

**Robustness of the Method of the Cost of Basic Needs in the
Estimation of Poverty: Simulations based on the Survey on
Burkinabè Households Living Conditions**

Wênangûa Grégoire Yameogo, National Institute of Statistics and Demography,
Burkina Faso

Paper Prepared for the Special IARIW-SSA Conference on
Measuring National Income, Wealth, Poverty, and Inequality in African Countries
Cape Town, South Africa, September 28-October 1, 2011

Session 2B: Inequality and Poverty Issues (Parallel)

Time: 2:00 PM-5:30 PM

Robustness of the method of the cost of basic needs in the estimation of poverty: Simulations based on the Survey on Burkinabè households living conditions.

YAMEOGO, Wênangûa Grégoire

National Institute of Statistics and Demography, Department of statistics on households living conditions.

Ouagadougou, Burkina Faso

yameogogreg@yahoo.fr

RESUME

We examine the robustness of the “method of the cost of basic needs” as it’s applied by several developing countries in the estimation of poverty. The technical choices that have to be made in the elaboration of the poverty line, using this method, namely the composition of the food basket and the daily caloric needs were the subject of our simulations. These simulations were made on the basis of the Burkinabé survey on households living conditions in order to test the sensibility of the line of poverty to the choices made by some countries. Our results strongly support the view that the technical choices (often made without enough rigorous) significantly influence the poverty line. These findings suggest the needs to base technical choices on scientific views in the measurement of poverty, a multidisciplinary approach. Such a process is essential to respect the principle of impartiality, which is one of the fundamental principles of official statistics.

Keywords: poverty line, incidence of poverty, method of the cost of basic needs.

1. Introduction

Surveys on Households living conditions provide with many relevant indicators to follow the progress made to improve the people well-being. Discussion about the best indicators to approach human welfare has known great evolution. Despite recent developments that attempt to consider poverty from a multidimensional point of view, monetary poverty remains an important direction for this dimension is considered to be a summary measure of living standards.

Within the framework of Strategic Documents to reduce poverty, many countries with an acceptable periodicity have gathered data having a great deal with poverty. However, as for the different estimations of poverty, analysts have to make some technical choices. The issue of international comparison of the results on poverty for a great majority of African countries remains delicate because of the different technical choices made by analysts in those countries. In fact, what is the impact of the choices that have been made on the results? The importance of such a question is to make sure that the different estimations of poverty that were got were not greatly influenced by the choices that were made.

Lanjouw J. et Lanjouw P. (1997) has studied the impact of the scale covered by the aggregate of consumption on the FGT¹ indicators for different approach in estimating the poverty line. They study concluded that estimation of the line through the method of cost of basic needs allows to measure the impact of poverty more robust to changes in the aggregate of consumption.

In this paper, we have presented methodological considerations linked to measuring poverty at the first step. Then, from simulations on some African countries, we'll show the need of choosing a harmonized

¹ Foster, Greer and Thorbecke indicators can be resumed in the following formulae:

$$p_{\alpha} = \frac{1}{\sum_{i=1}^n w_i} \sum_{i=1}^n w_i \frac{(z - Y_i)^{\alpha}}{z} 1_{Y_i \leq z}$$

, where α is parameter of aversion to poverty, n the number of households, z the poverty line, Y_i the expense per capita of the household i, w_i the weight of the household i in the population according to the structure of the sample.

The indexes P_0 , P_1 , P_2 denote the incidence, intensity and severity of poverty.

methodological basis to calculate poverty indicators in order to enable international comparisons of the phenomenon.

The second section deals with essential aspects of the measurement of the phenomenon and usually used analytic means.

In the third section we give a short background overview of the inquiries on households living conditions in BF focusing on the last one made in 2003.

The fourth section presents results of simulation made on the basis of the survey on households living conditions conducted by the National Institute of Statistics and Demography of Burkina Faso in 2003.

This study ends with section 5; then some recommendations are made.

2. Background of the survey on households living conditions in Burkina Faso and focus on the Burkinabé survey on households living conditions in 2003.

