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ALTERNATIVE METHODS FOR SETTING POVERTY LINES
Measuring Poverty in Cameroon

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Abstract. This paper examines alternative methods for setting poverty lines using the 1996 Cameroon Household Consumption Survey. In particular, it presents a methodology that blends the traditional food energy-intake and the cost-of-basic-needs methods. The food poverty lines are computed using both parametric and non-parametric regression techniques and the non-food expenditures implicit in the overall poverty lines are derived using a non-parametric regression technique. Poverty lines obtained using non-parametric regressions are preferred because they are less affected by the presence of "outliers" in the data and thus do not suffer from specification bias that originates from a "wrong" functional form. The poverty profiles in 1996 show that the spread, depth and severity of poverty in Cameroon were markedly higher in rural than other areas. Thus, policy measures to assist the poor in Cameroon may have to focus more in the rural areas. Such anti-poverty measures could equally focus more on the self-employed, especially farmers and informal sector workers, than on any other category of employment.

I. INTRODUCTION

Cameroon enjoyed a healthy economic climate until the second half of the 1980s when world prices of its commodities plummeted and revealed the internal structural deficiencies of the country. The harshness of the ensuing economic crisis led to the abandonment of the long-term development planning system pursued since independence in 1961[1] and the adoption of

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[1] For a succinct presentation of the planned policies executed through Five-year Development Plans in Cameroon, see Baye and Fambon (2001).

the IMF/World Bank (medium-term) structural adjustment programmes (SAPs) from 1988 in an effort to redress the dismal economic situation. The immediate effects of the ensuing measures designed to redress the situation instead fuelled poverty. The SAP measures implemented included the following: (1) liquidating non-profit making and privatizing some marginal profit-making public enterprises, (2) reducing public expenditure on education, road infrastructure, extension services, rural water supply and electrification, and health care services, (3) freezing salary increments of public sector workers, (4) implementing salary cuts, amounting to an average of about 60%, for public sector workers in January and November 1993 and (5) retrenching public and semi-public sector workers from the early 1990s. The liberalization of the commodity sub-sectors exposed farmers to the world commodity markets. These expenditure-reducing measures aggravated the burden on the poor.

Poverty alleviation became a major policy concern in Cameroon since the achievement of macroeconomic stability subsequent to the 1994 devaluation of the CFA franc. To put forward an anti-poverty programme that eases the effects of undesirable policy outcomes, the starting point is to construct poverty lines and profiles that show how the extent of poverty varies across sub-groups of a population. Some effort has been made in the past in constructing poverty lines and profiles for Cameroon (see for example, Lynch, 1991; Njinkeu *et al.*, 1997; World Bank, 1995 and Baye, 1998). A major weakness with past endeavours is the use of a very limited basket of goods and the absence of sufficient transparency in the process of setting poverty lines.[2] The value added of our paper lies in (1) filling this gap by following sound procedures that capture almost the entire basket of goods surveyed, and (2) contributing to empirical literature on poverty analysis by using both parametric and non-parametric techniques to compute poverty lines.

The main objective of this paper is to construct alternative poverty lines using the 1996 Cameroon Household Consumption Survey (CHCS 96) carried out by the Department of Statistics and National Accounts (DSCN, 1996). In particular, a blend of the food-energy-intake (FEI) and the cost-of-basic-needs (CBN) methods is used to derive the food and overall poverty lines. The food poverty lines are computed using both parametric and non-

[2]Fambon *et al.* (2000*a*, 2000*b*) on which this paper draws heavily is the first attempt at responding to these issues in Cameroon.

parametric techniques, and the overall poverty lines are derived using a non-parametric version of the CBN. Regional, occupational and sectoral poverty profiles are then constructed to illustrate the reason d'être of setting the poverty lines.

The rest of the paper is in four parts. Section II presents the framework for poverty analysis. Section III outlines the methodologies for constructing poverty lines. Section IV presents poverty profiles, and section V pools the various strands of the paper into concluding remarks.

II. FRAMEWORK FOR POVERTY ANALYSIS

CHOICE OF WELFARE INDICATORS

Any appropriate poverty analysis must start by identifying the unit of measurement and the measure of standard of living. The unit of measurement could be individual or household. Measuring the welfare of individuals is conceptually quite attractive because it allows for an assessment of intra-household resource distribution. This advantage is weakened by the fact that data collected at individual levels require much more resources, and many goods consumed by a household cannot be easily attributed to individual members of the household. As with most microeconomic surveys, the data used in the paper measures standards of living at household level.

Total income or expenditures may be used as measures of standard of living. Yet, at empirical levels, it can be shown that expenditures are usually measured with greater precision than incomes, especially when a significant share of income originates from informal sources. In the CHCS 96 data used in the paper, only 10 percent of the households surveyed were able to state the sources of their incomes (DSCN, 1996), an outcome that precludes us from using income as a welfare measure in the study.

The fact that households differ in size and composition sometimes persuades analysts to use per capita total expenditures. This procedure, however, does not capture the fact that some members of the household consume less than adults. According to Deaton and Muellbauer (1980), one way of proceeding is to calculate a measure of household size in terms of adult-equivalence, in which case, an adult equivalent scale is used to weight each household member on the basis of age and/or gender. A variant of this approach is used in the present study.

PRESENTATION OF HOUSEHOLD DATA

The analysis of poverty in this text is based on the 1996 Households Consumption Survey carried out by the Department of Statistics and National Accounts (DSCN, *French acronym*). The survey was realized from February to April 1996, and involved a national sample of about 1700 households. The Survey distinguished the following 6 regions or areas for data collection: Yaounde, Douala, Other Towns, Forest, High-Plateaux and Savannah. Two types of questionnaires were formulated: one for the cities and Other Towns, and the other for the rest of the country. These questionnaires were administered to selected households, and comprised 11 sections, several of which dealt with household welfare characteristics.

A number of adjustments were made on the data, especially concerning the unit prices of products consumed in rural areas, and in calculating the quantities of calories, since the survey did not provide the quantities and unit prices of foodstuffs consumed.[3] In particular, calories were valued in CFA francs in the various regions and adjusted for price differences, with Yaounde being the reference region. The welfare indicator used is "expenditures per adult equivalent". Since the composition of households by age was captured by the survey, we followed previous studies in Cameroon to attribute the adult equivalent scales of 1 to all adults (15 years old and above) and 0.5 to children (less than 15 years old).

