MEASURING POVERTY IN ARMENIA:
METHODOLOGICAL CLARIFICATIONS
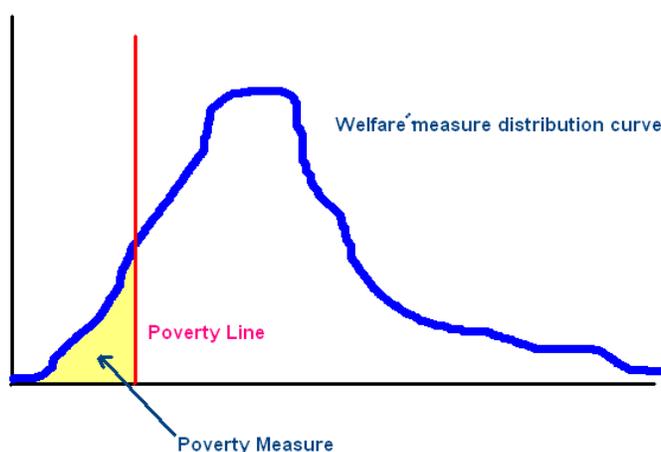
Methodology of Poverty Measurement Since 2009

A consumption aggregate is used to approximate well-being in Armenia. It is assumed that consumption is better declared and is less sensitive to short-term fluctuations than income, especially in transition countries. The consumption aggregate is estimated based on the Armenia Integrated Living Conditions Survey (ILCS). It comprises the following components: (i) the value of food and non-food consumption including consumption from home production, as well as aid received from humanitarian organizations and other sources; and (ii) the rental value of durable goods.

Poverty measurement in Armenia based on absolute poverty line.

A poverty measurement assumes 3 ingredients (see Figure 1):
- Distribution of living standards or welfare ;
- Poverty line below which individuals are classified as "poor"; and
- Poverty measure.

Figure 1. The ingredients of poverty measurement

In this chapter, we describe the poverty methodology used for Social Snapshot and Poverty in Armenia report of 2009. In other words, the Annex deals with all the three components of poverty measurement:
- Measurement of the main welfare indicator of households;
- Construction of poverty lines; and
- Measuring the poverty indices.

1.   Welfare Measure: Construction of the Consumption Aggregate

Poverty measurement in Armenia during 2004-2008 relied on a methodology developed based on the 2004 ILCS data. Armenia has experienced significant economic growth and its households have gone through remarkable socio-economic transformation. Since first years of independence, the Government of Armenia implemented important reforms, including large scale privatization of state owned enterprises and commercial and residential construction and ensuing changes in housing and other premises. There have been considerable changes in the population size, structure and geographical distribution, which in part the result of migration and socio-demographic

and economic activities of the population. Moreover, household living conditions, poverty incidence and nature, geographic and economic polarization, and the overall living standards have considerably changed over the last several years. This has necessitated the need for updating the baseline data for poverty measurement to reflect the changes in consumption and expenditure patterns of the population. However, note that the methodology of calculation of an updated consumption aggregate is conceptually similar to the 2004 one. The 2004 methodological details can be found in "Social Snapshot and Poverty in Armenia" Statistical Analytical Report published by NSS in 2006, based on 2004 ILCS.

In this chapter are presented the algorithm of construction of consumption aggregate in brief as well as to highlight the main differences between the methodology of 2009 and 2004.

(i) Food consumption:

Food consumption includes food consumed at home and outside the home and in-kind food consumption such as own food home production, food gifts and transfers in-kind, and humanitarian food aid.

(ii) Non-food consumption

Non-food consumption comprises the following categories: alcoholic beverages and tobacco, clothing and footwear, household goods, transportation, utilities, recreation, education, health, and the rental value of durable goods. It also includes in-kind non-food consumption such as non-food goods and services received free of charge (i.e., in-kind non-food humanitarian aid, gifts, non-food goods and services provided by the members of the household). Value of in-kind non-food consumption is estimated by households. Using monthly expenditure data, monetary values for expenditures on non-food items were estimated. Price adjustments for those groups were based on the official CPI for the corresponding quarter.