Burkina Faso, as several other African countries has applied a Structural Adjustment Program in 1991. However, noticing the social bad effects that the restrictive measures of those programs have had, new strategies were to be thought and applied in order to fight against poverty. This is how surveys in the households became one of the most efficient ways to measure the progress made in fighting against poverty. So, soon in 1994 BF made its first Priority Survey (PS1) That allows to have some basic indicator data about households living conditions. In order to measure the progress that was made a second and a third survey was made respectively in 1998 and in 2003. The Burkinabe 2003 inquiries on households living conditions was a two degree survey

Using the 1996 general census making of the populations and housings, a representative sample of 8500 households was considered.

Within a multidimensional view, the analysis considered aspects such as literacy campaigns and health in addition to monetary poverty. It was shown that the literacy rate in BF is still low (only 21% of Burkinabè know how to read and write in any language). It was also shown that the rate was four times higher at the “poor persons” than at the “rich ones”. As for heath, high levels of morbidity were pointed out with a poor access of the poor persons to heath services.

As for monetary poverty, the poverty line was estimated at 82672FCFA per capita and per year in 2003. Regarding this line, observation of the households' expenses showed that 46.4% of the Burkinabè was poor.

The table below presents the main results of this study:

	population share	headcount index(P0)	Poverty gap index(P1)	poverty severity index(P2)	Gini index
National	100	46.4	0.15610	0.07105	0.458821
area of residence					
Rural	0.81830	52.3	0.17852	0.08200	0.398934
Urban	0.18170	19.9	0.05514	0.02177	0.491357
Household head gender					
Woman	0.05249	36.5	0.12712	0.05712	0.526859
Man	0.94751	46.9	0.15771	0.07183	0.452584

According to the results of this survey, poverty was essentially a rural phenomenon: More than the population living in rural areas was poor. In urban areas, the poverty incidence was much low. But inequalities in wealth were much high in urban than in rural areas.

Focusing on the household head gender, we noticed that households headed by a man were much poor than those headed by women.

Around the same period, similar studies were made in other countries with sometimes very different results. As an illustration, a year earlier, 87.5% of the Burundi people were considered "poor". Two years just earlier, poverty incidence in Mali and Senegal were respectively estimated to 55.5% and 57.1%.

Though these results gave an idea of how important the phenomena is in the region, the question of international comparisons were problematic while knowing that building poverty line is not always done with the same technical choices. To answer this question, it is important to first give a short overview of the methods of building the line of poverty.

3. Monetary Poverty measurement and technical choices made.

In order to follow the progress made upon reducing poverty, it is necessary to choose a welfare indicator that may be the income per capita or expense per capita. In general, developing countries prefer expenses of consumption to income as an indicator of welfare for the following reasons summed up from AFRISTAT (2009):

- ✓ consumption is a better picture of well-being than income that precisely allows access to consumption.
- ✓ consumption is much more stable in time than income, precisely in rural areas.
- ✓ consumption is more easily measurable than income
- ✓ Consumption can resume the capacity of households to meet their basic needs like access to water, health, decent housing.....

Once this indicator is retained, the issue is then to define a line under which individual are considered to be poor. As for the method of determining this line, the methodological framework offers several possibilities going from absolute approaches (cost of basic needs, absolute line of 1 \$ a day and per capita, the method of needed energetic intake) to relative approaches (relative line corresponding to a portion of a household yearly spending).

As for the method of nutritive energy, the line of poverty is defined as the total spending of consumption an individual can be expected to make when s/he is adequately fed in his living area.

This method can be distinguished from the method of the costs of basic needs by the fact that it does not impose the choice of a national basket of food products for the estimation of food line. The basket may significantly vary from region to another of the country, depending on the eating habits, purchasing power of populations and many other varied aspects. The lines of poverty made by the application of such a method may be different from one group to another of the population, its tastes and preferences , the level of its activities, relatives prices, existence or not of public properties...all these vary from a region to another. In the case, the estimated poverty line can be higher in a richer region than in a poorer one. Consequently, two households with the same living standard may be classified respectively “poor” and “not poor” according to spatial settlement.

The method of the absolute line of 1\$ a day and per capita is based on the lines calculated in 1990 by the World Bank at purchasing power parity (PPP) basing on the 1985 prices. The line that was found was between 275 and 370\$ per capita and per year, what is approximated to a daily line of 1 \$.

