WG weight gain for age (50th percentile),
 - ERwg : Energy Requirement per kg of weight gain

→ *Age: 1 to 1.9 year :*

<u>Male:</u>	TEE= 0.93 * (310.2 + 63.3*KG - 0.263*KG ²) +	$2 * \begin{cases} WG * ERwg & \text{if U5MR}>10 \\ WG*ERwg & \text{if U5MR}\leq 10 \end{cases}$
<u>Female:</u>	TEE = 0.93 * (263.4 + 65.3*KG - 0.454* KG ²) +	$2 * \begin{cases} WG*ERwg & \text{if U5MR}>10 \\ WG*ERwg & \text{if U5MR}\leq 10 \end{cases}$

where: - U5MR : Under 5 mortality rate
 - KG : weight for attained height (50th percentile) from BMI distribution
 - WG weight gain for age (50th percentile),
 - ERwg : Energy Requirement per kg of weight gain

→ *Age: between 2 to 17.9 years:*

<u>Male:</u>	TEE= α * (310.2 + 63.3*KG - 0.263* KG ²) + WG * ERwg
<u>Female:</u>	TEE = α * (263.4 + 65.3*KG - 0.454* KG ²) + WG * ERwg

where: - α = $\begin{cases} 1 & \text{if } 2.0 \text{ age}<10 ; \\ 0.85 & \text{if } 10<\text{age}<18 ; \end{cases}$
 - KG : 50th percentile weight for attained height from BMI distribution in less than age 10 and 5th percentile from the BMI distribution in older ages,
 - WG weight gain for age (50th percentile for less than 10 and 5th percentile for 10 to 18),
 - ERwg : Energy Requirement per kg of weight gain

→ *Age: between 18 to 29.9 years:*

<u>Male:</u>	TEE = PAL * (692.2 + 15.057*KG)
<u>Female:</u>	TEE = PAL * (486.6 + 14.818*KG)

where: - KG : 5th percentile weight for attained height from the BMI distribution
 $KG=BMI*(height/100)^2$
 - PAL = 1.55 (sedentary physical life style)

→ *Age: between 30 to 59.9 years:*

<u>Male:</u>	TEE = PAL * (873.1 + 11.472*KG)
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Female: $TEE = PAL * (845.6 + 8.126 * KG)$

where: - KG : 5th percentile weight for attained height from the BMI distribution

$$KG = BMI * (height/100)^2$$

- PAL = 1.55 (sedentary physical life style)

→ *Age: 60 and above*

Male: $TEE = PAL * (587.7 + 11.711 * KG)$

Female: $TEE = PAL * (658.5 + 9.082 * KG)$

where: - KG : 5th percentile weight for attained height from the BMI distribution

$$KG = BMI * (height/100)^2$$

- PAL = 1.55 (sedentary physical life style)

C. MINIMUM DIETAR ENERGY REQUIREMENT IN TOTAL POPULATION

$$MER = (\sum_{ij} TEE_{ij} * Pr_{ij}) + exp$$

where: - i=sex

- j=age group

- Pr=population ratios (age/sex structure)

- exp=extra energy requirements for pregnant population

$$exp = (country\ birth\ ratio * 210\ Kcal/day)$$

pregnancy allowance

ANNEX 2. DATA AND FILE FORMAT REQUIREMENTS TO RUN THE FOOD SECURITY STATISTICS MODULE SOFTWARE

The food security statistical analysis uses the NHS detailed food consumption data together with some other variables of household and household’s members for cross sectional analysis in the SPSS format. It is therefore important to extract and prepare the following required working data files from the NHS data files structure in the appropriate standardized SPSS format as defined in the respective tables below:

Data File 1: **FOOD.SAV**
 Data File 2: **HH.SAV** having basic characteristics of the household
 Data File 3: **HM.SAV** having basic characteristics of each member of the household
 Data File 4: **COUNTRY_NCT.SAV** having the list of NHS food items with the corresponding conversion factors of macronutrients, refuse, density and gram quantity and codes of food groups.
 Data File 5: **INDEXES.SAV** having the monthly consumer and food price indexes for the survey year and by regions if available;
(OPTIONAL ONLY FOR NHS HAVING COLLECTED FOOD CONSUMPTION DATA OVER THE YEARLY SURVEY PERIOD)
 Data File 6: **HEIGHT.XLS/SAV** having age sex height distribution data at national, urban/rural or major regions.

Food source, indicative of how each food item was acquired by the household, is usually available in the NHS data files as follows:

1. As records (row) where a specific code of values 1,2,3,4 is allocated for each food item under the variable “**f_source**” as shown in Table 1a below or
2. Each food source information (quantity and value) corresponding to each food item are entered as separate variables in columns as in table 1b.

Thus, two food data file formats (FOOD.SAV) are respectively given as **Data files 1a and 1b**.

Please prepare the food data file using either Data file **1a** **OR** **1b** that best suits the country NHS data file structure and note that only **ONE** FOOD DATA file has to be prepared.

All variables listed in the different data files are numeric, except that “Food_des” of the data file COUNTRY_NCT.SAV which is alphanumeric and is not used in the FSSM program.

Data File 1a: FOOD.SAV with food sources of food item entered in <u>ROWS</u>			
Name of Variable	Labels	Values	Remarks and Checks
hh_no	Identification code of the household	Values may be either sequential numbers or a combination of geographical codes (district, area, village, region, etc).	Unique code defining each household in the data file.
Item_cod	Code of each food item used in the NHS	The food items codes may either be those of COICOP of UN or national classification codes	Please include food codes for alcoholic beverages and away from home food (canteens, bars, etc.). Exclude cigars, cigarettes and tobacco.
Unit	Code of the unit of quantity measurement of the food item	E.g. Code 1 for Kg; Code 2 for litres; Code 3 for unit; Code 4 for can; Code 5 for bundle, etc, <u>It is important to have the gram equivalent of each unit code available.</u>	If that code is not available because all quantity data have already been standardized in grams and millilitres, <u>PLEASE KEEP THAT VARIABLE AND ASSIGN A VALUE OF 1</u>

<p>fd_qty</p>	<p>Quantity of the food item reported by household</p>	<p>Examples of values of "fd_qty" are for: - food item "Rice" 2 (2kg of rice); - food item "Oil" 4 (4 litres of oil); - food item "eggs" 10 (10 eggs); - food item "potatoes" 2 (2 heaps of potatoes). <i>If quantities have been standardized, values are like 2000 (gm); 4000 (ml), etc.</i></p>	<p>If quantity has been standardized to grams/millilitres, values are large. Otherwise, values are small as they relate to number of kg, litres, etc. Missing values associated to food sources: purchased, own production and other sources will not be considered by the program so they have to be estimated before running the software. No missing values are allowed for those sources. <u>Check for any 0 or missing values.</u> <u>Check for any abnormal high values, which may not be meant for household consumption.</u></p>
<p>fd_mv</p>	<p>Corresponding monetary value in local currency (amount paid or estimated for the reported quantity of food item)</p>	<p>The exact value including cents, if any, has to be entered</p>	<p><u>Check for any missing or any abnormal high values.</u> No missing values are allowed, so they have to be estimated before running the software.</p>
<p>f_source</p>	<p>Code for the type of food acquisition (<i>purchases; own production; other sources and away from home</i>) of the food item</p>	<p>Please use the following codes: <u>If food item was obtained from</u> - purchases code is 1; - own production code is 2; - from other sources code is 3; and - bought and consumed away from home code is 4 (<i>restaurants, street vendors, school and work canteens, food courts, etc.</i>)</p>	<p><u>Only 4 food sources are analysed in the FSSM.</u> Other food sources (<i>free or gift, food aid, income in kind, gathering or fishing, etc.</i>) not listed should all be categorized in 'other food sources' having code 3. In cases where there are less than 4 food sources, <u>Please keep that coding structure</u></p>

<p align="center">Data File 1b: FOOD.SAV with food sources of food item entered as VARIABLES/ COLUMNS</p> <p align="center">Data file must have pair of variables (qty and value) for each available food source such as Purchases; Own Consumption, Other Sources and Away from Home.</p>			
<p>Name of Variable</p>	<p>Labels</p>	<p>Values</p>	<p>Remarks and Checks</p>
<p>hh_no</p>	<p>Identification code of the household</p>	<p>Values may be either sequential numbers or a combination of geographical codes (district, area, village, region, etc).</p>	<p>Unique code defining each household in the data file</p>
<p>Item_cod</p>	<p>Code of each food item used in the HS</p>	<p>The food items codes may either be those of COICOP of UN or national classification codes</p>	<p>Please include food codes for alcoholic beverages and away from home food (canteens, bars, etc.) Exclude cigars, cigarettes and tobacco</p>
<p>unit</p>	<p>Code of the unit of quantity measurement of the food item</p>	<p>E.g. Code 1 for Kg; Code 2 for litres; Code 3 for unit; Code 4 for can; Code 5 for bundle, etc, <u>It is important to have the gram equivalent of each unit code available.</u></p>	<p>If that code is not available because all quantity data have already been standardized in grams and millilitres. <u>PLEASE KEEP THAT VARIABLE AND ASSIGN A VALUE OF 1</u></p>

