

## **An assessment of poverty reduction programs in Cameroon: An analysis based on the structure of household consumption**

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## *1. Contexte et problématique*

Initially conceived as an asset for economic development, poverty is recognized globally as a constraint to development rather than a precondition for it. Since the implementation of the poverty reduction programs in the heavily indebted country jointly launched by the IMF and the World Bank in 1996 and in its reinforced version in 1999, it is universally accepted that governments have an important role to play in the fight against poverty (Ravallion, 2013). Despite the efforts made by the international community in developing countries, there is no evidence of poverty convergence (Ravallion, 2012). Indeed, a high level of poverty has an indirect and negative impact on income convergence. In addition, a high initial poverty level mitigated the impact of growth on poverty. In Cameroon, for example, poverty remains a challenge for public authorities, between 2001 and 2007. The poverty index remained high (40.2% to 39.9%); during the same period, the depth of poverty remained almost stable, going from 12.8% to 12.3% (INS, 2008). Although poverty fell by 6 points between 2007 and 2014, at the global level, it worsened in some regions such as the Far North and consumer prices increased by 28% in the same time. The living conditions of the populations have deteriorated further over the past three years with secessionist attacks in the North-West and South-West regions. (INS, 2014).

The INS (2008) had already noted that this inertia in the fight against poverty reflects the fact that the poor have not been able to take great advantage of the efforts of economic growth so that the average gap is significantly reduced. between the level of consumption and the poverty line. However, as Thorbecke (2013) has pointed out, a better understanding of pro-poor growth must take into account the specificities of each country and the impact of the efforts put in place to promote growth. An instantaneous cut in the structure of consumption to different horizons could be a way of appreciating the efforts to fight against poverty. Indeed, through its link with stratification and social order, consumption has an unnoticed political dimension. Flacher et Labarthe-Piol (2003) pointed out that progress and revolutions in society result in ruptures in forms of consumption because there are links between technical progress and the structure of consumption. Poverty is a situation illustrating a lack of financial resources to meet needs (food, health, education, housing, equipment, etc.), preventing individuals from living in a dignified manner on a daily basis. With regard to this definition, two dimensions emerge from the concept of poverty: a monetary dimension and a non-monetary dimension. Monetary poverty results in

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a lack of financial resources, while non-monetary poverty has an objective (quality of food, health care, education, security situation) and subjective aspect (low self-esteem, feeling of helplessness). These two dimensions of poverty influence household consumption behavior..

According to the PNUD (1997), poverty is a complex phenomenon which generally refers to a lack of resources and a deprivation of the possibilities of choice and opportunity that would provide people with decent living conditions. It presents a multitude of faces, among others, the lack of access to knowledge, poor health conditions, the inability to exercise civic rights, the lack of dignity and personal confidence, environmental degradation. In general, poverty reduction is a priority for policy makers around the world. By way of illustration, the counter-cyclical measures implemented by states during the recent financial and debt crises were mainly aimed at improving the purchasing power of households. In order to mitigate the effects of these, states have stimulated demand through the main component of GDP, which is household consumption. The economic crisis that hit the countries of sub-Saharan Africa in general and Cameroon in particular, was not without consequences on the deterioration of the quality and standard of living of the populations. And even after 20 years of cure, Cameroon has not found the previous path of prosperity (Touna Mama, 2008). In order to improve the living conditions of households, the government and the international community relied mainly on inclusive economic growth (Tamba, 2002). The growth strategy put in place by the public authorities in Cameroon emphasizes improving the living conditions of households, particularly in the health and education sectors (MINEPAT, 2009) in view of the high proportion young people.

Moreover, the work of Streeten (1981) asserts that an improvement in living conditions is not necessarily the result of sustained growth, but the result of an improvement in all of the basic needs from the different consumption items. The structure of household consumption appears as an element allowing to appreciate the changes that have occurred in society during the implementation of the economic programs undertaken by the Government. Cameroon experienced a period of economic prosperity until the middle of the 1980s with strong growth rates, following oil exploitation which started in the late 1970s. Following the fall in product prices agriculture and the deterioration of the terms of trade, there has been a decline in export earnings, an imbalance in the balance of payments, as well as a decline in public investment and the impossibility for the State to ensure regular payment of the service of the external debt as well as its social obligations. As a result, measures have been taken, including the abolition of the benefits granted to public officials, and the reduction of salaries by more than 50%. As a

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result macroeconomic indicators deteriorated as well as the living conditions of households. The Structural Adjustment Programs (SAPs) aimed to reduce aggregate demand and increase the supply of tradable goods. In the opinion of several observers these programs have not produced satisfactory results (Emini et al., 2009). Indeed, they have contributed to significantly reduce real income per capita, to increase the general level of prices of goods..