With relatives' approaches, poverty line corresponds to a portion the total spending per capita of the households. It may be the part of the total expenses per capita of the last quintile or even a fraction of the median expense per capita of the households. What such a method is reproached is for its supporting that poverty would never be eradicated for it would always be possible to calculate a fraction of a population that is consuming less than the retained line. This method does not seem to fit developing countries, because its importance only lays on the possibility it offers to follow the movement of some particular sub-groups according to a certain point of view.

The method cost of basic needs usually used by developing countries (it is applied by 14 out of the 19 countries that are members of AFRISTAT)² consists in estimating two components one of which is related to food and the other is not in order to determine the line of poverty. This imposes upon technicians a number of choices like selecting and enhancing the value of a basket of food products, choosing a normative caloric line, choosing a group of reference, and a table of caloric conversion.

Observing the practice of the countries that are members of AFRISTAT shows diverse choices depending on countries. So, up to 2006, the number of products selected in the food basket varied from one (for Mali) to 61 for Cameroon. As for the choice of the normative caloric line, the used reference seems to be the daily average optimum energy- giving ration (2400kcal a day and per capita) as recommended by the FAO. Nonetheless, here again there are a diversity of choices made by countries. The table of caloric conversion commonly used is that recommended by international organizations such as (FAO; WHO) with some adjustment due to products that do not coincide with the heading present in the basic table.

We can legitimately wonder about what the contribution has been of all these choices to the different results found from one country to another. To answer such a question, we shall make some simulations.

² Economic and Statistical Observatory of Sub Saharan Africa

4. Simulations and empirical lessons: impact of some technical choices on the estimation of poverty line.

In this section we are going to test the above mentioned developments through simulations. As mentioned above, some technical choices made by countries when estimating poverty could influence the different results that were got. Our simulations are based on two parameters: The composition of the food basket and the daily normative caloric line.

To test the strength of the method of the cost of basic needs, the simulations we are going to do will be bear on the poverty line.

The rule for decision making is the following:

If after simulation, the estimation of poverty incidence belongs to the interval of confidence (5% of risk of errors) of the parameter estimated without any simulation, we would conclude that the object of simulation has no significant influence upon the line of poverty and therefore is strong.

Otherwise, we will not say that the object of simulation does not influence the line of poverty in a significant way.

In the profile of poverty made on the basis of the Burkinabè survey on the households living conditions of 2003, intervals of confidence concerning poverty incidence were not provided. We have therefore decided to assess these intervals in order to apply of our rule of decision.

It comes out of the estimation of the incidence of poverty by interval of confidence that with 90% of level of confidence, one could say that the proportion of burkinabé that was poor in 2003 belong to the interval [43.7 ; 49.0].

a. EFFECTS FORM MODIFYING THE NUMBER OF ITEMS THAT MAY MAKE UP THE FOOD BASKET

An observation of the choices that were made by African countries in choosing the number of items to make up the food basket shows varied behaviors. In 2003, Burkina made its estimation of the poverty line on the basis of a food basket made up of the four elements the most eaten (millet, sorgho, rice and corn) while Mali up to 2006, would use a basket made up of only rice. Countries like Cameroon and Congo used baskets with much more important elements respectively 61 and 51.

Now, theoretically speaking, the more the number of food items is important the bigger chances to have a balanced basket with regard to the diversity the energy – giving supply (lipids, parotids, glucids). , AFRISTAT(2006).

As recommended by AFRISTAT (2006), it is important that the composition of the basket reflects the food habits of the populations. We therefore decide to make up the basket from the average profile of food consumption of all the households of country putting in the basket products representing 90% of food expenses. We then get a heading of 33 products better reflecting the food habits at the national level.

This new basket replaces the 4 elements one made by the analysts of the survey conducted in 2003³.

Keeping constant the daily caloric line at 2283kcal /day/capita, the food line shift from 41153FCFA to 78 628FCFA. And if the coefficient of proportionality used in 2003 is applied on this, the line of non-food goes from de 41153FCFA to 78 628FCFA, which finally gives a global line of 157956 FCFA.