<p>fqty_pur</p>	<p>Purchased quantity of the food item as reported by household</p>	<p>Examples of values of "fd_qty" are for: - food item "Rice" 2 (2kg of rice); - food item "Oil" 4 (4 litres of oil); - food item "eggs" 10 (10 eggs); - food item "potatoes" 2 (2 heaps of potatoes) If quantities have been standardized, values are like 2000 (gm); 4000 (ml), etc.</p>	<p>If quantity has been standardized to grams/millilitres, values are large. Otherwise, values are small as they relate to number of kg, litres, etc. Missing values associated to food sources: purchased, own production and other sources will not be considered by the program. No missing values are allowed for those sources, so they have to be estimated before running the software. <u>Check for any 0 or missing values.</u> <u>Check for any abnormal high values, which may not be meant for household consumption.</u></p>
<p>fval_pur</p>	<p>Corresponding monetary value in local currency paid for purchasing the reported quantity of food item.</p>	<p>The exact value including cents, if any, has to be entered</p>	<p><u>Check for any missing or any abnormal high values.</u> No missing values are allowed, so they have to be estimated before running the software</p>
<p>fqty_own</p>	<p>Quantity of the food item consumed from own production food items by household (own consumption food)</p>	<p>Examples of values of "fd_qty" are for: - food item "poultry meat" 2 (2kg of meat); - food item "milk" 4 (4 litres of milk); - food item "eggs" 10 (10 eggs); - food item "potatoes" 1 (1 kg of potatoes) If quantities have been standardized, values are like 2000 (gm); 4000 (ml), etc.</p>	<p>If quantity has been standardized to grams/millilitres, values are large. Otherwise, values are small as they relate to number of kg, litres, etc. Missing values associated to food sources: purchased, own production and other sources will not be considered by the program. No missing values are allowed for those sources, so they have to be estimated before running the software. <u>Check for any 0 or missing values.</u> <u>Check for any abnormal high values, which may not be meant for household consumption.</u> If food data on own consumption is not available, this variable is omitted.</p>
<p>fval_own</p>	<p>Corresponding monetary value in local currency of quantity of food item consumed from own production</p>	<p>The value including cents, if any, has to be entered</p>	<p><u>Check for any missing or any abnormal high values</u> No missing values are allowed, they have to be estimated before running the software. If food data from own production food is not available, this variable is omitted.</p>
<p>fqty_oth</p>	<p>Quantity of the food item obtained from other food sources (free or gift, food aid, income in kind, gathering or fishing, etc.) by household</p>	<p>Examples of values of "fd_qty" are for: - food item "fish" 3 (3kg of fish); - food item "beer" 2 (2 bottles of beer); - food item "eggs" 5 (5 eggs); - food item "potatoes" 1 (1 kg of potatoes) If quantities have been standardized, values are like 2000 (gm); 4000 (ml), etc.</p>	<p>If quantity has been standardized to grams/millilitres, values are large. Otherwise, values are small as they relate to number of kg, litres, etc. Missing values associated to food sources: purchased, own production and other sources will not be considered by the program. No missing values are allowed for those sources, so they have to be estimated before running the software. <u>Check for any 0 or missing values.</u> <u>Check for any abnormal high values, which may not be meant for household consumption.</u> If food data from other sources is not available, this variable is omitted.</p>

fval_oth	Corresponding monetary value in local currency of quantity of food item obtained from other sources (<i>free or gift, food aid, income in kind, gathering or fishing, etc.</i>)	The exact value including cents, if any, has to be entered	<u>Check for any missing or any abnormal high values.</u> If food data from other sources is not available, this variable is omitted. No missing values are allowed, so they have to be estimated before running the software
fval_awy	Monetary value or expenditures in local currency of consumption of food away from home (<i>restaurants, street vendors, school and work canteens, food courts, etc.</i>). Excl. tips given to waiters and tobacco consumption expenses.	The exact value including cents, if any, has to be entered	If food data from away from home expenditures is not available, this variable is omitted. No missing value is allowed <u>Check for any missing or any abnormal high values.</u>
fqty_awy	Quantity of the food item bought and consumed away from home (<i>restaurants, street vendors, school and work canteens, food courts, etc.</i>)	Some countries are able to collect the quantity values of some items of food bought and consumed away from home. In many other cases, only the expenditure values are collected and this variable is usually not available in the NHS data file. In such cases, it is recommended to insert that variable and leave it blank	However, if food consumption from away from home is available only as expenditures, (see fval_awy), PLEASE KEEP THIS VARIABLE AND LEAVE IT BLANK (NO VALUE)

* These Variables are categorized variables and should have well defined values with corresponding label names and the categories are subjective to the country specificity and may be adjusted accordingly

Data File 2: HH.SAV having basic characteristics of household			
Name of Variable	Labels	Values	Remarks and Checks
hh_no	Identification code of the household	Values may be either sequential numbers or a combination of geographical codes (district, area, village, region, etc).	Unique code defining each household in the data file
region *	Regional location of household District or provinces, etc.		It is recommended that each of the regions have at least a minimum of 500 or more households to have more reliable estimates. Thus it may be necessary to group some regions into a new one
urb_rur *	Area location of household urban; rural; semi urban or capital, etc	Codes are urban 1; or rural 2, Capital 3, etc.	If the information is not available, PLEASE KEEP THAT VARIABLE AND ASSIGN A VALUE OF 1.
HH_size	Number of members in the household	The number of people who lived and shared the meals of the household during the reference survey collecting period	Sometimes workers or relatives are included if they have shared the meals for quite some times depending the survey reference period.
hhsizec *	CODES for category groups of number of people in household for group analysis	Examples of HHSIZEC codes: -Code 1 for households having up to 2 members; -Code 2 for households having 3 and up to 5 members; and -Code 3 for households having more than 5 members.	It is recommended that each category has at least a minimum of 500 or more households to have more reliable estimates

num_days	The number of days of the reference survey collecting period of the food data.	Weekly – 7; Fortnight -14, For month it depends on the survey month.	
month	The survey reference month food data of that household was collected	E.g.: Values of 1, 2, 3...12 for months January, February, March ... December	
year	The survey year the food data was collected	E.g.: Values of 1998, 1999, 2000, 2003...etc. DO NOT ENTER VALUES SUCH AS 98, or 99 OR 00 or 03.	
hh_wgt	The household sampling weight. Please ensure that these weights have been adjusted for non-responding households.	Please verify that the total weights add up to the households' population.	If survey is self-weighting, <u>PLEASE KEEP THIS VARIABLE AND ASSIGN A VALUE OF 1.</u>
thh_cexp	Total household consumption expenditure for the same survey reference period of the food collection period.	Total household consumption expenditures excludes all expenditure not meant for consumption by households such as investments; life insurance premiums; food for pets or livestock or given away, etc.	If some collected household non-food expenditure, have different reference survey period than that of the food data; PLEASE STANDARDIZE THESE NON-FOOD EXPENDITURES TO THE SAME PERIOD OF FOOD DATA.
thh_inc	Total income received in the household from all sources for the same survey reference period of the food collection period.	Aggregate all money received by each person of the household from all sources including wages, profit from self employment, sales of own produced good and services, income in kind, transfers, rent received, etc.	If income data period is different from that of food survey period, PLEASE STANDARDIZE THE AGGREGATED HOUSEHOLD INCOME TO THE SAME PERIOD OF FOOD DATA. <i>If income data is not available, compute total income=total expenditure</i>
mder_nat	Minimum Dietary Energy Requirement at national level	Value in kilocalorie per person per day (only one value for all households)	To be estimated by the Food Security Statistics Module (FSSM) from heights (collected in the survey or available at national or regional level) and total population distribution which will be estimated from all household's members
mder_reg	Minimum Dietary Energy Requirement at regional level	Value in kilocalorie per person per day (one value for all households of each region)	
mder_u_r	Minimum Dietary Energy Requirement at the urban/rural area level (urban; rural; semi urban or capital, etc.)	Value in kilocalorie per person per day (one value for all households of each urban/rural area)	
ader_nat	Average Dietary Energy Requirement at national level	Value in kilocalorie per person per day (only one value for all households)	
ader_reg	Average Dietary Energy Requirement at regional level	Value in kilocalorie per person per day (one value for all households of each region)	
ader_u_r	Average Dietary Energy Requirement at the urban/rural area level (urban; rural; semi urban or capital, etc.)	Value in kilocalorie per person per day (one value for all households of each urban/rural area)	

Data File 3: HM.SAV having basic characteristics of households members			
Name of Variable	Labels	Values	Remarks and Checks
hh_no	Identification code of the household	Values may be either sequential numbers or a combination of geographical codes (district, area, village, region, etc).	Unique code defining each household in the data file
hm_no	Identification code of each member of the household		
hm_rel	Code of relationship allocated to each member of household in relation to the HEAD of household	The code value of the head of household should be 1, 2 for Spouse, etc.	
gender *	Gender of each member of household	Code is 1 for male Code is 2 for female	
height	Height in cm		If not collected, see Data File 6.
hm_age	Age in whole years		For children less than one year old, please enter a 0.
hmagec *	CODES for category groups of age of each member of the household for age group analysis	Examples of HMAGEC codes: - Code 1 for household's members of age less than 35 years; - Code 2 for household's members having age between 35 and less than 45 years; - Code 3 for household's members having age between 45 to 60 years; and - Code 4 for household's members having age greater than 60 years.	It is recommended that each category has at least a minimum of 500 or more households to have more reliable estimates
hm_eact *	The economic activity major group in which the head of household is working.	Use the major economic activity groups of the first digit of the national or international UN classification such as ISIC Rev 3.	It is recommended that each category has at least a minimum of 500 or more households to have more reliable estimates Replace the blank (missing data) by a common value, say 99.
hm_occ *	The major occupational group of the head of household's job.	Use the major occupational groups of the first digit of the latest ISCO of the United Nations or the National classification of occupations.	It is recommended that each category has at least a minimum of 500 or more households to have more reliable estimates Replace the blank (missing data) by a common value, say 99.
hm_edu *	The educational group level of the head of household	Examples of educational level based on the highest educational attainment of the head of household: - Code 1 for household heads having never gone to school; - Code 2 for households heads having followed primary education; - Code 3 for households heads having followed up to secondary or high school; and - Code 4 for household heads having followed tertiary education	It is recommended that each category has at least a minimum of 500 or more households to have more reliable estimates Replace the blank (missing data) by a common value, say 99.
hm_var1	New population grouping of the head of household or of the household		It is recommended that each category has at least a minimum of 500 or more households to have more reliable estimates Replace the blank (missing data) by a common value, say 99.

hm_var2	New population grouping of the head of household or of the household		It is recommended that each category has at least a minimum of 500 or more households to have more reliable estimates Replace the blank (missing data) by a common value, say 99.
hm_var3	New population grouping of the head of household or of the household		It is recommended that each category has at least a minimum of 500 or more households to have more reliable estimates Replace the blank (missing data) by a common value, say 99.
hm_var4	New population grouping of the head of household or of the household		It is recommended that each category has at least a minimum of 500 or more households to have more reliable estimates Replace the blank (missing data) by a common value, say 99.
hm_var5	New population grouping of the head of household or of the household		It is recommended that each category has at least a minimum of 500 or more households to have more reliable estimates Replace the blank (missing data) by a common value, say 99.