The upsurge in poverty challenged the international community, which combined debt reduction strategies with poverty reduction strategies; In doing so, the programs were geared towards this objective. The Bretons Woods Institutions framework for action was deployed on the link between debt relief and poverty reduction (Tamba, 2002)<sup>1</sup>. This resulted in the Heavily Indebted Poor Countries Initiative, which aimed to encourage social policies aimed at reducing poverty and definitively coming out of debt rescheduling. The IMF and the World Bank have transformed the programme Facilité d'Ajustement Structurel Renforcé (FASR) into Facilité pour la Réduction de la Pauvreté et la Croissance (FRPC)<sup>2</sup>. The aim was to base future loans to low-income countries on a results-based poverty reduction strategy set out in the Document de Stratégie pour le Réduction de la Pauvreté (DSRP). The need for coordinated and convergent action in the fight against this phenomenon led the international community to adopt the 2000 Declaration framed by the eight Millennium Development Goals (MGD)<sup>3</sup>.

The IPPTE and the Initiative d'Allégement de la Dette Multilatérale (IADM), respectively in 1999 and 2005, enabled Cameroon to benefit from external debt relief in terms of commitment after reaching the completion point in 2006 which amounts to 2445 billion FCFA (CAA, 2007). The resources freed up by debt relief were used to finance national poverty reduction programs based on sector strategies. These resources enabled financing in the health, education, infrastructure, governance sectors, etc.

PPTE projects target the areas of social development, education, infrastructure, health, rural development and governance. These areas each have their own priority axes.

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<sup>1</sup> Tamba (2002) « Profil de la pauvreté et de la dette en 2001/2002 » PP77-104 in *Stratégie de désendettement et politique de développement au Cameroun*

<sup>2</sup> The successful implementation of this program over the period (2000-2003) led Cameroon to the HIPC decision point in October 2000.

<sup>3</sup> The goals defined by the international community for the MDGs are 1) Eradicate extreme poverty and hunger, 2) Ensure universal primary education, 3) Promote gender equality and empower women, 4) Reduce mortality of children under 5, 5) Improve maternal health, 6) fight HIV / AIDS, malaria and other diseases, 7) Ensure a sustainable environment, 8) Establish a global partnership for development.

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In the field of social development, the priority axes are those of social protection and national solidarity, employment, the promotion of equity and equality between the sexes, the satisfaction of basic needs, social education.

In the field of education, expanding access to education, increasing the quality of education provision, developing an effective partnership, improving management and of the governance of the education system are the priority axes.

In the infrastructure domain, the priority is to maintain the priority road network, to develop and create rural tracks, to access drinking water through the creation of water supplies, in particular boreholes and wells developed in disadvantaged areas, to improve the supply of electrical energy and its access to the most disadvantaged populations in rural and urban areas.

In the health domain, the reduction of infant morbidity and mortality, the reduction of maternal mortality, the reduction in the number of people suffering from malnutrition, the fight against major endemics (AIDS, malaria, tuberculosis, etc.), management of medical emergencies, strengthening and structuring the demand for care, access to reproductive health services and support for effective and efficient management of health resources are the priority areas.