POVERTY MEASURES

In the literature of income poverty analysis, an appropriate poverty measure must reflect three basic elements: the incidence (or prevalence) of poverty, as measured by the number in the total population living below the poverty line; the intensity (or depth) of poverty, reflecting the extent to which the incomes of the poor lie below the poverty line; and the degree of inequality among the poor[4] (World Bank, 1990). If a poverty index is needed to assess the effects of structural adjustment, then the index must be decomposable across sectors

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[3] A detailed description of the content of those data, their sampling properties and other features can be found in Fambon *et al.* (2000*a*).

[4] This element is reflected in the properties of distributional sensitivity and strong monotonicity. Distributional sensitivity is the idea that transferring income from the poorest to the better-off poor should raise measured "poverty", and strong monotonicity requires that increasing some poor person's income, while holding the other poor person's income constant, should necessarily reduce poverty.

(Kanbur, 1987), or sub-group decomposable (World Bank, 1990). A class of poverty indices that meets the aforementioned requirements in a stepwise fashion is that suggested by Foster, Greer, and Thorbecke (1984). The FGT class of poverty indices takes the form:

$$P_\alpha = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{Z - y_i}{Z}\right)^\alpha \qquad (1)$$

where n is the total sample size, Z is the poverty line, and y_i is the welfare indicator of the i^{th} poor household/person. This class of poverty measures is flexible in two important respects: α is a policy parameter that can be varied to appropriately reflect poverty "aversion",[5] and the P_α class of poverty indices is sub-group decomposable.

In particular, $\alpha = 0$, gives rise to P_0, the head-count index, which is the proportion of total households below the poverty line. The head-count index is entirely indifferent to how poor each poor unit is and hence only registers the incidence of poverty. This measure remains the same even if a previously poor unit becomes even poorer. Indeed, if a monetary unit is transferred from a poor unit and given to a non-poor unit, the head-count ratio would remain unchanged.

$\alpha = 1$, gives rise to P_1, the poverty-gap index. P_1 is usually calculated as a measure of the depth of poverty, which takes into account how poor the poor are and reflects both the incidence and the intensity of poverty. The poverty-gap index has an interpretation that makes it extremely attractive from a policy point of view. It gives an indication of the potential savings that can be made from perfectly targeting transfers to the poor. Its computation usually facilitates the determination of the minimum resources required to eliminate poverty in a country. The P_1 measure, however, is insensitive to income distribution among the poor.

$\alpha = 2$, generates P_2, the squared poverty-gap index. P_2 is usually calculated as a measure of the severity of poverty, and can be thought of as the sum of two components: one due to the poverty-gap, and the other due to inequality among the poor (Ravallion, 1992). While P_2 is difficult to

[5]The larger α is, the greater is the emphasis given to the poorest families. As the value of α becomes very large, P_α approaches a Rawlsian measure giving weight only to the poorest of the poor.

interpret, its value lies in allowing us to make comparisons over time or space or between different policy options.

P_α is sub-group decomposable in the sense that if the population under study consists of m (mutually exclusive and exhaustive) sub-groups or sub-sectors, then $P_\alpha = \Sigma f_j P_{j,\alpha}$ ($j = 1, 2, \ldots, m$) where $P_{j,\alpha}$ is the class of poverty indices of group j and f_j is the population weight of the group and $\Sigma f_j = 1$. The contribution c_j of each region or socio-economic group to national poverty can be derived from: $c_j = (f_j P_{j,\alpha}) / P_\alpha$. If f_j and c_j are compared, one can easily identify the groups that are disproportionately suffering from poverty (as measured in terms of P_α), and those that are less so.

III. METHODOLOGY FOR CONSTRUCTING POVERTY LINES

SIGNIFICANCE OF A POVERTY LINE

A poverty line can be defined as the monetary cost of a reference level of welfare to a group of persons, at a given place and time, that separates the poor from the non-poor and relevant in inter-group comparisons. Moreover, poverty lines are important because they help to focus attention of governments, the donor community and civil society on the living conditions of the poor. A review of the literature indicates that a lot of attention has been paid to developing poverty measures that are capable of capturing changes in welfare distribution below the poverty line,[6] and treating the poverty line itself as a given. Only recently has attention been given to the importance of methods used in deriving poverty lines. As observed by Ravallion (1998), they can matter just as much as the poverty measures themselves, for the choices made in setting poverty lines can greatly influence the policy indications emanating from a study.

It is sometimes necessary to distinguish between "absolute poverty lines" and "relative poverty lines".[7] The former has fixed "real values" overtime and space, while the latter rise with average expenditure. Ravallion (1998) argues that for purposes of informing anti-poverty policies, "a poverty line should always be absolute in the space of welfare". Such a poverty line

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[6] See for example, Sen (1976), Atkinson (1987), and Foster, Greer and Thorbecke (1984).

[7] For a discussion of the absolute poverty concept, see Ravallion (1994) and for the relative poverty concept, see Ali (1997).

guarantees that the poverty comparisons made are consistent in the sense that two persons with the same level of welfare are treated the same way.

According to Ravallion and Sen (1996), the main ingredients of a poverty measure that entail normative judgments are (1) the caloric requirements, (2) the food bundle necessary to achieve those requirements, and (3) the allowance for non-food goods.

TRADITIONAL TECHNIQUES FOR CONSTRUCTING POVERTY LINES

The two traditional approaches for setting absolute poverty lines are the cost-of-basic-needs (CBN) and the food energy-intake (FEI) methods. Both methods anchor the definition of basic needs to food energy requirements.

The Food-Energy-Intake Method

The FEI method proceeds by finding the consumption expenditure or income level at which a person's typical food energy intake is just sufficient to meet a predetermined food energy requirement.[8] This method has been widely used in the literature (see for instance, Greer and Thorbecke, 1986; Ahmed, 1991; Ercelawn, 1991 and Fambon *et al.* 2000b).[9]

An advantage of the FEI method is that it automatically includes an allowance for both food and non-food consumption — thus avoiding the tricky issue of determining exactly the basic needs of these goods — as long as one locates the total consumption expenditure at which a person typically attains the calorie requirement. Other advantages of the FEI method include: (1) its non-reliance on the need for price data, which can be very problematic in countries like Cameroon, and (2) it allows for differences in preferences between sub-groups.

The main weakness of the FEI method is that it suffers from the inconsistency problem (Ravallion and Bidani, 1994). Consistency requires that the poverty lines used should imply the same command over basic needs within the domain of the poverty profile. In particular, Ravallion and Bidani (1994) argue that where food is relatively cheap, people will consume more,

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[8]It should be noted that the FEI method aims to measure consumption poverty rather than under-nutrition.