Note variables hm_var1, hmvar2 ... hmvar5 refer to additional analytical variables of the head of households that may be available in the NHS data file and useful for analysis. Please insert them appropriately and define the groupings accordingly with clear labels and values.

Data file 4 COUNTRY_NCT.SAV is a list of all food items used in the NHS with corresponding conversion factors for standardizing weight quantity and volume measures and estimating the values of macronutrients of dietary energy, protein, fats and carbohydrate to the 100 grams **edible weight**.

This data file has to be prepared based on the list of food items identified in the NHS. The corresponding nutrients, refuse and density values are obtained from either the available national or regional, or international food composition table (FCT). **Note that the values of the nutrients should be as 100 grams edible weight not as “purchased” weight.**

The "fugmml" variable is the corresponding grams or millilitres values of the each unit of quantity measurement of the food items in case food quantity values in the FOOD data file are entered as numbers of quantity units such as 2 kg of food item " Rice" or 4 litres of "oil" or 10 "eggs" or 2 heaps of 'potatoes", etc. In case the food quantity values have already been standardized in gram and millilitres, keep that variable and insert a value of 1 for all food items code.

NOTE if the local units of quantity such as heaps, tins, cups, plates, etc. are available in the food file, the corresponding grams weight or volume have to be obtained at the appropriate sample regional or community or village area as those local units differ across geographic regions.

Country NHS food data files sometimes have different units of quantity measurement for the same food item. E.g. Food item “Potatoes” may have quantity units in Kg., grams, bag, heap, etc. For those cases, each unit of quantity of that food item should be recorded separately with the appropriate gram equivalent entered in column variable “fugmml”.

Data File 4: COUNTRY_NCT.SAV having conversion factors of macro nutrients, density and gram quantity			
Name of Variable	Labels	Values	Remarks and Checks
Item_cod	Code of each food item used in the NHS	The food items codes may either be those of COICOP of UN or national classification codes	Please include food codes for food, alcoholic beverages and away from home food (canteens, bars, etc.)
food_des	Name of the food item	The names are useful for making correspondence with food items in food composition table.	
unit	Code of the unit of quantity measurement of the food item	E.g. Code 1 for Kg; Code 2 for litres; Code 3 for unit; Code 4 for 450 gm tin; Code 5 for bundles,etc,	Country HS food data files sometimes have different units of quantity measurement for the same food item. E.g. Food item “Potatoes” may have quantity units in Kg., grams, bag, heap, etc. For those cases, each unit of quantity of that food item should be recorded separately with the appropriate gram equivalent entered in column variable “ fugmml ”. If that code is not available because all quantity data have already been standardised in grams and millilitres, <u>PLEASE KEEP THIS VARIABLE AND ASSIGN A VALUE OF 1.</u>
Item_grp	Code of Food broad commodity group to which food item belongs.	Insert the digit codes as per list below: group 1: CEREALS AND PRODUCTS (<i>value =1</i>) group 2: ROOTS AND TUBERS AND PRODUCTS ; (<i>value =2</i>) group 3: SUGARS AND SYRUPS AND PRODUCTS; (<i>value =3</i>) group 4: PULSES; (<i>value =4</i>) group 5: TREE NUTS; (<i>value =5</i>) group 6: OIL CROPS (<i>value =6</i>) group 7: VEGETABLES AND PRODUCTS; (<i>value =7</i>) group 8: FRUITS AND PRODUCTS; (<i>value =8</i>) group 9: STIMULANTS; (<i>value =9</i>) group 10: SPICES; (<i>value =10</i>) group 11: ALCOHOLIC BEVERAGES; (<i>value =11</i>) group 12: MEAT; (<i>value =12</i>) group 13: EGGS; (<i>value =13</i>) group 14: FISH AND FISH PRODUCTS; (<i>value =14</i>) group 15: MILK AND CHEESE (<i>value =15</i>) group 16: OILS AND FATS (vegetable oils); (<i>value =16</i>) group 17: OILS AND FATS (animal fats); (<i>value =17</i>) group 18: NON ALCOHOLIC BEVERAGES; (<i>value =18</i>) group 19: MISCELLANEOUS AND PREPARED FOOD; (<i>value =19</i>)	Please refer to the “Food item list” excel data file for classifying the NHS food items to food commodity groups

fugmml	Conversion factors to convert the quantity into grams or millilitres	E.g. Kg – 1000; bottle – 750; litre – 1000; etc.	If the quantity values in the FOOD.sav data file are already in grams or millilitres, keep the "fugmml" variable and assign a value of 1 for operational purposes. These data must be entered as missing (no 0) when the food source of the combination item-unit is away from home
density	Density coefficients for liquid and semi liquid food items whose quantity measurements are in litres, bottles, pints, cans, millilitres, centilitres or decilitres.	Obtained from USDA or FAO webpage	Allocate a default value of 1 to all solid food items
fd_kcal	Energy in kcal per 100 edible grams of food.	From the equation: $fd_kcal = fd_pro*4 + fd_fat*9 + fd_car*4 + fd_alc*7 + fd_fib*2$	Use the edible portion values of food items to convert values of nutrients given as 100 grams edible portions to the appropriate 100 grams edible weight These data must be entered as missing (no 0) when the food source of the combination item-unit is away from home
fd_pro	Proteins in grams per 100 edible grams of food.	From Food Composition Table	
fd_fat	Fat in grams per 100 edible grams of food.	From Food Composition Table	
fd_car	Carbohydrates (excluding fibers) in grams per 100 edible grams of food.	From Food Composition Table	
fd_alc	Alcohol in grams per 100 edible grams of food	From Food Composition Table	
fd_fib	Total fibre in grams per 100 edible grams of food	From Food Composition Table	
refuse	Refuse proportion of the food item. Factor to convert the acquired food quantities to edible weight.	Values can be: - 0 for food items completely edible like rice, milk, etc... - >=1 and <= 90 for food items having peels, stones, bones, etc. (fish, meat, banana, etc) No missing values are allowed	The refuse factor has to be in percentage

Data File 5: INDEXES.SAV having the monthly consumer and food price indexes for the survey year

Name of Variable	Labels	Values	Remarks and Checks
month	Survey month period	E.g.: Values of 1, 2, 3...12 for months January, February, March ... December	
year	Survey year	E.g.: Values of 1998, 1999, 2000, 2003...etc.	DO NOT ENTER VALUES SUCH AS 98, OR 99 OR 00 OR 03.
cpi	Consumer price index (CPI)	CPI for the corresponding region, month and year	Indexes for all the months of the year survey period should be of the same base period.
fpi	Food price index (FPI)	FPI for the corresponding region, month and year	

Data File 6: HEIGHT.SAV/XLS having the age sex distribution and height data at national level (Data should correspond to the most recent estimates from the survey or population census or other health surveys)			
Name of Variable	Labels	Values	Remarks and Checks
age_grp	Age groups	The variable age_grp should have the following values 0; 1; 2; 3; 4; 5, 6; 7; 8; 9; 10; 11; 12; 13; 14; 15; 16; 17; 18; 19; 20-24; 25-29; 30-34; 35-39; 40-44; 45-49; 50-54; 55-59; 60-64; 65-69 & 70 +.	
gender	Gender of household head	It must be the same codification as in HM.sav	
height	Height at national level in cm	Mean or median height for each age group, as defined in variable age_grp	May be obtained from the population census or Demographic and Health Surveys (DHS) or Multiple Indicator Cluster Survey (MICS)

ANNEX3. LIST OF FOOD ITEMS BY FOOD GROUPS

The table gives a reference list of food items by food commodity sub-groups and food commodity groups useful for allocating food commodity group classification codes for the food items in the household income and expenditure survey.