The effects of all this are to darken a little more the table of poverty indicators for poverty incidence shift from 46.4% to 74.12%.

Table1: results of simulations based upon composition of the food basket.

	Choix du pays	Simulation
Number of items in the basket	4 (27.8%)	33(80.6%)
Food line (FCFA)	41153	78628
Non food line (FCFA)	41519	79328
Global line (FCFA)	82672	157956

Source: our calculations using data from survey on Burkinabè household living conditions of 2003.

	population share(%)	headcount index(P0)(%)	Poverty gap index(P1)	poverty severity index(P2)
National	100	79.2	0.39558	0.23473
Area of residence				
Rural	81.8	85.3	0.43752	0.26335
Urban	18.2	52.0	0.20672	0.10586
Household head gender				
Female	5.2	69.4	0.33451	0.19508
Male	94.8	79.8	0.39897	0.23693

Source: our calculations using data from survey on Burkinabè household living conditions of 2003.

³ Mil, sorgho, riz, maïs

As a consequence, it therefore appears that modifying the food basket (through the choice of a basket that is more representative of the food habits) leads to the final consequence of displacing the line of poverty upwards; hence providing noticeably different poverty index.

In applying the rule of decision making above described, we can say that the composition of the basket significantly influences the line of poverty since the simulated value does not belong to the interval of confidence of the parameter [43.7 ; 49.0].

b. INFLUENCE OF CHOICE ON THE DAILY CALORIC LINE

The level of nutritional needs necessary for an individual to be in good health depends on climate, altitude, physical activities and characteristics of the human body. Difficulties in taking into account all these aspects most of the time lead to considering the needs of a human of reference.

The daily average optimum energy-giving ration in the world is 2400 calories for FAO and 2200 Cal for the World Bank (World Bank , 1993)

In its handbook of food and nutrition, The World Food Program recommends an average of 2070 Cal. This average should be adjusted according to countries with regard to the degree of physical activities by adults and also to the daily average temperature. The most objective variable which is the average temperature intervenes only for values under 20°Celsius. According to these recommendations, great differences should objectively not be noticed among African most which register temperatures above 20°Celsius on average.

Several African countries use the line recommended by the FAO(Benin,Burundi, Centrafrica, Niger, Senegal, Tchad, Togo).

Burkina Faso, since the priority survey of 1994, has always considered a normative caloric line of 2283kcal corresponding to the average of weighted caloric needs of individuals aged from 15 to 65.

Among the African countries, Cameroon distinguishes itself by a very high caloric line (2900 Cal) what cannot objectively hardly be explained.

We have decided to assess again the line of poverty and the indexes FGT on the basis of the EBCVM 2003 using the normative caloric line used in Cameroon.

The results shows an increase in the line of food poverty that goes from de 41153FCFA to 52275 FCFA. Keeping the same coefficient of proportionality to determine the non food line , we get a global line of poverty of 105015FCFA and a poverty incidence of 52.29%.

This simulation also allows to conclude that the choice of a daily caloric line significantly influences the line of poverty since the simulated value of the index of poverty does not belong to the interval of confidence of the parameter.

Table 2: Results of simulations on the daily normative caloric line.

	Choice of countries	Simulation
Normative caloric (Cal)	2283	2900
Food line (FCFA)	41153	52275
Non food line (FCFA)	41519	79328
Global line (en FCFA)	82672	105015

Source : our calculations using data from survey on Burkinabè household living conditions of 2003.

	population share(%)	headcount index(P0)(%)	Poverty gap index(P1)	poverty severity index(P2)
National	100	60.2	0.23711	0.11959
Area of residence				
Rural	81.8	66.7	0.26806	0.13667
Urban	18.2	31.0	0.09771	0.04270
Household head gender				
Female	5.2	50.3	0.19511	0.09720
Male	94.8	60.7	0.23944	0.12083

Source : our calculations using data from survey on Burkinabè household living conditions of 2003.

The results shows an increase in the line of food poverty that goes from de 41153FCFA to 52275 FCFA. Keeping the same coefficient of proportionality to determine the non food line , we get a global line of poverty of 105015FCFA and a poverty incidence of 52.29%.