[9]For the conceptual difficulties involved in setting poverty lines by the CBN and the FEI methods, see Ravallion and Bidani (1994).

and poverty lines will be higher where prices of food are higher. They show that higher food prices in urban areas, together with the lower calorie requirements of most urban jobs, imply that urban caloric intake is lower than that of rural areas. At the same level of total expenditure, food energy intake will be lower in urban than in rural areas, but this does not necessarily mean that urban households are poorer at a given expenditure level.

The Cost-of-Basic-Needs (CBN) Method

This approach considers poverty as a lack of command over basic consumption needs, and the poverty line as the cost of those needs. The basic food basket is usually set using the nutritional requirements. The bundle is then costed at local prices to get the food component of the overall poverty line. Setting the non-food component of the poverty line is probably the most contentious since there is less agreement on an anchor analogous to the role played by food-energy requirements in setting the food component of the poverty line. Since there is less agreement in an anchor for estimating the non-food component of the poverty line, there tends to be much arbitrariness in determining the level of poverty. This implies the possibility of a multitude of poverty lines, as there are variations in assumptions used to determine the level of the non-food component, even from the same data set - outcomes that may not be very helpful to policy makers.

A traditional way of getting round this problem is to divide the food component of the poverty line by some estimate of the budget share devoted to food to obtain the overall poverty line. For instance, if a food share of one third is assumed, then the overall poverty line will be three times the food poverty line. The non-food component is then deduced by taking the difference between the overall and the food poverty lines. The problem here is that the determination of the budget share devoted to food is likely not to be a transparent process (Ravallion, 1998).

A BLEND OF THE TRADITIONAL METHODS

The method used in the paper to construct overall poverty lines is a blend of the traditional FEI and the CBN methods with *a priori* requirements that are less stringent. The food poverty line follows the FEI method and the non-food component follows the logic of the CBN method.

The procedure followed in deriving the poverty lines used to separate the poor from the non-poor consists of two-stages: (1) calculating a food poverty line by the FEI method, and (2) evaluating the corresponding non-food expenditures required to scale up the food poverty line to determine the

overall poverty lines. In determining the non-food expenditures that scale up the food poverty line to overall poverty lines, use is made of a non-parametric version of the CBN method that follows the logic of Ravallion and Bidani (1994), and Ravallion (1998).

The First Stage: Food Poverty Lines

Food poverty can be defined as a condition of insufficient resources to acquire adequate basic nutritional requirements. A household will be considered food poor if it is unable to provide its members with the recommended calorie intake. In this regard, the food poverty line corresponds to the minimum food expenditure needed to satisfy the daily basic calorie intake. The procedure consists of estimating the cost of a basket of food items required to meet some minimum level of calorie intake, estimated for Cameroon by FAO at 2400 kcal per adult per day. Two alternative methods are used in constructing the food poverty lines: a parametric regression technique that follows the logic of Greer and Thorbecke (1986) and a non-parametric version that follows the same logic.

Parametric Approach to Food Poverty Lines

In the traditional FEI method, the empirical relation between food consumption expenditure and food energy intake is presented in the semi-log format to reflect Engel's law. The cost of caloric function is given by equation (2):

$$\ln FE_j = \alpha + \beta C_j + \omega_j, \tag{2}$$

where FEj is food expenditure and C_j calorie-intake of household j. The two variables are expressed per adult equivalent, while α and β are parameters to be estimated, and ω a random error term. From the estimated regression equation, the food poverty line, Z_F, is derived as in equation (3).

$$Z_F = e^{[\hat{\alpha} + 2400\hat{\beta}]}, \tag{3}$$

where $\hat{\alpha}$ and $\hat{\beta}$ are the estimated coefficients.

Table 1 presents the estimated coefficients and the corresponding regional and national food poverty lines. The differences in the food poverty lines are thought to be reflecting differences in taste, preferences and price variability of food items in the different areas under study.

TABLE 1

Food Poverty Lines

Region	The Cost of Calorie Function $(LnFE_i=\alpha+\beta C_i+\omega_i)$			Food Poverty Lines (in CFAF per adult equivalent)		
				Parametric Approach		Non-Parametric Approach
	$\hat{\alpha}$	$\hat{\beta}$	R^2	Per year	Per day	Per day
Yaounde (N = 344)	5.125 (29.3883)	$2.90 * 10^{-4}$ (4.8043)	0.46	123139.403	337.36	336.64
Douala (N = 369)	5.186 (35.2863)	$3.17 * 10^{-4}$ (6.2384)	0.50	139 600.849	382.46	470.50
Other towns (N = 340)	5.209 (35.4574)	$2.72 * 10^{-4}$ (5.3229)	0.38	134 978.226	369.80	346.57
Rural forest (N = 210)	4.293 (31.1793)	$4.97 * 10^{-4}$ (7.6288)	0.65	87 970.371	241.01	258.81
Rural H-Plateaux (N = 200)	4.382 (47.5876)	$2.94 * 10^{-4}$ (11.1143)	0.72	59 049.555	161.77	170.50
Rural savannah (N = 203)	4.686 (35.1032)	$2.45 * 10^{-4}$ (5.6322	0.39	105 359.864	288.65	203.82
Cameroon (N = 1666)	4.866 (73.6607)	$2.78 * 10^{-4}$ (12.4692)	0.38	92 329.335	253.95	255.94

Source: Computed from CHCS 96 Survey Data.