The estimates of the rental value of durables—the value of flow of services from durables owned by a household were included in consumption aggregate. The rental value of dwelling— benefits for owner-occupied housing—is not estimated as a component of consumption due to the lack of data on housing transactions in Armenia.

Adjustments for regional and seasonal differences in prices

The nominal consumption aggregate was deflated using 2 dimensional price deflators (indices). Factors for price adjustments of food consumption which takes into account price differences between quarters and between urban and rural areas were estimated. The total consumption aggregate is then expressed in average annual national price levels.

(iii) Estimating consumption per adult-equivalent

Consumption per adult-equivalent is obtained dividing household total consumption by the number of *adult equivalent members* (EA_i). Adult equivalent members are calculated using the above estimates of equivalence scales and size economies according to the following formula for household *i*:

$$EA_i = (A_i + a\ C_i)^\theta$$

where A_i is the number of adults in the household, C_i is the number of children, θ is the scale parameter (θ=0.87) and a is the cost of a child relative to an adult (a=0.65). Children are individuals of age 14 and below.

What is different between 2004 and 2009 methodology?

- The 2009 consumption aggregate is more accurate:
  It includes the cost of all food items from the diary and some small items such as salt pepper and so on.

- The estimation of per equivalent adult consumption takes into account the exact number of days of presence of each household member during the survey month.

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- The Flow from durable goods is estimated slightly differently and it is simplified taking into account that the age of durable goods possessed by the households are not available from 2009 Survey. The monthly value is estimated as the value of a new item divided by maximum life or life expectancy (in months) of particular item. The life expectancy of durable goods varies from 5 years for personal computers to 20 for cars.

- While in 2004 the components of consumption aggregate were deflated separately, in 2009 the total nominal consumption of household was deflated by a single aggregate price deflator. In 2009 the total nominal consumption aggregate was first calculated and it was deflated by an aggregate two dimensional price deflators for each quarter and urban/ rural locations. This price deflator was calculated using price data partly from household survey data and partly from the official CPI data. The difference of food basket's cost across the survey quarters and urban /rural locations were calculated based on survey food consumption data. The food index simply is a ratio of the cost of the average food basket in particular quarter and location over the cost of the same basket expressed in 2009 average country prices. The non food price indices were taken from Official CPI. The aggregate Price deflator then was calculates as the weighted average of the two -food and non food deflators, where the weighs were identical with the weights of food and non food parts in the poverty line. Using one aggregate price deflator allows using it   not only for deflating of consumption but also the possible welfare measures such as income.

- The new poverty line was estimated based on latest available data of ILCS 2009. The details of estimation are described below.

2. Poverty lines

Having an up-to-date poverty line, which is in tune with current social and economic realities in the country, is a crucial element providing an opportunity to the Government of Republic of Armenia to pursue an effective pro-poor social policy. The updated national poverty line can be used in evaluating the impact of social assistance programs on poverty. It accounts, for instance, the impact of price changes for certain products and services on the standards of living of population.

The objective of this chapter is to describe the methodology and main steps of calculation of the national poverty new line for Armenia based on ILCS 2009 data. The poverty line is defined as the monetary value of the minimum consumer basket, which represents the amount of goods and services that meet the needs of the minimum level of living standards formed (actually expressed) in society. This is the factually formed minimum consumption standard the value of which varies according to changes in consumer prices.

The Minimum Consumer Basket consists of 2 components: a Minimum Food Basket, corresponding to the allowance for basic foods, and an allowance for basic non-food goods and services. Therefore, a poverty line consists of two components:
- Food poverty line (estimated monetary value of Minimum food basket).
- Estimated Cost of non food goods and services.

The previous poverty line was estimated in 2004 by NSS with the technical support of the World Bank. Since 2004 this poverty line was successfully used by National Statistical Services for producing and dissemination of official poverty statistics in Armenia.

The updated poverty line will provide a base for producing reliable data on living standard of population and poverty in Armenia.