FOOD COMMODITY GROUP (CODES)	FOOD COMMODITY SUB-GROUPS	FOOD ITEMS
1. CEREALS AND PRODUCTS (INCLUDES GRAINS AS WHOLE GRAIN, MEAL, FLOUR; PASTAS, MACARONI, SPAGHETTI, ETC.; COMMERCIALY BAKED GOODS & OTHER CEREALS PRODUCTS)	WHEAT & PRODUCTS	WHEAT
		FLOUR WHEAT
		BRAN OF WHEAT
		MACARONI
		GERM OF WHEAT
		BREAD
		BULGUR
		PASTRY
		WHEAT STARCH
		WHEAT GLUTEN
		BREAKFAST CEREALS
		MIXES AND DOUGH
		FOOD PREPARATIONS OF FLOUR MEAL OR MALT EXTRACT
	RICE & PROD (MILLED EQ.)	RICE, PADDY
		RICE, HUSKED
		MILLED RICE FROM IMPORTED HUSKED RICE
		MILLED PADDY RICE
		RICE, BROKEN
		RICE GLUTEN
		RICE, STARCH
		BRAN OF RICE
		RICE FLOUR
	BARLEY & PRODUCTS	BARLEY
		POT BARLEY
		BARLEY, PEARLED
		BRAN OF BARLEY
		BARLEY FLOUR AND GRITS
		MALT OF BARLEY
		MALT EXTRACTS
	MAIZE & PRODUCTS	MAIZE
		GERM OF MAIZE
		FLOUR OF MAIZE
		BRAN MAIZE
		MAIZE GLUTEN
		STARCH MAIZE
		GLUTEN FEED & MEAL
	RYE & PRODUCTS	RYE
		FLOUR OF RYE
		BRAN RYE
	OATS & PRODUCTS	OATS
		ROLLED OATS
		BRAN OF OATS
MILLET & PRODUCTS	MILLET	
	FLOUR OF MILLET	

		BRAN OF MILLET
	SORGHUM & PRODUCTS	SORGHUM
		FLOUR OF SORGHUM
		BRAN OF SORGHUM
	CEREALS, OTHERS & PRODUCTS	POP CORN
		BUCKWHEAT
		FLOUR OF BUCKWHEAT
		BRAN OF BUCKWHEAT
		QUINOA
		FONIO
		FLOUR OF FONIO
		BRAN OF FONIO
		TRITICALE
		FLOUR OF TRITICALE
		BRAN OF TRITICALE
		CANARY SEED
		MIXED GRAIN
		FLOUR OF MIXED GRAIN
		BRAN OF MIXED GRAIN
		WAFERS
		BREAKFAST CEREALS
	CEREALS - NOT ELSEWHERE SPECIFIED (NES)	
	FLOUR OF CEREALS	
	BRAN OF CEREALS	
	CEREAL PREPARATIONS NES	
2. ROOTS AND TUBERS AND PRODUCTS (INCLUDES STARCHES)	POTATOES & PRODUCTS	POTATOES
		FLOUR OF POTATOES
		FROZEN POTATOES
		POTATO STARCH
		POTATO TAPIOCA
	CASSAVA & PRODUCTS	CASSAVA
		FLOUR OF CASSAVA
		CASSAVA TAPIOCA
		CASSAVA DRIED.
		CASSAVA STARCH
	SWEET POTATOES	SWEET POTATO
	ROOTS & TUBERS, OTHER	YAUTIA (COCOYAM.)
		TARO
		ROOTS & TUBERS NES
		FLOUR OF ROOTS & TUBERS
		SAGOO
		ROOTS & TUBERS DRIED
YAMS	YAMS	

SUGAR CANE	SUGAR CANE
SUGAR BEETS	SUGAR BEETS

3. SUGARS AND SYRUPS AND PRODUCTS (INCLUDE SWEET; CANDY; JAM, MARMALADE, ETC.)	SUGAR & PROD. (RAW EQUIVALENT.)	CANE SUGAR
		BEET SUGAR
		SUGAR, CENTRIFUGAL RAW
		SUGAR REFINED
		SUGAR CONFECTIONARY (SWEETS)
		SUGARS FLAVOURED
	SUGAR, NON-CENTRIFUGAL	SUGAR, NON-CENTRIFUGAL
	SWEETENERS, OTHER & PRODUCTS	FRUCTOSE
		MALTOSE
		MAPLE SUGAR
		SUGAR CROPS
		MOLASSES
		OTHER FRUCTOSE
		SUGAR NES
GLUCOSE & DEXTROSE		
LACTOSE		
ISOGLUCOSE		
BEVERAGES NON-ALCHOLIC		
HONEY	HONEY	
4. PULSES	BEANS, DRY & PRODUCTS	BEANS, DRY
	PEAS, DRY & PRODUCTS	PEAS, DRY
	PULSES, OTHER & PROD.	BROAD BEANS, DRY
		CHICK-PEAS
		COW PEAS, DRY
		PIGEON PEAS
		LENTILS
		BAMBARA BEANS
		VETCHES
		LUPINS
		PULSES NES
		FLOUR OF PULSES
		BRAN OF PULSES
5. TREE NUTS	NUTS & PRODUCTS	BRAZIL NUTS
		CASHEW NUTS
		CHESTNUTS
		ALMONDS
		WALNUTS
		PISTACHIOS
		KOLANUTS
		HAZELNUTS
		ARECANUTS
		BRAZIL NUTS SHELLED
		CASHEW NUTS SHELLED
		ALMONDS SHELLED
		WALNUTS SHELLED
		HAZEL NUTS SHELLED
		NUTS NES
		PREPARED NUTS

6. OIL CROPS	SOYABEANS & PRODUCTS	SOYBEANS
		CAKE OF SOYBEANS

	SOYA SAUCE
	SOYA PASTE
	SOYA CURD
GROUNDNUTS	GROUND NUTS IN SHELL
	GROUND NUT S SHELLED
	CAKE OF GROUNDNUTS
SUNFLOWER SEED	SUNFLOWER SEED
RAPE, MUSTARD SEEDS	RAPESEED
	MUSTARD SEED
	FLOUR MUSTARD SEED
COTTONSEED	COTTONSEED
COCONUTS & COPRA	COCONUTS
	COCONUTS,DESSICATED
	COPRA
SESAME SEED	SESAME SEED
PALMKERNELS	OIL PALM FRUIT
	PALM KERNELS
OLIVES	OLIVES
	OLIVES PRESERVED
OILCROPS, OTHERS	KARITE NUTS
	CASTOR BEANS
	TUNG NUTS
	JOJOBA SEEDS
	SAFFLOWER
	POPPY SEED
	MELONSEED
	TALLOW SEEDS
	KAPOK FRUIT
	KAPOKSEED IN SHELL
	KAPOKSEED SHELLED
	LINSEED
	HEMPSEED
	OILSEEDS NES
	FLOUR / MEAL OF OILSEEDS

7. VEGETABLES AND PRODUCTS	TOMATOES & PRODUCTS	TOMATOES
		TOMATO JUICE CONCENTRATED
		TOMATO JUICE SINGLE STRENGTH (SS)
		TOMATO PASTE
		PEELED TOMATO
	ONIONS, DRY	ONIONS, DRY
	VEGETABLES, OTHER & PRODUCTS	CABBAGES
		ARTICHOKES
		ASPARAGUS
		LETTUCE
		SPINACH
		CASSAVA LEAVES
		CAULIFLOWER PUMPKIN & SQUASH & GOURDS

		CUCUMBER & GHERKINS
		EGGPLANTS
		CHILLIES & PEPPERS ,GREEN
		ONIONS, GREEN
		GARLIC
		LEEKs
		BEANS, GREEN
		PEAS, GREEN
		BROAD BEAN, GREEN
		STRING BEANS
		CARROTS
		OKRA
		GREEN CORN
		SWEET CORN FROZEN
		SWEET CORN PRESERVED
		MUSHROOMS
		DRIED MUSHROOMS
		CANNED MUSHROOMS
		CHICORY ROOTS
		CARROBS
		VEGETABLES FROZEN
		VEGETABLES DRIED NES
		VEGETABLES CANNED NES
		JUICE OF VEGETABLES NES
		VEGETABLES DEHYDROGENATED
		VEGETABLES IN VINEGAR
		VEGETABLES PRESERVED NES
		VEGETABLES TEMPORARY PRESERVED
		VEGETABLE PREPARATIONS

8 FRUITS AND PRODUCTS (INCLUDES FRESH, FROZEN, CANNED, DRIED ETC.)	ORANGES, TANGARINES & MANDARINES & PRODUCTS	ORANGES
		ORANGE JUICES
		ORANGE JUICE CONCENTRATED
		TANGERINES
	LEMONS, LIMES & PROD.	TANGERINE JUICE
		LEMONS LIMES
		LEMON JUICE SS
		LEMON JUICE CONCENTRATED
	GRAPEFRUIT & PRODUCTS	GRAPE FRUIT JUICE SS
		GRAPEFRUIT JUICE CONCENTRATED
		CITRUS FRUIT NES
	CITRUS FRUIT NES & PROD	CITRUS JUICE SS
		CITRUS JUICE CONCENTRATED
		BANANA
	PLANTAINS	BANANAS
		PLANTAINS
		APPLES
		APPLES & PRODUCTS
	DATES	APPLE JUICE SS
		APPLE JUICE CONCENTRATED
DATES		
PINEAPPLES & PRODUCTS	DATES	
	PINEAPPLES	

		PINEAPPLE CANNED
		PINEAPPLE, JUICE S
		PINEAPPLE JUICE CONCENTRATED
	GRAPES & PRODUCTS (EXCLUDING WINE)	GRAPES
		RAISINS
		GRAPE JUICE
	FRUIT, OTHER & PRODUCTS	PEARS
		QUINCES
		APRICOTS
		DRY APRICOTS
		SOUR CHERRY
		CHERRIES
		PEACHES
		PLUMS
		PLUMS, DRIED
		PLUM JUICE SS
		PLUM JUICE CONCENTRATED
		STONE FRUIT
		POMME FRUIT
		STRAWBERRIES
		RASPBERRIES
		GOOSEBERRIES
		CURRANTS
		BLUEBERRIES
		CRANBERRIES
		BERRIES NES
		WATERMELONS
		MELONS
		FIGS
		FIGS, DRIED
		MANGOES
		AVOCADOS
		MANGO JUICE
		PERSIMMONS
		CASHEWAPPLE
		KIWI
		PAPAYAS
		FRUIT TROPICAL NES
		FRUIT TROPICAL DRY NES
FRUIT FRESH NES		
FRUIT DRY NES		
FRUIT JUICE NES		
FRUIT PRESERVED NES		
FLOUR OF FRUIT		
FRUIT, NUTS, FRUIT PEEL PRESERVED BY SUGAR (JAM)		
FRUIT COOKED HOMOGENIZED		
9. STIMULANTS	COFFEE & PRODUCTS	COFFEE GREEN
		COFFEE ROASTED
		COFFEE EXTRACTS
		CHICORY & COFFEE SUBSTITUTES
	COCOA BEANS & PRODUCTS	COCOA BEANS