Notes:

- The figures in parenthesis represent t-ratios
- R^2 measures the goodness of fit of the regression
- N = the number of households surveyed

The estimated equation is specified in semi-log format to impose the respect of Engel's law. This parametric specification supposes that the analyst knows the functional relationship used *a priori*. This is unlikely to be true everywhere, especially for those far from the predetermined level of calorie intake (that is, those at the lower and upper tails of the distribution of spending and calorie intake). In such cases, the parameter estimates, and hence the food poverty lines, are likely to be significantly influenced by the presence of "outliers". This procedure may therefore yield biased parameter estimates of the "true" food poverty lines. As an alternative, one can estimate

the relation between food expenditures and caloric intake using non-parametric regression – a method that does not impose a functional form on the Engel curve. This is done using DAD 4.1, software for Distributive Analysis, developed by researchers in CIRPÉE (formerly CREFA), Université Laval.[10]

Non-Parametric Approach to Food Poverty Lines

A non-parametric regression does not impose an *a priori* functional form between food expenditures and calorie intake. On the contrary, it allows for some flexibility in the estimation of the relationship between the two variables following a weighting process based on the food expenditures of those individuals having calorie intakes in the neighbourhood of the predetermined minimum calorie intake that ensures normal activity levels (2400 kcal per day per adult in Cameroon). This procedure applies a weighting process that attributes smaller weights as the absolute gaps between individual calorie intakes and the predetermined minimum increase. The results obtained by this method are less affected by the presence of "outliers" in the data and thus do not suffer from specification bias that originates from a "wrong" functional form.[11]

The non-parametric regressions were performed using DAD for the whole of Cameroon (Figure 1) and separately for each of the six regions (figures not shown here). The poverty lines generated are 336.64; 470.50; 346.57; 258.81; 170.50; 203.82; and 255.94 CFA francs worth of food expenditures per adult equivalent per day, respectively for Yaounde, Douala, Other Towns, Rural Forest, Rural High Plateaux, Rural Savannah and Cameroon (Table 1).

As shown in the last two columns of Table 1, in many regions, the parametric and non-parametric techniques give very similar food poverty lines. However, for Rural Savannah, the parametric method gives a line that is 1.4 times higher, and for Douala, it gives a line that is 0.8 times as much. These differences require an explanation. An examination of the scatter-gram of these two regions show that Rural Savannah had some typical "outliers" at the upper tail of the distribution, while the reverse is observed for Douala.

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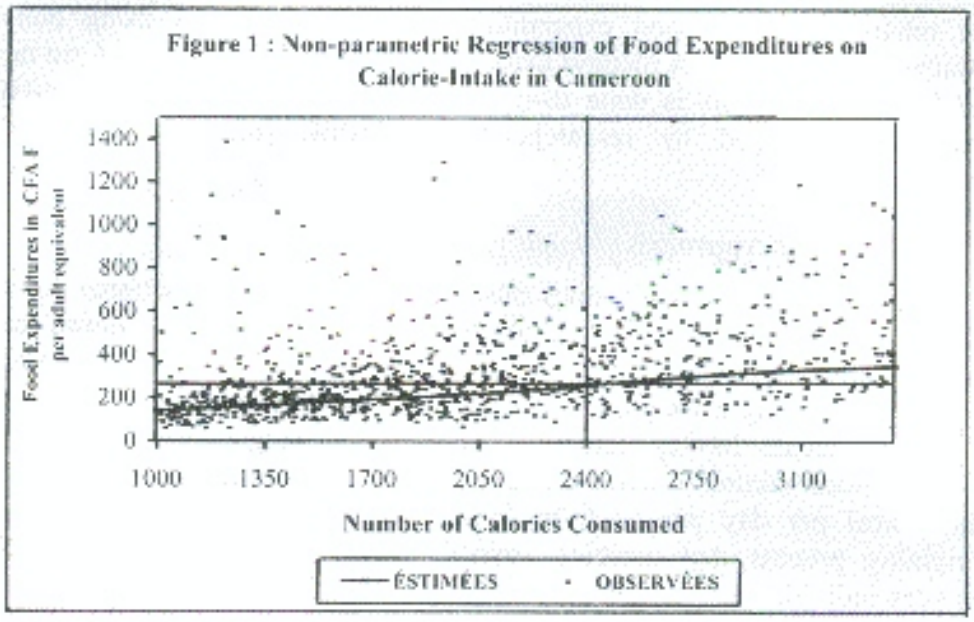
[10] Duclos, J. Y., Araar, A. and Fortin, C. (2001), "DAD 4.1: A Software for Distributive Analysis/Analyse Distributive", MIMAP program, International Development Research Centre, Government of Canada, and CRÉFA, Université Laval.

[11] For a more general discussion of non-parametric regression procedures, see Härdle (1990)



Food poverty lines generated by non-parametric regressions are used in the analysis that follows.

The Second Stage: Non-Food and Overall Poverty Lines

This stage consists of two activities. The first activity involves estimating the per capita non-food expenditures of those households whose *total* expenditure approximate the food poverty line estimated in the first stage. In this context, the reasoning runs as follows: considering all expenditures, those who choose to use part of this amount on non-food items (instead of using all the money on food items in order to satisfy their basic food needs) definitely consider expenditures on non-food items as important as on food items. When these expenditures are added to the food poverty line, we obtain the lower bound of the overall poverty line.

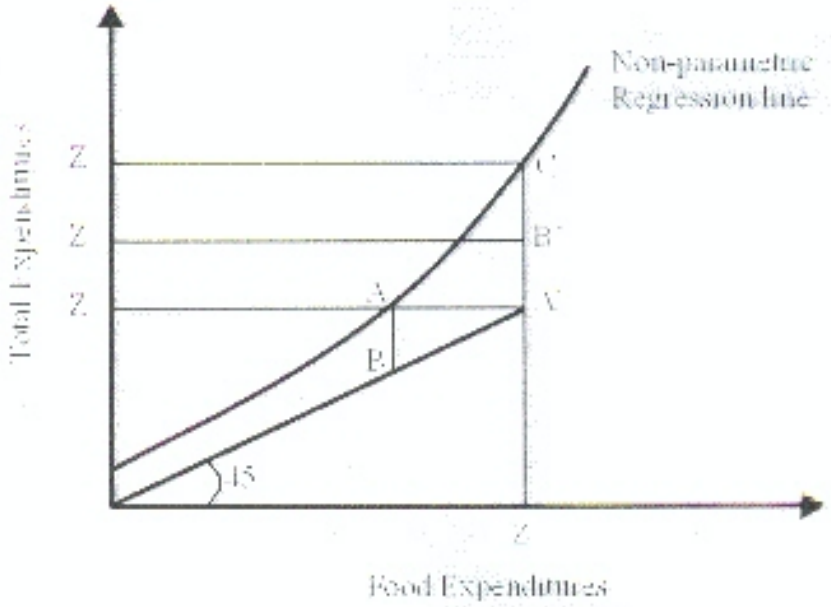
The second activity consists of estimating the per capita non-food expenditures of those households whose *food* expenditures approximate the food poverty line. When this is added to the food poverty line, we obtain the upper bound of the overall poverty line.[12]

[12]These arguments are analogous to those advanced by Ravallion and Bidani (1994), and Ravallion (1998), to allow them derive poverty lines using quadratic food-share Engel curves.