Estimation of the Food Poverty Line

To estimate the food poverty line, we use the WB's methodology based on the "Cost of basic needs" approach. The methodology of estimation of the Food poverty line as a cost of the minimum food basket consists of several steps. Below is a short conceptual description of these steps used for the development of the Food poverty line.

Minimum dietary energy requirement

The WHO in collaboration with FAO, continually reviews new research and information from around the world on human nutrient requirements and recommended nutrient intakes. This is a vast and never-ending task, given the large number of essential human nutrients. These nutrients include protein, energy, carbohydrates, fats and lipids, a range of vitamins, and a host of minerals and trace elements.

In a specified age and sex group, the amount of dietary energy per person is that considered adequate to meet the energy needs for maintaining a healthy life and carrying out a light physical activity. In the entire population, the minimum energy requirement is the weighted average of the minimum energy requirements of the different age and sex groups in the population.

Many countries rely on WHO and FAO to establish and disseminate this information, which they adopt as part of their national dietary allowances. Others use it as a base for their standards. The establishment of human nutrient requirements is the common foundation for all countries to develop food-based dietary guidelines for their populations.

The average caloric requirement for Armenia was calculated by NSS with the technical assistance of the World Bank in 2004 using information on caloric requirements of different demographic groups according to the World Health Organization (1985) standards and information on population shares of these demographic groups. In that way, the average caloric requirement for Armenia was estimated at 2,232 calories per day per capita.

The same caloric requirement was used in this analysis for the calculation of updated food poverty line, since it is believed that there is no a decisive change neither in demographic composition of population.

A reference population for the Minimum Consumer Basket

The choice of reference population for the minimum food basket has been guided by the need to adequately represent the population of households near the poverty line – thus reflecting food consumption that is near the poverty line (reflecting a minimum food basket that is not "too" poor and not too rich). The food basket of this group is meant to capture the food consumption patterns for a relevant, relatively low-income population. The choice of the reference population is a normative judgment in the construction of a poverty line. Ideally, the reference group will be chosen so as to be consistent with the resulting poverty estimates based on behavioral parameters of the reference group. In theory, then, one must first approximate who are the poor to set the reference group and then calculate the poverty line. In some cases it is necessary to iterate until there is convergence, by revising the reference group accordingly.

During the development of the methodology the team came up with a decision to use the second, third and forth consumption deciles per adult equivalent as a reference population for setting up of the of Minimum Food Basket. Additionally the team implemented the sensitivity analysis to check the robustness of the Minimum Food Basket's composition depending on a choice of the reference population.

The table 1 presents the analysis of consumption structure of different part of the population distribution.

Table 1. Composition of food consumption for various reference population

(percen)

Food groups	ALL population	Deciles 1-2	Deciles 2-4	Deciles 4-6	Deciles 1-5	Deciles 6-10
Bread and cereals	28.7	33.3	33.6	31.8	33.3	25.5
Meat	16.1	9.2	11.4	13.6	11.4	19.3
Fish	1.1	0.5	0.7	1.0	0.7	1.4
Milk, cheese and eggs	14.3	19.0	16.6	14.2	16.5	12.8
Oils and fats	7.2	8.2	7.6	7.2	7.6	6.9
Fruit	8.1	3.7	5.2	7.3	5.3	10.0
Vegetables	15.3	17.9	16.5	15.9	16.7	14.3
Sugar, jam, honey, chocolate, confectionary	4.6	3.5	3.8	4.3	3.8	5.2
Food products n.e.c.	1.0	1.1	1.1	1.1	1.1	1.0

Food groups	ALL population	Deciles 1-2	Deciles 2-4	Deciles 4-6	Deciles 1-5	Deciles 6-10
Coffee, tea and cocoa	3.0	3.3	3.1	3.1	3.2	2.8
Non-alcoholic drinks	0.7	0.3	0.4	0.5	0.4	0.9
Total	100	100	100	100	100	100

The Food poverty line as a cost of the Minimum Food Basket was established according to the actual consumption patterns of a reference population, which means that the composition of minimum food basket is identical with the composition of the composition of the reference population. But the quantities of food products and non alcoholic beverages are scaled up in order to come up with the total Caloric Value of 2232 Kcal per capita per day.

