

# School health, nutrition and school performance in rural Cameroon

Tohnain Nobert Lengha

Department of Agricultural Extension and Rural Sociology, Faculty of Agronomy and Agricultural Sciences, University of Dschang, Cameroon.

Accepted 21 February, 2014

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## ABSTRACT

Health and nutrition are the fundamental elements which impact on the schooling process of children irrespective of their level of education. These are non-negligible aspects that affect the performance of school going children. Recent developments in the effort to enhance the education for all initiative have been emphasizing on improved health and the nutrition status of pupils in order to better school performance. Given that human environment influences the health of individuals and communities in terms of their performance, discussions on nutrition and health are worthy of provoking debates involving several aspects of the political, social, economic and cultural developments of societies because the progress of a community depends on the health of its members. This is because health conditions of individuals affect their performance and output which have long run implications on the well being of the community as a whole. Societies that guarantee good health and nutrition for their citizens can boast of higher output including high performance in school. It is in this perspective that we carried out a study on school health, nutrition and school performance in rural Cameroon. Cameroon is divided into ten administrative regions with two of them speaking the English language while the rest speak French. Our study was carried in four of these ten regions. The choice of these localities was done from the assumption school distribution in the country is according to the different agro ecological zones which are: the Sudano-Sahelian region – (Adamawa, North and far north); equatorial forest region (Centre, South and East); the Savanna region (West and Northwest regions) and the coastal region (Littoral and Southwest). The different sites were selected from the four zones as follows: the Far North, the South, the Southwest and Northwest regions. In each of these localities, 180 teachers were interviewed in 30 schools from each while for each of the schools, 210 pupils in the final classes were interviewed. The category of schools which were considered from the rural areas were: lay private, mission schools and state owned schools. Two types of research tools were administered to the study population as follows: questionnaires for both teachers and parents while interviews through interview guides were administered to pupils of the senior primary classes (five and six). Data was obtained equally from parents and other key informants from government ministries and none governmental organisations through focus group discussion guides. We also carried out some observations in the different schools which enable us to see the different health and nutrition facilities available in these schools. Therefore, the data collection for this study was both quantitative and qualitative by the use of the aforementioned tools.

**Keywords:** Nutrition, health, school, performance, pupils, Cameroon.

E-mail: tohnole@yahoo.com.

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## INTRODUCTION

A study by Wolford et al. (1997) on National Action Plan for Comprehensive School Health Education provides a direct correlation between health and academic performance of learners. Participants in the study

workshop concluded that healthy children learn better and cautioned that no curriculum can compensate for deficiencies in learners health status. However, local school leaders and stakeholders often remain

unconvinced that improving learner's health represents a means to achieving improved academic outcomes. Maybe that is why much emphasis has not been placed on school health/nutrition as a cornerstone to achieving millennium development goals in most communities. The absence of structures like dispensaries or infirmaries in almost all primary schools visited, including the neglect of structures used for hygiene and sanitation, especially in government managed and some mission schools clearly presents a challenge to our education policies. It is time to unveil the myth in our education system which lay more emphasis on performance while ignoring environmental hygiene and sanitation issues. School feeding programmes contribute to the alleviation of short-term hunger and helps children concentrate on their studies and enable them to gain increased cognition and better educational outcomes. They also address micronutrient deficiencies such as vitamin A, iodine, and iron among others which directly or indirectly affect cognition and can result in better school performance. Hence, school feeding programmes need to be promoted with the intention of providing balanced meals for children in schools especially for those coming from poor and food insecure households and areas, as well as those affected by natural and man-made emergency situations. Children from well-off families need to be encouraged and taught to carry nutritious lunch boxes (Ministry of Education, Ethiopia, 2012).

The people of the Republic of Cameroon have experienced a very erratic course of educational development in the last two decades of the twentieth century. Whereas school enrollments had reached admirable levels in comparison to many other sub-Saharan African countries by the early 1980s, economic crises in Cameroon in the middle of that decade spoiled the country's promising educational performance and led to severe disruptions in the provision of education and the training of teachers. Deliberate government efforts were made during the 1990s to turn the educational situation around and to correct many of the problems endemic in Cameroon's basic education system especially. Since then, plans are being developed to better coordinate public and private educational offerings and to gather support from the private sector to improve basic education. Continuing improvements in the educational system seemed to depend most heavily on the decentralization of government authority and the separation of the different educational ministries to separately handle education endeavours in the country. In this light the country has three different ministerial departments handling the entire educational system. They are: the ministry of basic education for those at primary and kindergarten; the ministry of secondary education for the post primary school studies while the ministry of higher education handles those at the tertiary level. By making access to primary schooling free of charge in the 2000-2001 fiscal year, the Government of

the Republic of Cameroon signified its intentions to support basic education and to help all Cameroonian children enter a future where their social and economic well being could be better assured.