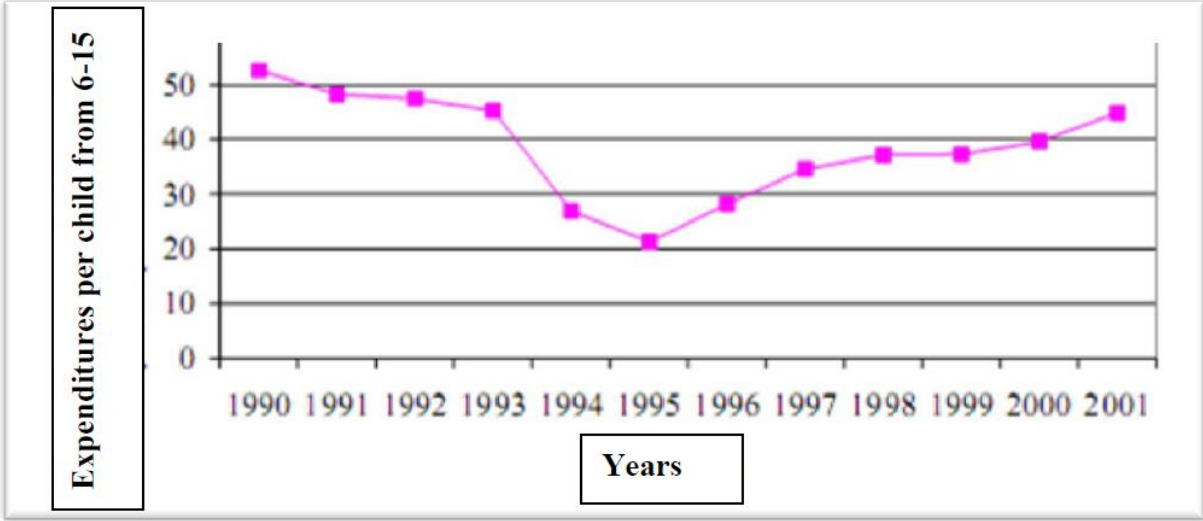
In the field of rural development, the priority axes are those of the development of the agricultural, pastoral and fishing sectors, the promotion of agricultural credit, the strengthening of producer organizations and the structuring of the rural world, agricultural mechanization, hydro-agricultural development, promotion of natural resource management and promotion of veterinary services.

The priority social sectors defined by the financial partners were health and education, because of their importance for the development of human resources. They constitute goals 2, 4,5 and 6 of the MDGs. Particular emphasis is placed on primary education for all (objective 2) and the fight against HIV / AIDS and malaria (objective 6).

The momentum created by donors has been accompanied by reforms in the fields of education and health. By Law No. 96/06 of January 18, 1996, the State guarantees the child the right to compulsory primary education, and since 2000 primary education is free (UNESCO, 2010) ). The Government of Cameroon has decided to develop a comprehensive education sector

strategy supported by the Dakar framework for action<sup>4</sup> in 2000 and the MGD. In this wake, the Competence-Based Approach (CBA) project set up by the World Bank in 2001 was adopted by Cameroon in 2003 by using the Rapport d’Etat du Système Educatif National (RESEN) of 2003, by which the donors are committed to support the Ministry of Basic Education in the various actions of the CBA. This same year the government set itself the objective of reaching a primary education rate of 100% in 2008. The figure 1 shows that per capita public expenditure for primary school children fell continuously between 1990 and 1995; the trend was reversed from 1996. HIPC funds intended for basic education enabled to build primary schools, train and support teachers. The number of primary school teachers was 39,384 in 1997, it increased to 43,135 in 2001 and to 70,230 in 2007.

Figure 1 : Evolution of expenditures per child from 6-15 years old in Cameroon



The reorganization of the health system enshrined in Decree No. 95/040 of 7 March 1995 reinforces the National Declaration on the implementation of the reorientation of primary health care of 1993. Participatory consultations for the preparation of the PRSP. It appears that the populations are calling for increased national solidarity to supply health structures with drugs, the fight against contagious diseases, the care of victims of HIV / AIDS, hepatitis and malaria. The latter alone costs Africa an average of \$ 12 billion each year (MINSANTE, 2010a).

<sup>4</sup> The World Declaration on Education for All (EFA) was adopted in 1990 by representatives of 155 countries at the World Conference on Education in Jomtien. The objective was to allow everyone to benefit was that everyone could have training in order to meet basic educational needs by the year 2000. By the World Education Forum in Dakar (2000) the States adopted a framework of action making it possible to keep collective commitments and is committed to achieving quality basic education for all by the year 2015.