The Cost of Minimum Food Basket

Based on the consumption shares of the selected reference population, 2232 calories per day is then allocated across the "most important" food items. This minimum calorie diet is then has been priced by 2009 average annual national prices using the price-per-calorie (P^f/c^f) for each food item. The monetary value of the minimum food basket which is the Food Poverty Line then was computed as the total cost of this diet which can be simply expressed as:

$$FPL = \sum_f \frac{P^f}{c^f} S^f(N).$$

Where for each food item f, c^f is a caloric content value, S^f the share of total calorie intake. N is number of food items in the basket.

The Food Items and nonalcoholic beverages in the Minimum Food Basket

There is a common misinterpretation of the number of food items in the minimum food basket. It is sometimes believed that the more items in the basket the better or the richer it is. This is actually not necessarily the case. The thing is that adding more products into the minimum food basket can be done on the expense of other food products. So it should be mentioned that the caloric value is fixed at the level of 2232 Kcal first, and then one can substitute one product with another or add any additional products (keeping the caloric value unchanged).

It is important to realize that less items does not necessarily mean "worse" basket.

In general, the list and the number of products in the minimum food basket depend on at least the following factors.

- How important are the food items - what is the population's budget share of particular items.
- Are the prices of food items available and easy to monitor and update.
- Some products may be included in the basket even if their consumption quantity or value is not very high, but they are essential in terms of population nutrition and health.
- Some food items may be included if they are traditionally commonly consumed even in small quantities.

An attempt is made to answer questions such as which food items and beverages must be represented in the Minimum Food Basket.

The Armenia ILCS collects information about the prices of 208 most important food items and non alcoholic beverages. The sensitivity analysis has been undertaken to check how the cost of minimum Food Basket will change if a subset of the 208 food items were used, keeping the caloric value of the Basket unchanged at the level of 2232 Kcal /day .

The analysis has revealed that if we dropped the "non important" food items, which all together constitute only <u>one percent</u> of the total food expenditures (consumption) then the list of products can be easily reduced to almost <u>half</u> of the 208 food items identified in the ILCS data. For instance if we look at the reference population (deciles 2-4) consumption patterns, we observe, that the total number of products which is being consumed in that group is 200. After ranking the products by consumption value in descending order and keeping only the list of food items and beverages which constitute 99 percent of cumulative consumption of reference population, then the number of food items can be reduced to only 106, which is just a little more than half of the

complete list of food items. Therefore, almost the half of food items may be dropped without significantly affecting household food expenditures.

Moreover, the cost of food basket based on shorter product list is quite robust. For instance, the Food Poverty Line as a cost of minimum food basket based on reference population deciles 2-4 is estimated as 518 Drams per day per capita if it is based on 200 products. If 94 important food items are dropped and the poverty line is recalculated based on the shortened product list, the cost becomes a 516 Dram per day. Thus, the difference is insignificant. Taking this fact into account the decision has been made to recommend the food poverty line which is based on food items which constitute together the 99 percent of cumulative food consumption. Dropping non important items allows avoiding food items with very low frequency of purchase and small share of consumption. Such items may have a higher error of estimation for both consumption quantities and values.

Estimation of Non-food Expenditures

Individuals have non-food needs in addition to food ones. The need for non-food consumption requires adding an allowance for non-food goods and services to the Minimum Food Basket. Having set the food poverty line, the question arises how to estimate an allowance for basic non-food goods, i.e. obtain the total poverty line which includes an allowance for both food and non-food expenditures. Several competing methods are available and each has merits on its own ground when judged from the technical point of view.

In this report, two simple and transparent methods of determination of the allowance for non-food consumption using the actual data are used. The non food allowance for the total poverty line is estimated using Food Expenditure Method (FEM) and Consumption Basket Method (CBM) (World Bank 2002). The estimation does not involve use of regression techniques, given they are not transparent to policymakers and non-technical users.