To avoid the use of predetermined functional forms as before, we use "non-parametric" regressions of total expenditures on food expenditures to determine overall poverty lines (that is, poverty lines that include the food and non-food components). To obtain the lower bound of the overall poverty line (see Figure 2), a point equivalent to the food poverty line (Z_F) is located on the Y-axis and projected to intersect the non-parametric regression line at point A. The length of the gap AB between this point and the 45° line constitutes the non-food component that is used to scale up the food poverty line to the lower bound of the overall poverty line, denoted by Z_L. In Figure 2, the length AB is transposed to $A'B'$, and the lower bound of the overall poverty line is given by the height of B'.

FIGURE 2

Overall and Non-Food Poverty Lines



To obtain the upper bound of the overall poverty line, the system projects an amount equal to the food poverty line from the X-axis to intersect the estimated regression line, point C in Figure 2. The corresponding point on the Y-axis defines the upper bound of the overall poverty line, denoted by Z_U. The non-food component can then be deduced by subtraction. Table 2 shows the results of the estimated food, overall and non-food poverty lines for the whole of Cameroon and for each of the six regions separately.

TABLE 2

Food, Overall and Non-Food Poverty Lines

Region	Proportion of population (in %)	Food Poverty lines Z_F	Overall Poverty lines		Non-Food Poverty lines	
			Z_L	Z_U	*ZNF-*	*ZNF+*
Yaounde	7.1	336.64	479.71	748.77	143.07	412.13
Douala	9.6	470.50	651.57	995.44	181.07	587.94
Other towns	12.7	346.57	498.51	731.79	151.94	385.22
Rural forest	18.5	258.81	393.26	472.70	134.45	213.89
Rural High-plateaux	27.8	170.50	235.23	356.78	64.73	186.28
Rural savannah	24.2	203.82	282.10	393.88	78.28	190.06
Cameroon	100	255.94	373.26	533.87	117.32	277.93

Source: Computed from CHCS 96 Survey Data.

Notes:

Z_F = Food Poverty line

Z_L = Lower bound of the overall poverty line

Z_U = upper bound of the overall poverty line

ZNF- = $Z_L - Z_F$ = Non-food component of the lower bound of the overall poverty line

ZNF+ = $Z_U - Z_F$ = Non-food component of the upper bound of the overall poverty line

IV. POVERTY PROFILES FOR CAMEROON IN 1996

Use is made only of the national poverty lines in the analyses that follow. This choice is important because its helps us to circumvent the problem of differences in taste, preferences and other region-specific characteristics that may render comparisons inconsistent. Overall poverty lines are equal to the sum of the food and non-food poverty lines. We use national poverty lines with a lower bound, Z_L = 373.26 CFAF and an upper bound, Z_U = 533.87 CFAF per adult equivalent per day, to construct poverty profiles for Cameroon. The rest of this section presents zonal, regional, occupational and sectoral poverty profiles.

ZONAL POVERTY PROFILES

It is useful to examine how poverty rates vary across different areas because this helps in targeting antipoverty programmes to meet the needs of the poor

more effectively. This type of information is vital for effective poverty alleviation programmes.

Zonal poverty comparisons for urban, semi-urban and rural areas are presented in Tables 3.1 and 3.2. Both tables show the P_α poverty indices for Cameroon as a whole, and for the urban, semi-urban and rural areas, as well as their relative contributions to national poverty using the lower and upper poverty lines, respectively.

Looking first at the incidence of poverty in different areas, the Zonal poverty profiles using the lower bound of the overall poverty line shows that rural poverty is higher than urban poverty (Table 3.1). The incidence of rural poverty is 56.6 percent – 1.5 times higher than the 36.9 percent found in semi-urban, and considerably higher than the 17 percent in urban areas. Comparison using the poverty-gap and squared poverty-gap indices also show that poverty is deeper and more severe in rural than in urban areas. The rural population contributes up to 84.21% to national poverty, while the shares of both semi-urban and urban populations amount only to 4.36% and 11.41%, respectively (Table 3.1). Similar trends are observed when using the upper poverty line (Table 3.2).

TABLE 3.1

Decomposition of Poverty by Zone in 1996 Using Z_L

Region	Proportion of population (in %)	P_0	P_1	P_2	C_0 (in %)	C_1 (in %)	C_2 (in %)
Urban	29.44 (1.49)	0.1703 (0.0193)	0.0466 (0.0065)	0.0183 (0.0031)	11.41 (1.49)	10.07 (1.57)	9.40 (1.78)
Semi-Urban	5.17 (0.57)	0.3699 (0.054)	0.0900 (0.0182)	0.0346 (0.0090)	4.36 (0.84)	3.41 (0.82)	3.13 (0.91)
Rural	65.37 (1.63)	0.5660 (0.0278)	0.1805 (0.0117)	0.0767 (0.0067)	84.21 (1.76)	86.51 (1.81)	87.46 (2.05)
Cameroon	100.00	0.4393 (0.0206)	0.1364 (0.0089)	0.0573 (0.0046)	100.00	100.00	100.00

Source: Calculated from CHCS 96 Survey Data.

Note: Figures in parentheses represent standard errors.

TABLE 3.2

Decomposition of Poverty by Zone in 1996 Using Z_U

Region	Proportion of population (in %)	P_0	P_1	P_2	C_0 (in %)	C_1 (in %)	C_2 (in %)
Urban	29.44 (1.49)	0.3675 (0.0242)	0.1162 (0.0099)	0.0509 (0.006)	15.92 (1.43)	12.72 (1.38)	11.18 (0.015)
Semi-Urban	5.17 (0.57)	0.6032 (0.0523)	0.2096 (0.0246)	0.00946 (0.002)	4.59 (0.69)	4.03 (0.69)	3.65 (0.007)
Rural	65.37 (1.63)	0.8265 (0.0187)	0.3426 (0.0128)	0.1748 (0.009)	79.48 (1.62)	83.23 (1.59)	85.16 (0.017)
Cameroon	100	0.6797 (0.0164)	0.2690 (0.0098)	0.1342 (0.007)	100	100	100

Source: Calculated from CHCS 96 Survey Data.

Note: Figures in parentheses represent standard errors.

As indicated by both poverty lines, the contribution of rural poverty to national poverty increases with the parameter α, while the contributions of the semi-urban and urban areas decrease (Tables 3.1 and 3.2). This is an indication that the poorest of the poor are overwhelmingly present in the rural areas. In 1996, poverty in Cameroon was essentially a rural phenomenon.