This simulation also allows to conclude that the choice of a daily caloric line significantly influences the line of poverty since the simulated value of the index of poverty does not belong to the interval of confidence of the parameter.

The results of our simulations are straightforward: Both the basket and the daily caloric line significantly affect the poverty line and thus, the incidence of poverty.

5. Conclusion and recommendations

Our aim in this study was to test the robustness of the “Cost of basic needs method” as applied by many countries in the estimation of poverty. To assess these objectives we distinguished two criteria which are subject to varied choices in the measurement of the phenomenon. It was namely about the composition of the food basket and the daily caloric line.

Our findings revealed a great effect of the value of the “daily caloric line” in the estimation of the poverty line. Similarly, taking better account of patterns of household consumption increases the level of poverty and thus reveals a higher incidence of poverty.

The implications of our results are straightforward: When the scientific guidance of the method of the cost of basic needs are not applied in the estimation of poverty line, the estimations found are not consistent. And According to their politics affiliations, technicians might influence the incidence of poverty. The choices made by some countries are often subjective: In this, the first fundamental principle of official statistics on the necessity of impartiality of official statistics is not met. This principle stipulates « Official statistics provide an indispensable element in the information system of a democratic society, serving the government, the economy and the public with data about the economic, demographic, social, and environmental situation. To this end, official statistics that meet the test of practical utility are to be compiled and made available on an impartial basis to honor citizens’ entitlement to public information”.

Adherence to this principle requires, in view of our results to base choices involved in estimating the poverty line on scientific grounds. This means that the country must work to use a basket of goods representative of consumer habits both at national and regional levels. In addition, it is necessary to be rigorous in the choices of the daily caloric line. This cannot happen without an interdisciplinary approach that combines nutritionists and technicians who develop national poverty line when they are making estimation upon such important realities like living conditions of households. All the same, it will allow international comparisons of indexes of poverty. Such an approach is crucial for the reliability of various estimates; that will help maintain confidence in official statistics.

REFERENCES:

- [1] **AFRISTAT** (2009), Méthodologie d'élaboration de la ligne de pauvreté sur une base harmonisée : bilan dans les Etats membres d'AFRISTAT, série Méthodes N° 7, Mars 2009.
- [2] **Angus Deaton, Salman Zaidi**, (2002), Guidelines for constructing consumption aggregates for welfare analysis, Living Standards measurement study working paper, Washington D.C, The World Bank.
- [3] **Appleton S.**, (2001), the rich are just like us, only richer: poverty functions or consumption functions? *Journal of African Economics*, Vol 10, #4, p 433- 469.
- [4] **Atkinson A. B.**, (1987), "On the Measurement of Poverty", *Econometrica* 55(44), 749-764.
- [5] **Burkina Faso**, Institut National de la Statistique et de la Démographie, (2003), La pauvreté en 2003.
- [6] **Burkina Faso**, Ministère de l'économie et du développement, (2004), Cadre Stratégique de lutte contre la pauvreté.
- [7] **Deaton, Angus S.**, (1980), "The measurement of welfare: theory and practical guidelines," LSMS Working Paper No. 7, Washington, DC. The World Bank.
- [8] **Howes, Stephen, and Jean Olson Lanjouw.**(1994). "Making Poverty Comparisons Taking Into Account Survey Design: How and Why." first draft. World Bank and Yale University.
- [9] **Lanjouw, Jean Olson, and Peter Lanjouw**, (1997), "Poverty comparisons with non compatible data: theory and illustrations," Policy Research Working Paper, Washington, DC. The World Bank.
- [10] **Lanjouw J et Lanjouw P.**
- [11] **Ravallion Martin**, (1992), poverty comparisons, a guide to concepts and methods Living Standards measurement study working paper N° 88, The World Bank, Washington D.C.
- [12] **Ravallion, Martin**, (1998), "Poverty lines in theory and practice," LSMS Working Paper 133, Washington, D.C. The World Bank.
- [13] **Sen A. K.** (1976), "Poverty: An Ordinal Approach to Measurement", *Econometrica* 44, 219-231.