According to the FEM, first those individuals whose food consumption is just around the value of the food poverty line are selected. Now this part of the sample will constitute the reference group for the derivation of the allowance of non food and the general poverty line. The *share* of total consumption that goes to non-food consumption will be calculated for this reference group. This share is the 'allowance' for non food consumption that is added to the value of the food poverty line to get the complete poverty line. This allowance further may be decomposed to the components such as services and non food items. More precisely, the food share is calculated as a "grand-mean" of the average food shares of households whose <u>food consumption per adult equivalent</u> is lying within interval of ± 2-10% around Food poverty line (non-parametric estimate).

According to the second method which is CBM, the food share is calculated as a "grand-mean" of the average food shares of households whose <u>total consumption per adult equivalent</u> is lying within interval of ± 2-10% around Food poverty line .
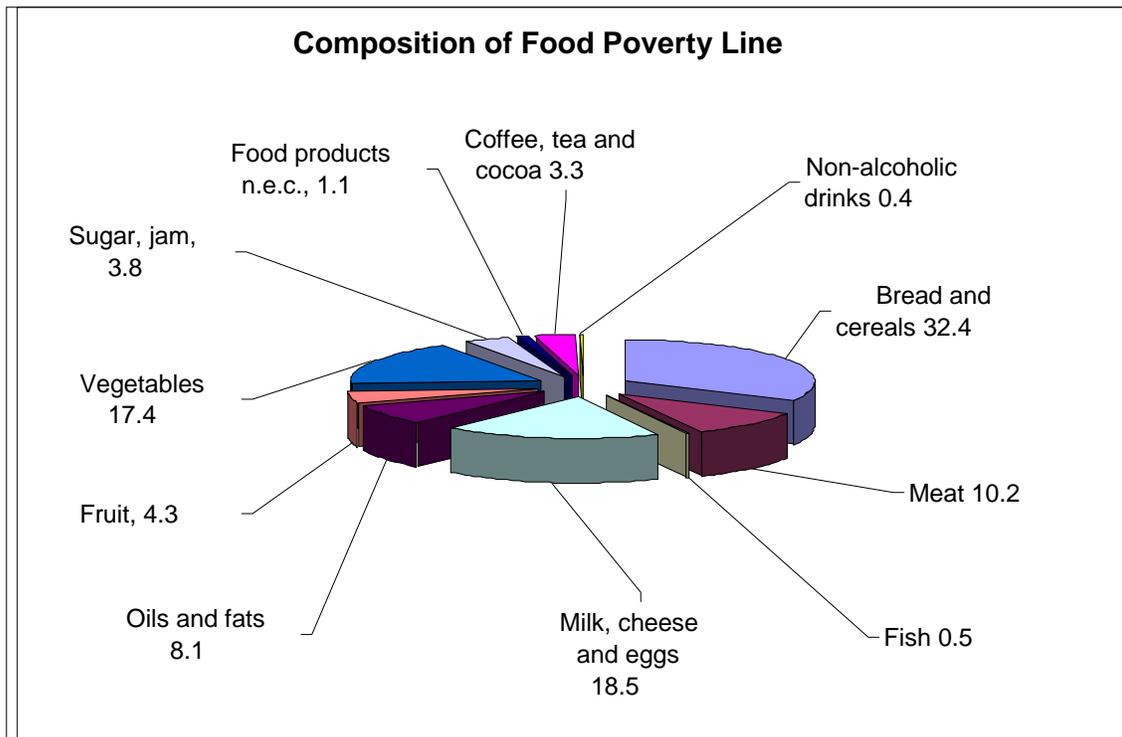
This leads to estimates of two poverty lines: lower poverty line and upper poverty line. The Poverty line, which includes the non food allowance according to FEM is called <u>upper poverty line.</u> The Poverty line, which includes the non food allowance according to CBM is called <u>lower poverty line.</u>

Summary: The Estimated Poverty Lines

The value of recommended Food Poverty Line for 2009 was estimated as much as **17,483 AMD** per month per adult equivalent. However we would like to state that the values between **17,000 and 20,000 AMD** per month per adult may serve as a food poverty line based on various reference population and food basket structure.