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Cameroon's natural environment is favorable to different epidemiological facies of malaria. It has a significant socioeconomic weight and mainly affects the poor. The 2006 report of Programme National de Lutte contre le Paludisme (PNLP) noted that malaria was responsible for 36% of cases seen in outpatient clinics, 39% in pregnant women, 37% of hospitalized illnesses, 62% of deaths in children under five and 5% deaths among pregnant women (MINSANTE, 2010b) . In addition, it has an impact on the achievement of the MDGs (1, 2, 4, 5, 6 et 8)<sup>5</sup> ; to achieve these objectives, the government has implemented a strategy for the eradication of malaria by combining curative and preventive measures associated with Vector Control (VC)<sup>6</sup>.

With the support of partners, during 2001-2015, the State set itself the objective of controlling the vectors responsible for human diseases in order to reduce the disease burden among the poor and vulnerable populations. The fight against malaria has mobilized significant funding in five years. The national vector control coordination committee has had a budget estimated at 35.68 billion FCFA (MINSANTE, 2010a), the PNLP between 2004-2009 initiated actions in home care, prevention, epidemiological surveillance.

At the national level, during the 2004-2009 five-year period, the PNLP set itself the objective of access to treatment for 60% of the population, the granting of mosquito nets impregnated with insecticide to 60% of pregnant women and children under of 5 years. With support from the Global Fund, the PNLP has distributed more than 2,000,000 insecticide-treated mosquito nets to children under five. Artemisinin-based combinations have been introduced for the treatment of uncomplicated malaria as a replacement for amodiaquine. Between 2005-2008, IADM funding have enable to set up 10 pilot health districts, 25 sentinel sites for malaria surveillance in all regions of the country.

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<sup>5</sup> MDG 1 reduce poverty: In Africa, malaria costs 12 billion USD per year; MDG 2: Primary education for all, MDG 4: reduce mortality in children under 5, MDG 5: Improve maternal health, MDG 6: Combat malaria, AIDS and other diseases: Malaria case fatality among more important, MDG 8: Develop a global partnership for development (one aspect related to this is access to essential medicines).

<sup>6</sup> The main vector-borne diseases (MVBD) which constitute public health problems in Cameroon are: Malaria, rypanosomiasis Human African, Onchocerciasis, Lymphatic Filariasis, Yellow Fever and Schistosomiasis. With the exception of malaria, which is rife throughout the country, the other MTVs have a marked geographical location (MINSANTE, 2010). Actions to combat these diseases are carried out with the help of strategic plans. The fight against malaria took place in three eras, that of eradication (after the 1960s through the use of pesticides) the era of control (systematic treatment with chloroquine but an obstacle appeared because of the resistance to chloroquine noted in 1985), and the era of integrated pest management that combines curative and preventive insecticidal action.

For a targeted action towards the eradication of poverty, it is appropriate to assess the impact of the actions undertaken by the public authorities on the behavior of households taken collectively, both in rural and urban areas and to gauge the trade-offs made in over time. Table 1 shows the consumption structure in Cameroon in 2001 and 2007.

Tableau 1: consumption structure in Cameroon in 2001 and 2007 (en %)

Years	<i>Food, Drinking &amp; tobacco</i>	<i>Clothing &amp; shoes</i>	<i>Housing</i>	<i>Health</i>	<i>Education</i>	<i>House Equipment</i>	<i>Transport &amp; Communication</i>	<i>Hotels &amp; restaurants</i>	<i>Leisure</i>	<i>goods &amp; services</i>
2001	35,1	6,9	15,4	6,3	5,4	5,3	6,4	7,3	1,5	5
2007	40	7,5	15,1	3,9	4,7	3,8	12,3	6,9	1,4	4,5