POVERTY PROFILES BY REGION OF RESIDENCE OF HEAD

Tables 4.1 and 4.2 show the P_α poverty values for Cameroon as a whole, and for the different regions, according to the overall lower and upper poverty lines, respectively. It is seen that the incidence of poverty is strikingly higher in the rural strata – over 58, 57 and 49 percent of the population of High Plateaux. Forest and Savannah, respectively were poor in 1996. At the other extreme, the incidence of poverty in Douala and in "Other Towns" is minimal.

TABLE 4.1

Decomposition of Poverty by Region in 1996 Using Z_L

Region	Proportion of population (in %)	P_0	P_1	P_2	C_0 (in %)	C_1 (in %)	C_2 (in %)
Yaounde	7.1	0.1924 (0.040)	0.0410 (0.008)	0.0120 (0.003)	3.10 (0.007)	2.13 (0.005)	1.50 (0.004)
Douala	9.6	0.1656 (0.034)	0.0612 (0.014)	0.0269 (0.006)	3.63 (0.008)	4.33 (0.011)	4.54 (0.012)
Other Towns	12.7	0.1616 (0.028)	0.0387 (0.009)	0.0152 (0.005)	4.67 (0.008)	3.60 (0.009)	3.37 (0.011)
Rural (Forest)	18.5	0.5779 (0.039)	0.1845 (0.017)	0.0755 (0.009)	24.31 (0.025)	25.00 (0.030)	24.32 (0.035)
Rural (High Plateaux)	27.8	0.5879 (0.044)	0.1719 (0.018)	0.0700 (0.010)	37.20 (0.036)	35.03 (0.039)	33.94 (0.047)
Rural (Savannah)	24.2	0.4900 (0.045)	0.1681 (0.020)	0.076 (0.011)	27.06 (0.030)	29.89 (0.036)	32.32 (0.045)
Cameroon	100.00	0.4393 (0.020)	0.1364 (0.001)	0.0573 (0.004)	100.00	100.00	100.00

Source: Computed from CHCS 96 Survey Data.

Note: Figures in parentheses represent standard errors.

TABLE 4.2

Decomposition of Poverty by Region in 1996 Using Z_U

Region	Proportion of population (in %)	P_0	P_1	P_2	C_0 (in %)	C_1 (in %)	C_2 (in %)
Yaounde	7.1	0.4161 (0.043)	0.1282 (0.017)	0.0504 (0.007)	4.34 (0.006)	3.37 (0.006)	2.66 (0.005)
Douala	9.6	0.3343 (0.042)	0.1191 (0.019)	0.0591 (0.018)	4.74 (0.008)	4.27 (0.008)	4.25 (0.009)
Other Towns	12.7	0.3655 (0.038)	0.1075 (0.015)	0.0450 (0.008)	6.83 (0.009)	5.07 (0.008)	4.26 (0.008)
Rural (Forest)	18.5	0.8382 (0.024)	0.3488 (0.018)	0.1764 (0.013)	22.79 (0.019)	23.96 (0.023)	24.31 (0.026)
Rural (High Plateaux)	27.8	0.8116 (0.030)	0.3378 (0.019)	0.1687 (0.014)	33.19 (0.027)	34.90 (0.031)	34.96 (0.036)
Rural (Savannah)	24.2	0.7869 (0.034)	0.3149 (0.023)	0.1633 (0.016)	28.09 (0.024)	28.40 (0.027)	29.54 (0.033)
Cameroon	100	0.6797 (0.016)	0.2690 (0.009)	0.1341 (0.007)	100	100	100

Source: Computed from CHCS 96 Survey Data.

Note: Figures in parentheses represent standard errors.

It can be observed that the ranking of poverty by the three measures P_0, P_1 and P_2 remains unchanged. The concentration of poverty in the Forest, High Plateaux and Savannah is confirmed by their contributions to national poverty, which increase as α increases, for example, from 27 percent for P_0, through 29.8 percent for P_1, to 32.3 percent for P_2 for the Savannah regions (Table 4.1). The contributions of all the other regions decrease, with Yaounde's contribution decreasing most rapidly as α increases.

Table 4.2 tells a similar story, notably the identification of the rural regions (Forest, High Plateaux and Savannah) as an area for a concerted policy stance in the context of poverty alleviation.

POVERTY PROFILE BY OCCUPATION OF HEAD

Although the regional dimension of poverty is an essential element of general policy, one must nevertheless recognize that numerous aspects of economic policy, particularly in the context of stabilization, call for different decompositions revolving around the link between the poor and the structure of employment in the economy. To identify households whose sources of income are linked to occupation is not necessarily the same thing as identifying the regions from where they come. It is for this reason that we define socio-economic groups in relation to the economic activity of the household head. We have distinguished 5 socio-economic groups in order to go a little more deeply into the analysis of poverty. We identify households whose head has a main occupation, households whose head is an independent worker, and other households whose heads are unskilled workers, merchants, managers or skilled workers, as shown in Tables 5.1 and 5.2.

It emerges from Table 5.1 that 57.27% of household heads interviewed are independent workers working alone. When household heads are classified according to occupation, the above category of households accommodates the highest proportion of poor people. This household category contributes a share of more than 73.7% to national poverty with an incidence of poverty reaching 56.8%. The four categories identified (independent with employees, unskilled worker, merchant, manager or skilled worker) that represent about 32.12% of the household heads in the sample contribute only 16.67% to national poverty. The same tendency is observed when the upper poverty line is used (see Table 5.2).

Given that the ability of the majority of households in Cameroon to escape poverty will depend on their earnings from employment, and given that the most important income-earner in a household is usually the head,

policies that aim at reducing poverty through enhancing income-generating capabilities should be targeted towards independent workers. A strong policy message for targeting purposes emanating from the result is that more than half of the poor are found among households in which the heads are independent without employees. This implies that policies to reduce poverty in Cameroon must reach independent workers if any major reduction in poverty is to be achieved – any policy that misses out the self-employed workers will by-pass around 73 % of national poverty.