The food lines are first estimated on a per capita basis to arrive at the cost of 2232 Kcal per person per day and then scaled up using the scaling factor 1.113 (calculated by the World Bank in 2004). For compatibility reason we use the same scaling coefficients for conversion of per capita poverty line to adult equivalent one as it was done in 2004. Figure 2 below illustrates the decomposition of the food poverty line by COICOP 2 digit level groups.

Figure 2. The composition of food poverty line, in %

Composition of Food Poverty Line

- Food products n.e.c., 1.1
- Coffee, tea and cocoa 3.3
- Non-alcoholic drinks 0.4
- Sugar, jam, 3.8
- Bread and cereals 32.4
- Vegetables 17.4
- Fruit, 4.3
- Meat 10.2
- Oils and fats 8.1
- Milk, cheese and eggs 18.5
- Fish 0.5

The Food poverty line is the cost of the **minimum food basket**, which:
- consists of 106 main food items and non alcoholic beverages,
- has an energetic value of 2232 Kilocalories per capita per day and
- is based on consumption patterns of adult equivalent consumption deciles 2-4.

Lower poverty line

The Consumption Basket Method, which calculates the food share in total consumption of those households, whose total Consumption is around to the food poverty line, estimates the food share closer to 70 Percent. Adding the respective non food allowance we come up with Lower Poverty line. The recommended lower poverty line for 2009 is 25,217 AMD Per month per adult equivalent. The values between 24,000 AMD and 28,000 AMD per month per adult may serve as a lower poverty line based on various reference population and food basket structure.

Figure 3. The composition of lower poverty line

Composition of Lower Poverty Line

30.7

69.3

- ■ Food and non-alcoholic beverages
- ■ Non food and services
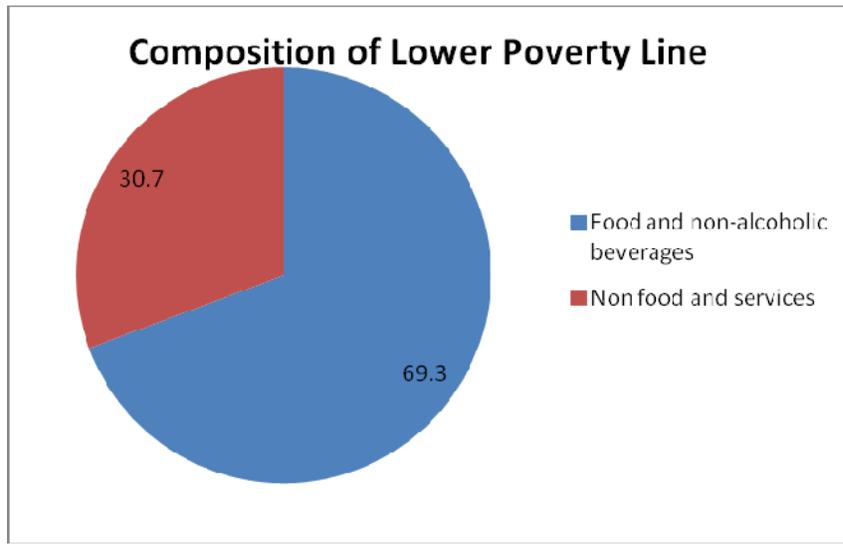
Upper Poverty Line

Meanwhile the Food Expenditures Method, which calculates the food share in total consumption of those households, whose food consumption value is around the food poverty line, estimates the food share closer to 56.5 Percent.

With these assumptions the total poverty line per adult equivalent in 2009 comes to 30,920 AMD per adult equivalent per month. The values between 29000 AMD and 36000 AMD per month per adult may serve as an upper poverty line based on various reference population and food basket structure.