Source : INS data

An analysis of the structure of household consumption based on the estimation of the Engel function could be appropriate to understand the distortions undergone by the consumption behavior of households. In fact, the budget coefficient associated with food is a plausible indicator of the standard of living to the extent that it allows a measure of the well-being of households regardless of their demographic composition. The first general law on consumer behavior was drawn up by Engel (1857) in a study on the analysis of family budgets. This study highlights that: i) food represents the main expenditure in the budget of families, ii) the proportion of expenditure devoted to food decreases as the standard of living of families increases, iii) the proportion of Spending on housing and clothing is roughly constant while spending on luxuries increases with standard of living. On the basis of his work, he developed the general theory of economic well-being based on the following hypothesis: "the degree of human well-being is expressed by the relationship which exists between the proportion of the expenditure which he must devote to his physical subsistence and the part he can devote to his other needs ". Along the same lines, Halbwachs in 1933 as part of a study on needs in the working class, points out that the social need of a class is not a juxtaposition of individual needs, but it channels the number and the intensity of the particular needs that a class considers necessary, allowing to bring out the needs which are more important than the others. In this extension, Martiniache (2012) notes that consumption is a means of expressing our social status, our aspirations, but also an instrument of political struggle. It acts as an indicator of the social relationships that bind us to each other.

Indeed, household spending determines what they have found necessary given their budget constraint, the analysis of the budget structure is a tool from which the living condition of families can be observed (Tremblay and Fortin, 1964). In addition, it makes it possible to assess



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the convergence of consumer behavior between social (Langlois, 2003) and socioeconomic classes (Gardes et al., 2010).

To assess the average impact of transfers on the household budget, Randazzo and Piracha (2014) used Propensity Score Matching (PSM). Clément (2006) in order to capture the distributive impact of housing subsidies in Russia used an analysis by the PSM. From his work, he concludes that public housing assistance has a limited impact on household income and is unable to reduce poverty due to poor targeting. Moreover, Clément (2011) in the case of Tajikistan uses this same method to assess the impact of transfers on household income, his results show that internal and external transfers on investment spending are not productive.

Most studies relating to household well-being in Cameroon have focused on the factors that influence it, the emphasis has been on consumption items with inequalities (Chameni and Miamo, 2012), the determination of a poverty line (Baye et Epo, 2011) the evolution of poverty indices according to the equivalence scale (Nembot Ndeffo et al., 2014). This work underlines the importance for the government of strengthening sectoral measures to fight poverty (Nembot Ndeffo et al., 2014; Chameni and Miamo, 2012) in view of the results produced so far (Emini et al., 2009).

To our knowledge, no study on the estimation of Engel's function in the case of Cameroon has yet been done. In addition, the evaluation of the impact of poverty reduction programs by national and international authorities has not yet been the subject of research work in Cameroon.

By considering households as a whole, and taking into account the significant investments from which Cameroon has benefited, we could ask the question: **How have the measures to combat poverty affected household consumption items over time?**

## ***2. Objectives of the study***

The objective of the study is to appreciate how the policies of the fight against poverty have affected the structure of household consumption in Cameroon.

Specifically, it is:

- To assess the trade-offs made by households over time as a result of poverty reduction policies;
- To assess the impact of poverty reduction policies on the various household consumption items relating to social needs

## ***3. Methodology***

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The methodological approach is broken down into two stages. The first step is to specify Engel's consumption function, and secondly to assess the impact of poverty reduction programs on primary education and the fight against malaria.

The specification of the form of the Engel function was developed in 1857. Practical considerations limit Engel functions to three types, linear, semi-log and double log. The latter has the advantage of greater flexibility in processing multiple currencies and allows easier processing of the population size effect. In addition, the double logarithmic approximation is used by Engel himself in his work of 1855 (Houthakker, 1957). For the estimation of the Engel function, we will retain the form of the equation used by Houthakker (1960) and Leser (1962). This form has the advantage of being valid regardless of the size of the population, it is specified as follows :

$$\log w_i = \alpha_i + \beta_i \log M - \log(\sum e^{x_j} + \beta_i \log M) + \varepsilon_i$$

Where: the dependent variable is the proportion of expenditure.  $w_i = v_i/M$

with  $v_i$  : group expenses of good i and M income

To assess the impact of these poverty reduction programs on health and education, we use the PSM. This method offers an interesting framework thanks to the construction of a comparison sample from observable characteristics of households. However, this method has limitations compared to the double difference method, which assesses the impact of setting up a program by comparing participants with non-participants before and after the program. (Gertler, 2011).