Table 5.1

Decomposition by Main Occupation of the Head Using Z_L

Occupation of the Household Head	Proportion of population (in %)	P_0	P	P_2	C_0 (in %)	C_1 (in %)	C_2 (in %)
Independent with Employees	5.70 (0.008)	0.3612 (0.078)	0.0939 (0.025)	0.0391 (0.014)	4.69 (0.013)	3.93 (0.012)	3.90 (0.015)
Independent without Employees	57.27 (0.019)	0.5658 (0.098)	0.1810 (0.0121)	0.0778 (0.007)	73.76 (0.027)	75.98 (0.028)	77.80 (0.031)
Unskilled Worker	5.85 (0.007)	0.2497 (0.062)	0.0729 (0.022)	0.0270 (0.0010)	3.33 (0.009)	3.13 (0.011)	2.76 (0.011)
Manager or skilled worker	14.07 (0.012)	0.1642 (0.043)	0.0463 (0.014)	0.0188 (0.006)	2.42 (0.006)	2.20 (0.007)	2.13 (0.007)
Merchants	6.50 (0.009)	0.1945 (0.044)	0.0436 (0.011)	0.0128 (0.003)	6.23 (0.016)	4.50 (0.013)	3.15 (0.013)
Other Occupation	2.86 (0.05)	0.3383 (0.092)	0.1172 (0.034)	0.0522 (0.017)	2.20 (0.007)	2.45 (0.008)	2.60 (0.010)
Undefined	7.71 (0.007)	0.4180 (0.052)	0.1375 (0.025)	0.0567 (0.011)	7.34 (0.013)	7.77 (0.016)	7.63 (0.019)
Cameroon	100.00	0.4393 (0.020)	0.1364 (0.008)	0.0573 (0.004)	100	100	100

Source: Computed from CHCS 96 Survey data by the authors.

Note: Figures in parentheses represent standard errors.

Table 5.2

Decomposition According to Occupation of the Head Using Z_U

Occupation of the Household Head	Proportion of population (in %)	P_0	P_1	P_2	C_0 (in %)	C_1 (in %)	C_2 (in %)
Independent with Employees	5.70 (0.008)	0.6124 (0.070)	0.1999 (0.035)	0.0956 (0.022)	5.14 (0.010)	4.24 (0.010)	4.06 (0.011)
Independent without Employees	57.27 (0.019)	0.8215 (0.018)	0.1708 (0.031)	0.0774 (0.018)	69.22 (0.022)	73.30 (0.023)	75.11 (0.025)
Unskilled Worker	5.85 (0.007)	0.4668 (0.065)	0.1708 (0.031)	0.074 (0.018)	4.02 (0.008)	3.71 (0.009)	3.38 (0.009)
Manager or skilled worker	14.07 (0.012)	0.5391 (0.071)	0.1329 (0.022)	0.0533 (0.012)	5.15 (0.011)	3.21 (0.007)	2.58 (0.006)
Merchants	6.50 (0.009)	0.3499 (0.046)	0.1139 (0.019)	0.0471 (0.009)	2.36 (0.006)	2.28 (0.007)	2.40 (0.007)
Other Occupation	2.86 (0.05)	0.5625 (0.085)	0.2148 (0.046)	0.1126 (0.028)	2.36 (0.006)	2.28 (0.007)	2.40 (0.007)
Undefined	7.71 (0.007)	0.6025 (0.047)	0.2536 (0.027)	0.1304 (0.018)	6.84 (0.009)	7.27 (0.012)	7.50 (0.010)
Cameroon	100.00	0.6797 (0.016)	0.2690 (0.009)	0.1341 (0.006)	100	100	100

Source: Computed from CHCS 96 Survey data by the authors.

Note: Figures in parentheses represent standard errors

POVERTY PROFILE BY SECTOR OF ACTIVITY OF HEAD

Tables 6.1 and 6.2 give the decomposition of poverty by sector of activity of household head. Following this dimension, poverty in Cameroon affects informal sector household heads disproportionately.

Indications are that the modern sector of the economy accounts for less of the poor people – that is, only 19.18%, on a national average of 43.93% (see Table 6.1). On the other hand, the informal sector accounts for 51.32 % of the poor in Cameroon. The same trends are observed when the depth and severity of poverty are analyzed. Nearly 7% of individuals in the informal sector are severely stricken by poverty against only 1.3% in the formal sector. The contribution of the informal sector to national poverty is 79% on the average.

Following the profile outlined with the upper poverty line and whatever the sector of activity considered, about 39.2% of the household heads in the formal sector are considered as poor against 77% in the informal sector.

Table 6.1

Decomposition of Poverty by Sector of Activity of Head Using Z_L

Sector	Proportion of population (in %)	P_0	P_1	P_2	C_0 (in %)	C_1 (in %)	C_2 (in %)
Formal	20.80 (0.014)	0.1918 (0.035)	0.0449 (0.0095)	0.0135 (0.0033)	8.85 (0.018)	6.67 (0.015)	4.78 (0.0131)
Informal	67.23 (0.017)	0.5132 (0.026)	0.1614 (0.0111)	0.0693 (0.0063)	78.55 (0.0255)	79.54 (0.026)	81.27 (0.029)
Other	12.48 (0.010)	0.4431 (0.044)	0.1505 (0.0552)	0.064 (0.0099)	12.59 (0.018)	13.77 (0.022)	0.1394 (0.026)
Cameroon	100	0.4393 (0.020)	0.1364 (0.008)	0.0573 (0.0046)	100	100	100

Source: Computed by the authors from CHCS 96 Survey data.

Note: Figures in parentheses represent standard errors.

Table 6.2

Decomposition of Poverty by Sector of Activity of Head Using Z_U

Sector	Proportion of population (in %)	P_0	P_1	P_2	C_0 (in %)	C_1 (in %)	C_2 (in %)
Formal	20.80 (0.014)	0.3920 (0.039)	0.1229 (0.016)	0.0499 (0.008)	11.69 (0.016)	9.26 (0.015)	74.41 (0.014)
Informal	67.23 (0.017)	0.7744 (0.018)	0.3132 (0.012)	0.1582 (0.008)	76.60 (0.0203)	78.26 (0.022)	79.31 (0.0241)
Other	12.48 (0.010)	0.6374 (0.0391)	0.2687 (0.023)	0.1412 (0.015)	11.70 (0.013)	12.46 (0.016)	11.13 (0.019)
Cameroon	100	0.6797 (0.0164)	0.2690 (0.0098)	0.1341 (0.0067)	100	100	100

Source: Computed by the authors from CHCS 96 Survey data.

Note: Figures in parentheses represent standard errors.

Our results are in line with the empirical regularity that the poor are disproportionately located in the rural areas and primarily engaged in small-scale agriculture and associated informal activities. Accordingly, the majority of the very poor eke out a living from subsistence agriculture, either as small farmers or low-paid farm workers. The remaining poor are located partly in rural areas and partly on the fringes of urban centres where they engage in various forms of self-employment such as street-hawking, trading and petty services.