		COCOA PASTE
		COCOA POWDER
	TEA	TEA
		EXTRACT TEA,
		MATE
10. SPICES & ADDITIVES	PEPPER	PEPPER BLACK WHITE
	PIMENTO	PIMENTO
	CLOVES	CLOVES
	SPICES, OTHER	VANILLA
		CINNAMON
		NUTMEG
		ANISE
		GINGER
	SALT	
	VINEGAR	
	SPICES NES	
11. ALCOHOLIC BEVERAGES	WINE	WINE
	BARLEY, BEER	VERMOUTH
	BEVERAGES FERMENTED	BEER BARLEY
		WHEAT FERMENTED BEVERAGES
		RICE FERMENTED BEVERAGES
		BEER MAIZE
		BEER MILLET
		BEER SORGHUM
	BEVERAGES DISTILLED ALCOHOLIC	BEVERAGES FERMENTED, CIDER, ETC.
MUST OF GRAPES		
BEVERAGES DISTILLED ALCOHOLIC		

12. MEAT (INCLUDES FRESH, FROZEN, CANNED, PROCESSED, BIRDS, INSECTS, GAME OR WILD SPECIES, ETC.)	MEAT & PRODUCTS, BOVINE	BEEF VEAL
		BEEF BONLESS
		BEEF DRIED SALTED SMOKEDS
		MEAT EXTRACTS
		SAUSAGE BEEF
		BEEF PREPARATIONS
		BEEF CANNED
		MEAT HOMOGENIZED
		BUFFALO MEAT
	MEAT & PRODUCTS, SHEEP&GOAT	MUTTON LAMB
		GOAT MEAT
	MEAT & PRODUCTS, PIG	PIGMEAT
		PORK
		SAUSAGES PIG
		MEAT PREPARATONS PIG
	MEAT & PRODUCTS, POULTRY	CHICKEN MEAT
		POULTRY MEAT
		FAT LIVER PREPARATIONS
		MEAT CANNED CHICKEN
		DUCK MEAT
GOOSE MEAT		

		TURKEY MEAT	
	MEAT & PROD, OTHER ANIM	HORSEMEAT	
		MEAT ASSES	
		MEAT MULES	
		MEAT CAMEL	
		RABBIT MEAT	
		MEAT RODENTS	
		MEAT OTHER CAMELIDS	
		GAME MEAT	
		MEAT DRY NES	
		MEAT NES	
		MEAT PREPARED NES	
		SNAILS NOT SHELLED	
		OFFALS, EDIBLE	OFFALS CATTLE
			LIVER PREPARATIONS
	OFFAL BUFFALO		
	OFFALS SHEEP		
	OFFALS GOATS		
	OFFALS PIGS		
	OFFAL CHICKEN		
	OFFALS LIVER GOOSE		
	OFFALS LIVER DUCK		
	OFFALS LIVER TURKEY		
	OFFALS HORSE		
	OFFALS CAMELS		
	OFFALS CAMELIDS		
	OFFALS NES		
	BLOOD MEAL		
	MEAT MEAL		

13. EGGS	EGGS & PRODUCTS	EGGS FRESH
		EGG ALBUMINE
		EGGS LIQUID HEN
		EGGS POULTRY
		EGGS DRY HEN
14. FISH AND FISH PRODUCTS (INCLUDES FRESH; FROZEN, CANNED; DRIED; SALTED; SHELLFISH; ALIGATORS, TURTLES, FROGS, ETC.)	DIADROMOUS FISHES	DIADROMOUS FISH, FRESH
		DIADROMOUS FISH, FILETS
		DIADROMOUS FISH, DRY/SALTED
		DIADROMOUS FISH, CANNED
		DIADROMOUS FISH, PREPARED NES
	DEMERSAL FISHES	DEMERSAL FISH, FRESH
		DEMERSAL FISH, FILETS
		DEMERSAL FISH, DRY/SALTED
		DEMERSAL FISH, CANNED
		DEMERSAL FISH, PREPARED NES
	PELAGIC FISHES	PELAGIC FISH, FRESH
		PELAGIC FISH, FILETS
		PELAGIC FISH, DRY/SALTED
		PELAGIC FISH, CANNED
		PELAGIC FISH, PREPARED NES
	SALTWATER FISHES	SALTWATER FISH, FRESH

		SALTWATER FISH, FILETS
		SALTWATER FISH, DRY/SALTED
		SALTWATER FISH, CANNED
		SALTWATER FISH, PREPARED NES
	CRUSTACEANS & PRODUCTS	CRUSTACEANS FRESH
		CRUSTACEANS FROZEN
		CRUSTACEANS CURED
		CRUSTACEANS CANNED
		CRUSTACEANS PRESERVED NES
		CRUSTACEANS MEALS
		CRUSTACEANS PRODUCTS FRESH
		CRUSTACEANS PRODUCTS FROZEN
		CRUSTACEANS PRODUCTS CURED
		CRUSTACEANS PRODUCTS CANNED
		CRUSTACEANS PRODUCTS NES
		CPHP MEALS
	MOLLUSCS OTHER & PRODUCT	MOLLUSCS FRESH
		MOLLUSCS FROZEN
		MOLLUSCS CURED
		MOLLUSCS CANNED
		MOLLUSCS MEALS
	AQUATIC MAMMALS MEAT	AQUATIC MAMMALS MEAT
		AQUATIC MAMMALS MEAT PREPARATIONS NES
	AQUATIC ANIMAL OTHERS	AQUATIC MAMMALS FRESH
		AQUATIC MAMMALS CURED
		AQUATIC MAMMALS MEALS
		AQUATIC MAMMALS PREPARATIONS NS
	AQUATIC PLANTS & PROD.	AQUATIC PLANTS
		AQUATIC PLANTS DRIED, PREPARATIONS, NES

15. MILK AND CHEESE (EXCLUDING BUTTER)	MILK & PRODUCTS (EXCLUDING BUTTER)	COW MILK
		SKIMMED MILK OF COWS
		WHOLE MILK, CONDENSED
		WHEY, FRESH, DRY, CONDENSED
		YOGHURT
		YOGHURT CONCENTRATED
		BUTTERMILK ,CURD
		WHOLE MILK ,EVAPORATED
		SKIMMED MILK EVAPORATED, CONDENSED
		COW MILK DRY
		MILK SKIMMED DRY CONCENTRATED
		CHEESE WHOLE COW MILK
		CHEESE SKIMMED COW MILK
		WHEY CHEESE
		PROCESSED CHEESE
		RECONSTITUTED MILK
		CASEIN
		BUFFALO MILK, SKIMMED MILK, CHEESE
		SHEEP MILK, SKIMMED MILK, CHEESE
		GOAT MILK, SKIMMED MILK, CHEESE

		CAMEL MILK
		CREAM, FRESH
16. OILS AND FATS (VEGETABLE OILS)	SOYBEAN OIL	OIL SOYABEAN
	GROUNDNUT OIL	OIL GROUNDNUTS
	SUNFLOWER OIL	OIL SUNFLOWER SEED
	RAPE & MUSTARD OIL	OIL RAPESEED
		OIL MUSTARD SEED
	COTTONSEED OIL	OIL COTTONSEED
	PALM KERNEL OIL	OIL OF PALM KERNEL
	PALM OIL	PALM OIL
		FATTY ACIDS
		RESIDUE FATTY SUBSTANCES
	OIL OF COCONUTS	OIL COCONUTS
	SESAME OIL	SESAME OIL
	OLIVE & RESIDUE, OIL	OLIVE OIL
		OIL OLIVERES
	RICE, BRAN OIL	RICE BRAN OIL
	MAIZE, GERM OIL	MAIZE GERM OIL
	OILCROPS, OTHER OIL	KARITE NUTS BUTTER
		OIL CASTOR BEANS
		TUNG OIL
		JOJOBA OIL
OIL SAFFLOWER		
OIL POPPY SEED		
VEGETABLE TALLOW		
STILLING OIL		
OIL OF KAPOK SEED		
OIL LINSEED		
OIL HEMPSD		
OIL VEGETABLE ORIGIN NES		
COCOA BUTTER		
LIQUID MARGARINE		
MARGARINE		
OILS BOILED		
OILS HYDROGENATED		
OTHER OIL AND FAT PRODUCTS	MAYONNAISE	
	DRESSING AND SANDWICH SPREAD, ETC.	
17. OILS AND FATS (ANIMAL FATS; MARINE OILS; MIXED & OTHER OIL AND FAT PRODUCTS)	FATS, ANIMALS, RAW	FAT CATTLE
		CATTLE BUTCHER FAT
		FAT BUFFALO
		FAT OF SHEEP
		FAT OF GOATS
		FAT PIGS
		PIG BUTCHER FAT
		LARD
		FAT POULTRY
		FAT R POULTRY
		FAT CAMEL
		FAT OTH CAMERLIDS

		OILS ANIMAL
		STEARINE
		DEGRAS
		TALLOW
		FATS PREPARATIONS NES
	BUTTER , GHEE	BUTTER, COWS
		GHEE, COWS
		BUTTER BUFFALO
		GHEE BUFFALO
		BUTTER SHEEP
		BUTTER, GOAT
	FISH BODY OIL	FISH BODY OILS
		DEMERSAL (DMRS) BODY OIL
		PELAGIC BODY OIL
		MARINE BODY OIL
		AQ M OILS
	FISH LIVER OILS	FISH LIVER OILS
		PELAGIC LIVER OIL
		MARINE LIVER OIL
	OTHER FAT PRODUCTS	OTHER FAT PRODUCTS
18. NON ALCOHOLIC BEVERAGES	SOFT DRINKS	SOFT DRINKS INCLUDING CARBONATED BEVERAGES MINERAL WATER
19. PURCHASED FOOD EATEN AWAY FROM HOME; MISCELLANEOUS AND PREPARED FOOD	FOOD PREPARATIONS	INFANT FOOD
		CHOCOLATE
		ICE CREAM
		FOOD ENERGY DRINKS
		MEALS CONSUMED OUTSIDE HOME
		PREPARED MEALS & SNACKS
		OTHER FOOD PREPARATIONS