Figure 4. The composition of upper poverty line

Composition of Upper Poverty Line

43.5

56.5

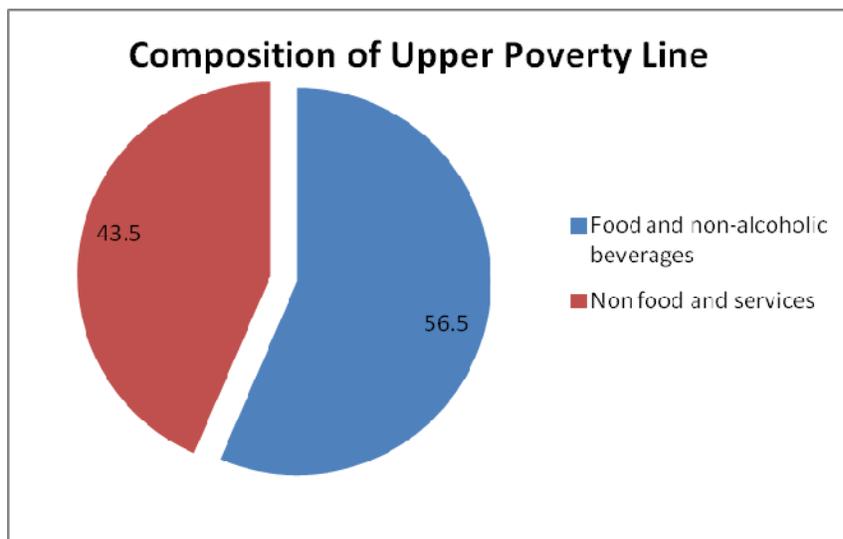- ■ Food and non-alcoholic beverages
- ■ Non food and services

Table 2 presents the poverty lines for Armenia. The poverty lines are expressed in Armenian Drams in 2009 average annual prices.

Table 2. Poverty lines per adult equivalent AMD / month, 2009.

Food line	17,483
Lower poverty line	25,217
Upper poverty line	30,920

The above poverty lines are expected to better reflect current realities in Armenia and the spending and consumption patterns of its population. However, taking into account the possible underestimation of consumption, which may have been reflected in the ILCS data, further revision of the poverty line may be considered based on a different reference population.   In any case the poverty line stated by ILCS of households could be differed from the poverty "normative" line that is developed for administrative, but not for statistical purposes according to health and social minimal normative requirements.

The methodology of 2012 poverty measurement

In order to measure poverty in 2012 there was a need to re-estimate the 2011 poverty lines i.e. the food poverty line , the lower and upper complete poverty lines. It has to be mentioned that the other two components of poverty measurement which are the calculation of consumption aggregate and the poverty measures remain unchanged.

The 2012 poverty line was re-estimated as follows: The monetary value of the 2011minimum food consumption basket was scaled using Food price Index , which was estimated as 2.0%, and the non-food component in lower and upper complete poverty lines was scaled with non- food price index (3.1%).

3. Main poverty indicators

In this report, following international practice, poverty is measured by the poverty incidence, gap and severity indicators. The headcount index or poverty incidence is the simplest and most frequently used measure of poverty. It represents the fraction of individuals with consumption per adult equivalent below the poverty line (Forster et al 1984). The poverty gap index indicates how poor the poor people are, i.e. how far their consumption is below the poverty line. The severity of poverty indicator is used to measure the inequality of consumption among the poor (some poor people may have consumption close to the poverty line, while some may be far from it).

The poverty measurement indicators are described by the following formula:

$$P(\alpha) = \frac{1}{n} \sum_{i=1}^{n} \left[\max\left(\frac{z - c_i}{z}, 0 \right) \right]^{\alpha}$$

where α is parameter (explained below), z is the poverty line, ci is consumption of individual i, and n is the total number of individuals. For α equal to 0, P(0), or the poverty headcount index is obtained; it measures the fraction of individuals below the poverty line. If α is equal to 1, P(1), or the poverty deficit index is obtained; it indicates how far the poor, on average, are below the poverty line.

P(1) can be defined in the following way:

$$P(1) = P(0) * (Average\ Deficit)$$

where the average deficit is measured as a percentage of the poverty line by which the consumption of the poor on average falls short of the poverty line. Finally, if α is equal to 2, P(2), or the severity of poverty index is obtained; it indicates inequality of consumption among the poor.

In this report, overall poverty trends are described using all three measures of poverty, while the analysis of the poverty profile mainly relies on the poverty headcount.