In the case of our study, the use of the double differences method would not be appropriate, because the programs of fight against poverty in general, basic education and fight against malaria in particular, were implemented in National level. In addition, it would be difficult to construct a longitudinal data cohort. However, using PMS techniques, including pairing, we could compare individuals who have roughly the same characteristics over time. This would enable to capture the changes following programs to promote basic education and fight against malaria. To do this, we have the Cameroonian Household Surveys (ECAM) 2 and 3 ECAM II (2001) has a sample of 10,992 households (it aimed to update the poverty profile of 1996), ECAM III (2007) a sample of 11,931 households (aimed at monitoring and evaluating the implementation of the poverty reduction strategy and the MDGs (INS, 2008)) and ECAM IV (2014) a sample of 10,303 households (aimed at to produce indicators on the living conditions of populations, with a view to updating the poverty profile, monitoring and evaluation of the

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growth and employment strategy with a view to achieving the MDGs (INS, 2014)). The ECAM II, III and IV samples are large enough to conduct nationally relevant analyzes.

Let  $D$  be the binary variable equal to 1 if the household receives the treatment (ECAM III) and 0 otherwise (ECAM II). Let  $Y_0$  be the variable on which the processing is supposed to act.  $Y_0$  captures the state of households before the implementation of the program and  $Y_1$  after the implementation. The effect of the treatment is expressed by

$$\Delta\bar{Y} = E(Y_1 - Y_0 / D = 1) \quad (1)$$

And by breaking it down, we get:  $\Delta\bar{Y} = E(Y_1 / D = 1) - E(Y_0 / D = 1) \quad (2)$

The second term on the right hand side represents the counterfactual sample or comparison group and describes the condition of treated households before they received treatment. In general, household surveys give a picture of the situation of households at a given point in time (cross-section) and do not allow the situation of households receiving assistance to be observed before it is received. The PSM technique is to artificially construct a comparison group using the observed characteristics of households not receiving the transfer. After controlling for differences in characteristics, the only difference will be the effect of the treatment. PSM is based primarily on the conditional independence assumption and the propensity score technique. This hypothesis states that the results observed are independent of participation in a treatment, participation conditional on certain observable characteristics. This hypothesis is expressed as follows:  $((Y_1, Y_0) \perp D / X) \quad (3)$

An estimate of the unobserved component can be obtained by conditioning the fact of benefiting or not from poverty reduction programs on a vector of observable characteristics. An estimate of the unobserved component is:

$$E(Y_0 / D = 1, X) = E(Y_0 / D = 0, X) \quad (4)$$

The impact of treatment is measured by:  $\Delta\bar{Y} = E(Y_0 / D = 1, X) - E(Y_0 / D = 0, X) \quad (5)$

By considering the propensity score  $P(X)$  given by the probability of receiving the treatment under the condition of a set of observable characteristics, the impact of the treatment is finally measured by :  $\Delta\bar{Y} = E[(Y_1 / D = 1, P(X))] - E[(Y_0 / D = 0, P(X))] \quad (6)$

The PSM estimator is given by  $\Delta\bar{Y} = \frac{1}{T} \sum_{j=1}^T (Y_{j1} - \sum_{i=1}^C W_{ij} Y_{ij0}) \quad (7)$

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Where  $Y_{ij}$  is the variable of interest after treatment,  $Y_{ij0}$  the variable of interest for the  $i$ th untreated case joined to the  $j$ th treated case,  $T$  the number of cases treated  $C$  the number of untreated cases and  $W_{ij}$  the weights or the weighting function retained. The weighting method used here is that of the nearest neighbor. It assigns a weighting equal to 1 for the closest observation in terms of score and to 0 for all the others. This involves associating with each treated case the closest untreated case on the propensity score mud. In the context of this work we could possibly retain the average of the two or five closest neighbors. Each time, the matching will be carried out if the difference in terms of score between the treated case and the untreated cases does not exceed a certain threshold that will be defined. Table 2 presents the description of the variables to be used in the estimation while Table 3 presents the statistics of these variables