ANNEX 4. DENSITY COEFFICIENTS

	Food Item Description	Density Coefficients
1	Alcoholic Beverage - Beer - bottle light	0.996
2	Alcoholic Beverage - Beer - bottle regular	1.003
3	Alcoholic beverage - Gin	0.938
4	Alcoholic beverage - Martini	0.952
5	Alcoholic Beverage - Rum	0.938
6	Alcoholic Beverage - Sake	0.982
7	Alcoholic beverage - Tequila sunrise	1.050
8	Alcoholic beverage - Vodka	0.938
9	Alcoholic Beverage - Whisky	0.938
10	Alcoholic Beverage -Wine, dessert, dry	0.996
11	Alcoholic Beverage -Wine, dessert, sweet	0.996
12	Alcoholic Beverage -Wine, light	0.996
13	Alcoholic Beverage -Wine, table, white	0.992
14	Alcoholic Beverage -Wine, table, red	0.992
15	Apple cider-flavored drink	1.013
16	Coconut water	1.013
17	Carbonated drinks with Cola	1.036
18	Chocolate-flavored drink	1.030
19	Coffee, Prepared - Instant	1.006
20	Corn (maize) beverage	1.019
21	Ginger Ale	1.030
22	Liqueur	1.175
23	Malt Beverage	0.999
24	Soda water/Carbonated Water/Tonic Water	1.030
25	Tea Lemon - Sweetened	1.093
26	Tea Prepared - Instant	1.001
27	Water - Mineral	1.000
28	Edible oil	0.920
29	Castor oil	0.956
30	Coconut oil	0.924
31	Cod oil	0.928
32	Corn oil	0.924
33	Cotton seed oil	0.925
34	Linseed oil	0.929
35	Olive oil	0.860
36	Palms oil	0.924
37	Peanut oil	0.920
38	Rapeseed oil	0.920
39	Sesame seed oil	0.923
40	Soya bean oil	0.926
41	Sunflower oil	0.920
42	Whale oil	0.925
43	Egg, White, raw, fresh	1.025
44	Egg, Yolk, raw, fresh	1.025
45	Honey	1.430
46	Ice cream	0.608
47	Apple juice	1.046
48	Carrot juice	0.996
49	Concentrated juice	1.198
50	Cranberry juice	1.068
51	Grape Juice	1.067
52	Grapefruit juice, raw	1.043
53	Lemon juice raw	1.030
54	Lime juice raw	1.040
55	Orange Juice raw	1.046
56	Passion-fruit juice, purple (or yellow), raw	1.042
57	Pineapple juice	1.057
58	Prune juice	1.080

	Food Item Description	Density Coefficients
59	Tangerines juice	1.051
60	Tomato Juice	1.026
61	Vegetable juice cocktail	1.024
62	Jam	1.350
63	Lard, Liquid	0.865
64	Buttermilk	1.033
65	Coconut milk / cream	1.013
66	Cream milk	1.013
67	Marmalade	1.350
68	Mayonnaise	1.008
69	Milk shakes, thick chocolate (or vanilla)	0.959
70	Milk, chocolate beverage	1.053
71	Milk, Condensed	1.289
72	Milk, Evaporated	1.063
73	Milk, Fresh	1.030
74	Milk, goat	1.030
75	Milk, human	1.040
76	Milk, sheep	1.033
77	Milk, skim	1.034
78	Milk, Soy	1.033
79	Almond Paste	0.958
80	Sesame paste	1.080
81	Paste, Tomato canned (tomato puree)	1.055
82	Fish Sauce	0.959
83	Molasses	1.422
84	Mustard, prepared, yellow	1.055
85	Sauce oyster	0.270
86	Soy Sauce	1.076
87	Tomato ketchup	1.013
88	Tomato Sauce	1.034
89	Sauce, barbecue sauce	1.055
90	Sauce, tomato chili sauce	1.152
91	Sauce, Worcestershire	1.160
92	Shortening	0.865
93	Soup Asparagus Cream	1.059
94	Soup Chicken & Veg	1.038
95	Soup cream chicken canned	1.059
96	Soup Cream Mushroom Canned	1.030
97	Soup pork bean canned	1.135
98	Soup shark fins	0.911
99	Soup, black bean	1.084
100	Soup, chicken noodle-canned	1.016
101	Soup, pea, green, canned, condensed	1.110
102	Soup, stock, chicken, home-prepared	1.013
103	Soup, tomato, canned, condensed	1.059
104	Soup, vegetable, canned	1.013
105	Soup,beef,noodles	1.030
106	Soup,chicken condensed	1.038
107	Soup,fish	0.983
108	Syrup, Malt	1.620
109	Syrup, Maple	1.359
110	Syrup, Sorghum	1.392
111	Syrups, table blends, cane and 15% maple	1.329
112	Vanilla extract	0.878
113	Vinegar	1.004
114	Yoghurt	1.034

Source: USDA Nutrient Database

ANNEX 5. REFUSE FACTOR

Commodity and description	Refuse (%)
STARCHY ROOTS:	
Arracacha (<i>Arracacia xanthorrhiza</i>)	30
Cassava fresh (<i>Manihot</i> spp.)	25
Potato (<i>Solanum tuberosum</i>)	15
Potato, baked, with skin (<i>Solanum tuberosum</i>)	13
Potato, cooked, with skin (<i>Solanum tuberosum</i>)	13
Sweet potatoes (<i>Ipomoea batatas</i>)	17
Taro (<i>Colocasia</i> spp.) Coco-yam	18
Yam (<i>Dioscorea</i> spp.)	14
Yautia (<i>Xanthosoma</i> spp.)	20
NUTS AND SEEDS:	
Groundnuts, peanuts In shell (<i>Arachis hypogaea</i> L.)	29
TREENUTS:	
Chestnuts: Dry	18
Chestnuts: Fresh	21
Coconuts, meat, fresh: Old, ripe (<i>Cocos nucifera</i> L.)	54
Coconuts, meat, fresh: Young, under-ripe (<i>Cocos nucifera</i> L.)	66
Hazelnut (cobnut) (<i>Corylus avellana</i> L.)	58
Macadamia nut (queensland nut) (<i>Macadamia ternifolia</i> f. v. <i>mue</i>)	34
Treenuts, other (Almonds, Brazil nuts, filberts, pecans, pistachios, walnuts)	57
SEEDS:	
Squash, watermelon, sunflower	47
Sunflower, seed, dry (<i>Helianthus annuus</i> L.)	48
FRESH VEGETABLES:	
Amaranth leaves (<i>Amaranthus</i> spp.)	31
Artichokes, French or globe (<i>Cynara scolymus</i>)	53
Asparagus (<i>Asparagus officinalis</i>)	33
Bamboo shoots (<i>Bambusa vulgaris schrad.</i>)	58
Beans, broad or fava (<i>Vicia faba</i>)	68
Beans, lima (<i>Phaseolus lunatus macrocarpus</i>)	61
Beans, snap or string, young in pods (haricots) (<i>P. vulgaris</i>)	9
Beet greens (<i>Beta vulgaris</i>)	20
Beets, common red (<i>Beta vulgaris</i>)	26
Broccoli (<i>Brassica oleracea botrytis</i>)	42
Brussels sprouts (<i>B. oleracea gemmifera</i>)	24
Cabbage, Chinese (<i>B. chinensis</i> and <i>L. pekinensis</i>)	21
Cabbage, common, headed (<i>B. oleracea capitata</i>)	31
Carrots (<i>Daucus carota</i>)	8
Cassava leaves (<i>Manihot</i> spp.)	15
Cauliflower (<i>Brassica oleracea botrytis</i>)	47
Celery (<i>Celeri graveolens</i>)	38
Chard, silver beet (<i>Beta vulgaris</i>)	20
Chayote fruit (<i>Sechium edule</i>)	17
Cherry tomatoes (<i>L. esculentum cerasiforme</i>)	3
Chicory (<i>Cichorium intybus</i> L.)	11
Chicory and endive (<i>Cichorium intybus</i> , <i>C. endivia</i>)	38
Cress (<i>Lepidium sativum</i> L.)	37
Cucumbers (<i>Cucumis sativus</i>)	28
Dandelion greens (<i>Leontodon taraxacum</i>)	10
Eggplant - Aubergine (<i>Solanum melongena</i>)	18
Endive (<i>Cichorium endivia</i> L.)	23
Fennel leaves (<i>Foeniculum vulgare</i>)	7
Garlic (<i>Allium sativum</i> L.)	12
Ground cherry - cape gooseberry or poha (<i>Physalis</i> spp.)	6
Honey mushroom (<i>Armillariella mellea</i> fr.)	50
Horse-radish (<i>Cochlearia armoracia</i> L.)	47
Ipomoea greens (<i>Ipomoea</i> spp.)	10
Jerusalem artichokes - Topinambour (<i>Helianthus tuberosus</i>)	30
Kale (<i>Brassica oleracea acephala</i>)	37