V. CONCLUSION

Poverty alleviation became a major policy concern in Cameroon since the achievement of macroeconomic stability subsequent to the 1994 devaluation of the CFA franc. To put forward a credible anti-poverty programme, the starting point includes the construction of poverty lines and profiles that show how the extent of poverty varies across sub-groups of a population. Until recently, however, the problem of how one sets a poverty line has been largely ignored in the literature.

The central theme of this paper was to examine alternative methods for constructing poverty lines using the 1996 Household Consumption Survey conducted by Cameroon's Department of Statistics and National Accounts. In particular, it presented a methodology that blends the traditional food energy-intake and the cost-of-basic-needs methods, which was used to derive overall poverty lines. The food poverty lines were computed using both parametric and non-parametric regression techniques, and the non-food expenditures implicit in the overall poverty lines were derived using a non-parametric regression technique. Non-parametric techniques do not impose any functional form to the Engel curve, but use a weighting procedure that assigns weights that rapidly decline as deviations of caloric-intakes from a predetermined ideal widen in the data set. The results obtained by this method were, therefore, less affected by the presence of "outliers" in the data and thus do not suffer from specification bias that originates from a "wrong" functional form.

Poverty profiles in 1996 showed that the spread, depth and severity of poverty in Cameroon were higher in rural than other areas. This study is definitely insufficient to furnish a package of policies to reduce poverty, yet some principles may be stated regarding the formulation of specific measures. Policies to assist the poor in Cameroon must focus more on the rural areas since the poor are disproportionately present there. By so doing,

anti-poverty measures must focus more on the self-employed, especially farmers and informal sector workers than on any other category of employment.

REFERENCES

Ahmed, T. U. (1991), Poverty in Bangladesh. In *Proceedings of Workshop of Dissemination of Current Statistics*. Dhaka: Bangladesh Bureau of Statistics.

Atkinson, A. B. (1987), On the measurement of poverty. *Econometrica*, Volume 55, No. 4, pp. 749-764.

Ali, A. A. G. (1997), Dealing with poverty and income distribution issues in developing countries: Cross regional experiences. Paper presented at the *AERC Bi-Annual Research Workshop*, Nairobi, December 1996. Revised: January 1997.

Baye, M. F. (1998), Inequality and the degree of poverty among the public sector workers in Cameroon. *Nigerian Journal of Economic and Social Studies*, Volume 40, No. 3, pp. 433-452.

Baye, M. F. and Fambon, S. (2001), The impact of macro and sectoral policies on the extent of poverty in Cameroon. In *Globalization and Poverty: The Role of Rural Institutions in Cameroon*. Background Paper submitted to FASID, Tokyo, Japan.

Baye, M. F., Fambon, S. and Sikod, F. (2002), Globalization: Institutional changes and poverty in rural Cameroon. *FASID Final Report*, Tokyo, Japan.

Deaton, A. and Muellbauer, J. (1980), *Economics of Consumer Behavior*. Cambridge, UK: Cambridge University Press.

Duclos, J. Y., Araar, A. and Fortin, C. (2001), DAD 4.1 – A Software for Distributive Analysis/Analyse Distributive. MIMAP program, International Development Research Centre, Government of Canada and CRÉFA, Université Laval.

DSCN (1996), *Data Base of CHCS 96*. Government of the Republic of Cameroon.

Ercelawn, A. (1991), Absolute poverty as risk of hunger: Norms, incidence and intensity for rural and urban Pakistan. University of Karachi, Applied Economics Research Centre.

Fambon, S., Amin A. Ajab, Baye, F. Menjo, Noumba, I., Tamba, I. and Tawah, R. (2000*a*), Réformes économiques et pauvreté au Cameroun durant les années 1990. Rapport final project collaboratif sur la pauvreté AERC, Nairobi, Kenya, May.

Fambon, S., Amin A. Ajab, Baye, F. Menjo, Noumba, I., Tamba, I. and Tawah, R. (2000*b*), Pauvreté et Répartition des Revenus au Cameroun durant les Années 1990. Cahier de Recherche, N° 01-06 de l' Université Laval, format PDF, available on http://www.crefa.ecn.ulaval.ca/cahier/liste01.html.

Foster, J., Greer, J. and Thorbecke, E. (1984), A class of decomposable poverty measures. *Econometrica*, Volume 52, No. 3, pp. 761-776.

Greer, J. and Thorbecke, E. (1986), A methodology for measuring food poverty applied to Kenya. *Journal of Development Economics*, Volume 24, pp. 59-74.

Härdle, W. (1990), *Applied Non-Parametric Regression*. Cambridge University Press, Cambridge.

Kanbur, R. S. M. (1987), Poverty and the Social Dimensions of Structural Adjustment in Côte d'Ivoire. SDA, Policy Analysis, World Bank, Washington D.C.

Lynch, S. G. (1991), Income Distribution, Poverty and Consumer Preferences in Cameroon. Cornell Food and Nutrition Policy Program, Washington D.C.

Njinkeu, D., Kobou, G. and Noumba, I. (1997), Structural Adjustment and poverty in Cameroon: A labor Market Analysis. ICEG Final Report, Nairobi, Kenya.

Ravallion, M. (1992), Poverty comparisons: A guide to concepts and methods. *LSMS Working Paper* No. 88, The World Bank.

Ravallion, M. (1994), Measuring social welfare with and without poverty lines. *American Economic Review*, Volume 84, No. 2, pp. 359-364.

Ravallion, M. (1998), Poverty lines in theory and practice. *LSMS Working Paper* No. 133. The World Bank, Washington DC.

Ravallion, M. and B. Sen (1996), When method matters: Toward a resolution of the debate about Bangladesh's poverty measures. *Economic Development and Cultural Change*, Volume 44, pp. 761-792.

Ravallion, M., and B. Bidani (1994), How robust is a poverty Profile? *The World Bank Economic Review*, Volume 8, No. 1.

Sen, A. K. (1976), Poverty: An ordinal approach to measurement. *Econometrica*, Volume 44, pp. 219-231.

World Bank (1990), *Making Adjustment Work for the Poor*: *A Framework for Policy Reform in Africa*. The World Bank.

World Bank (1995), *Cameroon*: *Diversity, Growth and Poverty Reduction*. The World Bank Report No. 13167-CM.