**Table 2: The variables used in the estimation of the Engel function and in the model of PSM**

<b>Group of variables</b>	<b>Variables</b>	<b>Nature variables</b>	<b>Description of variables</b>
<b>Household characteristics</b>	Sexe of household head	Dummy	1=Male; 0=Female
	Age of household head	Qualitative and continue	1=lest than 30 ; 2= 30-39 ; 3=40-49 ; 4=50 and more
	Level of education of household head	Dummy	0 = At most primary, 1 = Secondary and above
	Activity status of the head of household	Dummy	0 = Self-employed, 2 = Employee
	Household size	Quantitative and continue	Number of individuals living in the household
	Place of residence	Dummy	0= Rural, 1=Urbain
	Matrimonial status	Dummy	0= non married, 1= married
<b>Result variables</b>	Feed expenditures	Quantitative and continue	Monthly feed expenditures
	Clothing and shoes expenditures	Quantitative and continue	Monthly clothing and shoes expenditures
	Housing expenditures	Quantitative and continue	Monthly housing expenditures
	Health expenditures	Quantitative and continue	Monthly health expenditures
	Education expenditures	Quantitative and continue	Monthly education expenditures
	Leisure expenditure	Quantitative and continue	Monthly leisure expenditure
	Has malaria	Dummy	0= no 1= yes
	Duration of illness: malaria	Quantitative and continue	0= 0- 2 weeks, 1=more than 2 weeks
	Know how to read or write	Dummy	0= no 1= yes

**Table 3: data characteristics (Total sample in Cameroon)**

Variable	ECAM II (10992 OBS)			ECAM III (11931 OBS )			ECAM VI (10303 OBS)		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
	Sexe of household head	0.756095	0	1	0.7330349	0	1	0.7107639	0
Age of household head	42.92704	13	99	41.92046	1	5	43.47947	1	5
Level of education of household head	0.415154	0	1	0.4326222	0	1	0.2582023	0	1
Activity status of the head of household	8659025	0	1	0.906066	0	1	0.8657673	0	1
Household size	5.134916	1	38	4.493899	1	43	4.473454	1	30
Place of residence	0.452601	0	1	0.558774	0	1	0.530331	0	1
Matrimonial status	0.603457	0	1	0.567641	0	1	0.5487473	0	1
Feed expenditures	610981.5	0	1.76e+07	613651.8	0	1.78e+07	718974.5	500	1.12e+07
Clothing and shoes expenditures	117625	0	1.32e+07	123415.5	0	4610194	0	1.32e+07	133415.5
Housing expenditures	283045.5	20224.72	1.16e+07	248975.7	18169.12	2913620	20224.72	1.16e+07	258975.7
Health expenditures	125748.5	0	2.73e+07	62447.82	0	3236893	0	2.73e+07	63447.82
Education expenditures	96400.17	0	7260000	83281.93	0	3191371	101235.6	100	4891698
Leisure expenditure	30708.77	0	1.01e+07	24248.79	0	1588989	25752.66	1.01e+07	24248.79
Has malaria	0.144741	0	1	0.0720808	0	1	0.0720808	1	0.0720808
Duration of illness: malaria	0.553777	0	1	0.4263094	0	1	0.4263094	1	0.4263094
Know how to read or write	0.697132	0	1	0.6219823	0	1	0.6219823	1	0.6219823

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#### 4. Expected results

After estimating Engel's function, we expect Engel's law to be verified over time, in view of efforts to improve people's living conditions. The decrease in the budgetary share of the food item has benefited items other than health and education, which have benefited from significant funding. The interest in basic education and the fight against malaria have contributed on the one hand to reducing the illiteracy rate and on the other hand to reducing the case of malaria-related diseases and reducing the duration of treatment of this endemic.

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## 6. Budget

Item	Costs (\$ US)
Literature Review and Methodology (books, software and equipment)	2 000
Supplement data collection (technical assistants honorarium)	2 500
Data analysis (Cleaning, organizing and analysis of data)	2 500
Report writing	2 500
Local workshop participation	2 000
Dissemination Workshop	1 000
Office and communication	1 000
<b>Total</b>	<b>13 500</b>

## 7. Work Plan

Periods(Months)	M 1	M 2	M 3	M 4	M 5	M 6	M 7	M 8	M 9	M 10	M 11	M 12
Activities												
Literature Review and Methodology	■											
Supplement data collection		■	■									
Data analysis				■	■	■						
Report writing							■	■				
Final report									■	■		
Results dissemination											■	■