Commodity and description	Refuse (%)
Kohlrabi (<i>Brassica oleracea gongylodes</i>)	48
Leek (<i>Allium porrum l.</i>)	42
Leeks and green onions (<i>Allium porrum, A. odorum, A. cepa</i>)	53
Lettuce (<i>Lactuca sativa</i>)	31
Maize (corn), green (<i>Zen mays</i>)	62
Miscellaneous leaves: dark green	21
Miscellaneous leaves: light green, pale yellow	27
Mushroom - chanterelle (<i>Cantharellus cibarius fries</i>)	39
Mushroom - edible boletus (flat mushroom, cepe) (<i>Boletus edulis bull.</i>)	20
Mushroom - morel (<i>Morchella esculenta pers.</i>)	17
Mushroom - orange-agaric (<i>Lactarius deliciosus fr.ex.l.</i>)	39
Mushroom - red boletus (<i>Leccinum aurantiacum gray</i>)	20
Mushroom - ringed boletus (<i>Suillus luteus fr.</i>)	20
Mushroom - rough-stemmed boletus (<i>Leccinum scabrum fr.ex bull.</i>)	30
Mushroom (<i>Agaricus bisporus (lange) sing</i>)	2
Mustard greens (<i>Brassica juncea, B. lepidum</i>)	17
Oca (<i>Oxalis tuberosa</i>)	10
Okra (<i>Hibiscus esculentus</i>)	12
Onions, mature (<i>Allium cepa</i>)	7
Parsley, leaf (<i>Petroselinum sativ. hoffmann</i>)	40
Parsley, root (<i>Petroselinum sativum hoffmann</i>)	39
Parsnips (<i>Pastinaca sativa</i>)	35
Peas, edible-podded (<i>P. sativum</i>)	9
Peas, fresh (<i>Pisum sativum</i>) - pod and seed, green	56
Peppers, green (<i>Capsicum annuum</i>)	18
Peppers, red (<i>Capsicum annuum</i>)	18
Peppers, unspecified (<i>Capsicum annuum</i>)	18
Pumpkin (<i>Cucurbita pepo l.</i>)	30
Pumpkins, squashes and gourds, immature (<i>Cucurbitaceae, mainly Cucurbita spp.</i>)	17
Pumpkins, squashes and gourds, mature (<i>Cucurbitaceae, mainly Cucurbita spp.</i>)	32
Radish (raphanus sativus l. var. niger kerner)	24
Radishes, common, small (<i>Raphanus sativus</i>)	44
Radishes, large rooted (daikon) (<i>R. sativus</i>)	5
Red cabbage (b. oleracea l. var. capitata rubra)	22
Rhubarb (<i>Rheum undulatum l.</i>)	22
Salsify and black salsify (<i>Tragopogon porrifolius, Scorzonera hispanica</i>)	23
Savoy cabbage (b. oleracea l. var. sabauda l.)	28
Soya bean, seed, dry (<i>Glycine hyspida maxim.</i>)	17
Soybean sprouts	17
Spinach (<i>Spinacia oleracea</i>)	19
Squash, summer (<i>Cucurbita pepo l. convar.</i>)	13
Squash, winter (<i>Cucurbita maxima</i>)	26
Swede (turnip, rape, rutabaga) (<i>Brassica napus var.</i>)	17
Sweetcorn (<i>Zea mays l.</i>)	63
Tomato, common varieties ripe (<i>Lycopersicon esculentum</i>)	3
Turnip and rutabaga tops (<i>Brassica rapa, B. campestris</i>)	25
Turnips and rutabagas or swedes (<i>Brassica rapa, B. campestris</i>)	5
Unspecified fresh vegetables	21
White cabbage (b. oleracea l. var. capitata alba)	22
FRUITS:	
Apples (<i>Malus sylvestris</i>)	16
Apricots (<i>Prunus armeniaca</i>)	9
Avocados (<i>Persea spp.</i>), all types	32
Avocados (<i>Persea spp.</i>), High fat types	30
Avocados (<i>Persea spp.</i>), Low fat types	33
Bananas (<i>Musa sapientum</i>)	29
Berries, All, unspecified	2
Bilberry (blueberry, huckleberry) (<i>Vaccinium myrtillus l.</i>)	3
Both, unspecified (<i>Musa spp.</i>)	31
Breadfruit (<i>Artocarpus communis</i>)	23

Commodity and description	Refuse (%)
Caimito (<i>Chrysophyllum caimito</i>)	13
Carambola (starfruit), bilimbi (<i>Acerrhoa carambola A. bilimbi</i>)	6
Carissa (natal plum) (<i>Carissa grandiflora dc.</i>)	13
Cashew fruit (<i>Anacardium occidentale</i>)	29
Cherimoya, custard apple, sweetsop-sugar apple (<i>Annona cherimola, A. reticulata, A.</i>	40
Cherries (<i>Prunus spp.</i>)	9
Cherry (morello) - sour cherry (<i>Prunus cerasus l.</i>)	11
Cherry, sweet (<i>Prunus avium l.</i>)	12
Crabapple (<i>Malus spectabilis</i>)	16
Currants (<i>Ribes spp.</i>) Red, black & white	3
Durian (civet) (<i>Durio zibethinus murr.</i>)	75
Feijoa-pineapple guava (<i>Feijoa sellowiana</i>)	25
Figs (<i>Ficus carica</i>)	3
Gooseberries (<i>Ribes spp.</i>)	1
Granadilla giant fruit raw (<i>Passiflora quadrangularis (P. macrocarpa)</i>)	65
Grapefruit (<i>Citrus grandis</i>)	36
Grapes (<i>Vitis spp.</i>)	8
Grapes, American type (slip skin) (<i>Vitis spp.</i>)	42
Guavas (<i>Psidium spp.</i>)	22
Jaboticaba (<i>Myrciaria (dc.) ber eugenia polycephaloides</i>)	20
Jackfruit (<i>Artocarpus integrifolia</i>)	72
Java-plum - Jambolan	19
Jujube (<i>Ziziphus jujuba mill.</i>)	7
Kiwi fruit (chinese gooseberry, strawberry peach) (<i>Actinidia chinensis planch.</i>)	13
Lemons (<i>C. limonia</i>)	38
Limes (<i>C. aurantifolia</i>)	35
Litchi (lychee) (<i>Litchi chinensis sonn.</i>)	37
Longan (<i>Nephelium longanum (lam.) cam.</i>)	50
Loquat (japanese medlar) (<i>eriobotrya japonica</i>)	37
Malpighia, West Indian Cherry (<i>Malpighia spp.</i>) - Acerola	17
Mamey (<i>Mammea americana</i>) - Mammiaapple	38
Mangoes (<i>Mangifera indica</i>)	38
Mangosteen (<i>Garcinia mangostana l.</i>)	71
Melons, unspecified	46
Mombin, hog plum (<i>Spondias spp.</i>)	31
Mountain-cranberry (red-bilberry) (<i>Vaccinium vitis idaea l.</i>)	6
Muskmelons (<i>Cucumis melo</i>)	44
Nectarine (<i>Prunus persica</i>)	9
Oranges (<i>C. sinensis</i>)	28
Oranges, Mandarin type - Tangerine (<i>C. nobilis</i>)	29
Oval kumquat (nagami) (<i>Fortunella margarita (lour.) s</i>)	2
Papayas (<i>Carica papaya</i>) - Pawpaw	34
Passion fruit or granadilla (<i>Pasiflora spp.</i>)	67
Passionfruit; granadilla, purple or yellow:Fruit, raw (<i>Passiflora spp.</i>)	39
Peaches (<i>Amygdalus persica</i>)	12
Pears (<i>Pyrus communis</i>)	18
Persimmons, Japanese (<i>Diospyros kaki</i>)	20
Pineapples (<i>Ananas sativus</i>)	36
Pitanga, jambu fruit, Malay apple, rose apple etc. (<i>Eugenia spp.</i>)	23
Plantains (<i>Musa paradisiaca</i>)	34
Plums (<i>Prunus spp.</i>)	6
Pomegranates (<i>Punica granatum</i>)	52
Prickly pear (<i>Opuntia ficus-indica l. mill.</i>)	45
Pummelo (like grapefruit but larger) (<i>Citrus maxima, syn. C. grandis</i>)	44
Quinces (<i>Cydonia oblonga</i>)	22
Rambutan (<i>Nephelium lappaceum l.</i>)	56
Raspberries (<i>Rubus idaeus l.</i>)	4
Sapodilla or sapote (<i>Achras sapota</i>)	23
Sapote or marmalade plum (<i>Calocarpum mammosum</i>)	26
Small-cranberry (moorberry, bogberry) (<i>Vaccinium oxycoccus l.</i>)	8

Commodity and description	Refuse (%)
Soursop (<i>Annona muricata</i>)	34
Strawberries (<i>Fragaria</i> spp.)	4
Subtropical areas	21
Tamarind (<i>Tamarindus indica</i> l.)	66
Temperate areas	17
Tree tomato (tamarillo) (<i>Cyphomandra betacea</i>)	27
Tropical areas	35
Watermelons (<i>Citrullus vulgaris</i>)	47
<u>FRUITS, DRIED:</u>	
All, unspecified	5
Figs, dates, prunes, raisins, jujubes	11
Litchi (lychee) (<i>Litchi chinensis</i> sonn.)	46
Longan (<i>Nephelium longanum</i> (lam.) cam.)	64
<u>OTHER FRUITS - WILD:</u>	
Blackthorn (<i>Prunus spinosa</i> l.)	9
Cornelian cherry (<i>Cornus mas</i> l.)	3
Elderberry, black (<i>Sambucus nigra</i> l.)	30
Hawthorn (<i>Crataegus monogyna</i> jacq.)	21
Rose hip, haw (<i>Rosa canina</i> l.)	35
Rowanberry, sweet (<i>Sorbus aucuparia</i> l.var.)	50
Sea buckthorn (sallow thorn) (<i>Hippophae rhamnoides</i> l.)	40
<u>OLIVES:</u>	
Greek process (ripe)	27
Processed (green)	20
<u>MEAT AND MEAT PRODUCTS:</u>	
<u>BEEF, CARCASSES:</u>	
Thin - incl. kidney fat	19
Medium - incl. kidney fat	16
Fat - incl. kidney fat	15
Very fat - incl. kidney fat	12
Beef or veal, very thin carcasses	20
<u>VEAL, CARCASSES:</u>	
Thin - incl. kidney fat	22
Medium - incl. kidney fat	21
Fat - incl. kidney fat	19
Veal, chop, outlet with bone	22
Veal, knuckle with bone	36
Veal, leg of veal with bone	22
Veal, neck with bone	25
Calf's kidney	12
Calf's liver	3
Calf's lungs (lights)	24
Calf's tongue	23
<u>PORK, CARCASSES:</u>	
Thin (head on)	22.6
Thin (head off)	16.4
Medium (head on)	17.5
Medium (head off)	12.5
Fat (head on)	14.5
Fat (head off)	10.5
Pork, chop with bone	20
Pork, hip-bone (hind leg)	23
Pig's brain	2
Pig's heart	12
Pig's kidney	13
Pig's liver	7
Pig's lungs (lights)	13
Pig's tongue	16
<u>MUTTON AND LAMB, CARCASSES:</u>	
Thin, young, incl. kidney fat	29