However, the Government of Cameroon is interested in organizing the health research system in a way that enables it to provide evidence that supports the health sector reform process, thereby contributing to constant improvements in the quality and provision of health care and services in Cameroon. To this effect three ministries are involved in the governance and management of health research in Cameroon: 1) the Ministry for Scientific Research and Innovation; 2) the Ministry of Public Health and, 3) the Ministry of Higher Education. While academic research is coordinated by the Ministry of Higher Education, operational research is coordinated by the Ministry for Scientific Research and Innovation through the Division for Research and Programme Policy and the Ministry of Public Health through the Division for Health Operations Research established in 2003. More specifically, this divisions' mission is to coordinate health research actors and activities, define priorities, conduct clinical research studies, promote research within hospitals and operations research in the domains of disease control, reproductive health and food and nutrition, and disseminate research results. Given its recent implementation it is still in the process of organizing and coordinating health research and the exact division of responsibilities between the Ministry for Scientific Research and Innovation and Ministry of Public Health is not yet clearly defined. In addition to an ethical clearance, all health research projects must obtain administrative approval from the Ministry of Public Health the Division for Research and Programme. This indicates Cameroon's efforts to ensure adequate health for its citizen through policy decisions that result from research findings. Nevertheless, much is still needed to establish the link between education and health for learners at the primary school level (WHO, 1996).

Our study, carried out on school health, nutrition and academic performance in rural Cameroon raises awareness on the importance of health and nutrition in schools stakeholders.

Results from this study indicate that no matter the level of intelligence of the learner, if health and nutritional requirements are not met, the academic performance of learners would be negatively affected. Poor environmental conditions and unbalanced diets have revealed to have adverse effects on health, and this increases the rate of absenteeism which affects performance in schools. Here, we must agree that in areas where learners suffer from health or nutrition related problems learners register poor school performance in aggregate than those with relatively good health and nutritional standards. This so because, poor health and nutritional levels could have psychological effects on children because both of them hamper the normal functioning of

the body metabolic processes and could have a long run effects on the overall performance of the learners. This study reveals that children (70%) who suffered from chronic health problems registered high absenteeism and poor performance as testified by the respondents (teachers, parents and pupils) in the various schools visited. Unless environmental issues concerning school health and nutrition are properly addressed in rural schools in Cameroon, it will be difficult to compromise health issues and academic performance in schools.

The fundamental ideas that a school's environment affects the day-to-day health and well-being of those who interact with it and that an unhealthy school environment can compromise the quality of any health programme are well established. Three elements combine to make up the school environment: the physical aspects; the psychological aspects of education and the larger geographical and social community within which the school functions (WHO, 1996).

## METHODOLOGY

Although health is linked to both geographical, climatic conditions and nutrition, individual incomes also affect the quality of food intake and health in communities. Our study was conducted in four of the ten regions of Cameroon, notably: the Far North, the South, the Southwest and Northwest regions. Each of these localities has a distinctive geographical and climatic condition. People everywhere entertain certain notions about the nature of the world in which they live (Rose, 1974:61). People living in these different localities have different conceptions about food and hence, the nutrition of their children. What is considered food in one locality is not food in another. Therefore, what the pupils feed on in the various localities is not the same. The research methodology adopted in this study is the survey design. Two approaches were used for the study: the qualitative and the quantitative approaches. In the qualitative approach, data were collected through interviews, observations and focus group discussions while for the quantitative approach we used questionnaire to collect the data. Interview guides, structured questionnaires were used for the collection of quantitative data. This study on school health, nutrition and school health was limited to the primary education sub-system in both the French and the English sectors even though the entire education system in Cameroon is affected by this phenomenon.