Commodity and description	Refuse (%)
Medium, incl. kidney fat	24
Fat, incl. kidney fat	19
Mutton, brisket	11
Mutton, shoulder	15
Mutton, leg	16
Mutton, chop	19
Mutton, sirloin	13
Sheep's brain	2
Sheep's heart	22
Sheep's kidney	3
Sheep's liver	6
Sheep's lungs (lights)	24
Sheep's tongue	32
OTHER MEATS:	
Horsemeat, carcass	25
Goat meat, carcass	25
Buffalo, carcass, very lean	36
Carabao, carcass, very lean	36
Camel	19
Frog :Raw.:; refuse, viscera and bones	62
Ox heart	12
Ox kidney	13
Ox liver	7
Ox lungs (lights)	24
Ox tongue	12
Reindeer	20
Rabbit, domestic, dressed and drawn	20
GAME:	
Birds, dressed, not drawn	42
Hare, average (<i>Lepus europaeus pallas</i>)	20
Mammals, dressed	16
Venison, average (<i>Cervus elaphus l.</i>)	21
Venison, back	30
Venison, haunch (leg)	18
POULTRY (Total edible - flesh, skin, giblets, and fat):	
Chickens (<i>Gallus domesticus l.</i>)	39
Ducks (<i>Anas boschas l.</i>)	39
Geese (<i>Anser anser l.</i>)	39
Turkeys (<i>Meleagris gallopavo l.</i>)	33
Poultry, unspecified, group figure.	39
Chicken (boiling fowl) average	27
Chicken (chicken for roasting) average (<i>Gallus domesticus l.</i>)	26
Chicken, breast with skin	28
Chicken :Raw:Young birds, cut up pieces:Leg, dark meat:Drumstick.:; refuse, bones.	40
Chicken :Raw:Young birds, cut up pieces:Leg, dark meat:Thigh.:;refuse, bones	25
Chicken :Raw:Young birds, cut up pieces:Neck.:;refuse, bones	52
Chicken :Raw:Young birds, cut up pieces:Wing.:;refuse, bones	51
Duck, average (<i>Anas boschas l.</i>)	20
Pheasant, average (with skin, without bone)	14
Pigeon, average with skin and bone	53
Turkey, adult animal average, with skin (<i>Meleagris gallopavo l.</i>)	27
Turkey, breast without skin	11
Turkey, young animal average, with skin, up to 24 weeks (<i>Meleagris gallopavo l.</i>)	27
MEATS, CURED:	
Pork (ham, shoulder)	13
Bacon (smoked belly)	6
EGGS:	
Duck	13
Goose	13
Guinea fowl	11

Commodity and description	Refuse (%)
Hen	11
Iguana - lizard	9
Ostrich	13
Pigeon	11
Quail	8
Turkey	12
Turtle (including charapa, motelo, taricaya)	9
FISH AND SHELLFISH:	
FISH, FRESH:	
Fat-rich - round (fillet refuse is 0)	50
Cod and related species - round (fillet refuse is 0)	55
Others - round (fillet is 0)	55
All, unspecified - round (fillet is 0)	53
CRUSTACEANS AND MOLLUSCS, FRESH:	
Crustaceans, in shell	63
Molluscs, in shell	75
Both, unspecified, in shell	72
FISH, CURED - SALTED, SMOKED, DRIED, FAT-RICH KINDS:	
Light cure:	
Only flesh considered as edible (when eaten whole refuse is 0)	31
Medium cure:	
Only flesh considered as edible (when eaten whole refuse is 0)	31
Hard, heavy cure:	
Only flesh considered as edible (when eaten whole refuse is 0)	31
FISH, CURED - SALTED, SMOKED, DRIED, FAT-POOR KINDS:	
Light cure:	
Only flesh considered as edible (when eaten whole refuse is 0)	45
Medium cure:	
Only flesh considered as edible (when eaten whole refuse is 0)	45
Hard, heavy cure:	
Only flesh considered as edible (when eaten whole refuse is 0)	45
FISH - SPECIFIC - SALT-WATER	
Anglerfish, monkfish (<i>Lophius Piscatorius L.</i>)	27
Barracuda, sea-pike (<i>Sphyræna spp.</i>)	36
Bluefish (<i>Pomatomus saltatrix</i>)	40
Croaker (<i>Otolithus spp.</i>)	44
Picked dogfish, (spiny dogfish) (<i>Squalus acanthias</i>)	53
Flounder (<i>Platichthys flesus L.</i>)	55
Halibut (<i>Hippoglossus hippoglossus l.</i>)	20
Greenland halibut (<i>Rheinhardtius hippoglossoides</i>)	20
Grouper (<i>Epinephelus spp., Serranus spp.</i>)	37
Herring, atlantic (<i>Clupea harengus l.</i>)	30
Herring, baltic sea herring (<i>Clupea harengus membras l.</i>)	35
Jack (<i>Caranx spp.</i>)	53
John dory (<i>Zeus faber</i>)	66
Cod (<i>Gadus morhua l.</i>)	25
Catfish, wolffish (<i>Anarhichas lupus l.</i>)	48
Dab (<i>Limanda limanda</i>)	35
Drum (<i>Umbrina spp.</i>)	37
Garrick, palometa, pampano (<i>Trachinotus spp. Lichia spp.</i>)	26
Shad (<i>Ethmalosa dorsalis, E. fimbriata</i>)	30
Saithe (coalfish) (<i>Pollachius virens l.</i>)	35
Kabeljaauw (<i>Sciaena spp.</i>)	36
Ling (<i>Molva molva l.</i>)	32
Lemon sole (<i>Microstomus kitt</i>)	41
Tusk (ascanius) (<i>Brosme brosme (ascanius)</i>)	48
Mackerel (<i>Scomber scombrus l.</i>)	35
Mullet (<i>Mugilidae spp.</i>)	48
Goatfish (<i>Mullidae spp.</i>)	59
Redfish (ocean perch) (<i>Sebastes marinus l.</i>)	52

Commodity and description	Refuse (%)
Witch (<i>Glyptocephalus cynoglossus</i> L.)	31
Anchovy (<i>Engraulis encrasicolus</i> L.)	27
Sardine, pilchard (<i>Sardina pilchardus</i>)	41
Haddock (<i>Melanogrammus aeglefinus</i> L.)	43
Plaice (<i>Pleuronectes platessa</i> L.)	44
Swordfish (<i>Xiphias gladius</i> L.)	35
Hake (<i>Merluccius merluccius</i> L.)	42
Sole (<i>Solea solea</i> (L.))	29
Sprat (<i>Sprattus sprattus</i> L.)	41
Turbot (<i>Psetta maximus</i> L.)	54
Smelt (<i>Osmerus eperlanus</i> L.)	52
Horse mackerel (jack mackerel) scad (<i>Trachurus trachurus</i>)	60
Tuna (<i>Thunnus</i> spp.)	39
<u>FISH - SPECIFIC - FRESHWATER</u>	
Bream (<i>Abramis brama</i> L.)	44
Carp (<i>Cyprinus carpio</i> L.)	48
Eel (<i>Anguilla anguilla</i> L.)	30
Perch (river perch) (<i>Perca fluviatilis</i> L.)	60
Pike (<i>Esox lucius</i> L.)	45
Pike-perch (<i>Stizostedion lucioperca</i> L.)	50
Pollan (<i>Coregonus</i> spp.)	32
Salmon (<i>Salmo salar</i> L.)	36
Sheat (<i>Silurus glanis</i> L.)	40
Tench (<i>Tinca tinca</i> L.)	60
Trout (<i>Salmo trutta</i>)	48
<u>FISH - SPECIFIC - CRUSTACEANS AND MOLLUSCS</u>	
Abalone (ormer) (<i>Haliotidae</i>)	52
Brown shrimp (<i>Crangon crangon</i> L.)	57
Crayfish (<i>Astacus fluviatilis</i> f.)	77
Cuttle fish (<i>Sepia</i> spp.)	21
Edible snail (<i>Helix pomatia</i> L.)	60
Krill, antarctic (<i>Euphausia superba</i>)	70
Lobster (<i>Homarus</i> sp.)	64
Mussel (<i>Mytilus edulis</i> L.)	82
Oyster (<i>Ostrea edulis</i> L.)	90
Scallop (<i>Pectinidae</i>)	56
Soft clam (<i>Mya arenaria</i> L.)	65
Spiny lobster, crawfish (<i>Palinurus</i> spp.; <i>panulirus</i> spp.)	53
Turtle (<i>Chelonia mydas</i> L.)	69
<u>FISH - SPECIFIC - FISH PRODUCTS</u>	
"Bückling" (hot smoked herring)	29
Catfish, wolffish, smoked	19
Dutchcured herring	57
Eel, smoked	24
Flounder, smoked	22
Greenland halibut, smoked	24
Haddock, smoked	40
Herring, vinegar cured (bismarckhering)	5
Herring, fried	8
Klippfish	1
Mackerel, smoked	31
Redfish (ocean perch) smoked	27
Saithe, smoked	18
Salmon, canned (naturell; total canned amount)	2
Spicked dogfish, smoked	20
Sprat, smoked	41
Stockfish	36