### Sample characteristics

From the geographical point of view, the study was carried out in four regions of Cameroon. The choice of these regions was based on agro-ecological characteristics which makes them theoretically adapted to the educational system. From this agro-ecological resemblance, the following zones or regions were identified: the Northwest and the West regions (Savanna zone) are similar. They are the grassfields while the almost identical nature of the northern region (Sudano-Sahelian), led to the choice of Maroua as the northern site for the study. From the East, the Centre and the South regions (Equatorial Forest zone) with a lot of similarities, the South region was chosen as a study site. Although the Littoral and the Southwest regions (coastal zone) present several similarities, the Southwest region was chosen because of its linguistic difference with the Littoral which has a significant impact on health, nutrition,

the quality of teaching, learning and consequently school performance.

### Sampling unit

To better understand this question on school health, nutrition and school performance, only the primary schools were retained as a unit of investigation for this study. Schools from rural areas were chosen in each region and in each of schools five types of units were observed:

- i) Toilet types,
- ii) Canteens or dining sheds.
- iii) Water sources (springs, portable water, streams and rivers)
- iv) Health facilities, dispensaries, infirmaries etc
- v) Hygiene and sanitation in classrooms and outside the classes (the school environment).

Parents and leaders of non-governmental organization involved in educational activities were equally included in the unit of investigation. However, the type of schools selected were, the public schools, lay private schools and private missionary schools. Given that class six pupils are those who have assimilated the entire primary school program and are ready to face public or external examinations, they are those who were subjected to our investigation to come out with data concerning their health, nutrition and school performance rate. In each of these sites, 180 teachers were interviewed in 30 schools from each site while for each of the schools, 210 pupils were interviewed. A total of 6600 pupils made up the sample characterized by five nominal variables notably: type of school, region, sex, locality and the school environment.

## RESULTS AND DISCUSSION

Four focus group discussions involving parents and teachers were conducted in each of the sites to obtain a concerted opinion on this issue from the members of the focus group discussion. Most of these group discussions raised sensitive issues concerning national policy in matters concerning educational performance as a strategy to achieve millennium development goals in Cameroon.

The analyses were made depending on the relevance of variables or issues related to the school environment, nutrition, health status, and pupils' performance in schools. Thus, we analyzed each of the issues referring to the health and nutrition and the test of independence of the chi-square was used to know whether pupils in a health and nutrition difficult situation depend significantly on a socio-demographic characteristic. The socio-demographic characteristics chosen for our study are: the sex, the geographical area, the level of education, type of education and the area of residence of the pupils.

As limitations to the study, we faced the problem of awareness on the part of our target population. Most of our respondents and other stake holders in the education system concentrate problems of access to education and did not really consider feeding and health related issues to be hindrances for the academic performance of their children. We consider this as a real limitation to this study because at each moment we had to explain to the

**Table 1.** Pupils' participation in lessons.

Type of school	Participation of pupils in lessons		
	Very active (%)	Active (%)	Not active (%)
Islamic	12.10	69.70	12.10
Government	33.30	66.70	0.00
Lay private	17.90	64.30	12.50
Mission	43.30	53.30	3.30

Source: Field data, 2012.

respondents what nutrition actually mean.

Historically, the evaluation of school performance has often been focused based on the education system (quality of the system, didactic material and quality of teaching). More so, school health and nutrition are often considered as important determinants for school performance. However, Baba et al. (1996) shows that under-feeding of children below five years alters their intellectual development hence, leading to poor performance in school<sup>1</sup>.

According to World Health Organization « *health is the complete physical state, mental and social well-being which does not only mean the absence of a disease or infirmity* ». School health is defined as the sum of the experiences that an individual can acquire in a school environment and which can contribute in the development of good habits, attitudes and knowledge of this individual.

According to the Larousse dictionary, nutrition is defined as the function of digestion and assimilation of food. Studies show that in the school milieu, malnutrition affects intellectual development<sup>2</sup>. In effect, in 2002, a framework of intervention for the improvement of school health and nutrition was developed by the United Nations Educational, Scientific and Cultural Organization (UNESCO), World Health organization (WHO) and the World Bank<sup>3</sup>. Besides, other researchers have also been interested on the question of the impact of school health and nutrition on the performance of the learners. A comparison of the intellectual performance of children from 6 to 16 years with others from 12 to 16 years in the situation of food insecurity show a significant influence because the first performed less in mathematics, repeating more and having more psychological problems. This study indicates how important the nutritional factor is to the intellectual development of children. In order to establish the relationship that exist between school health, nutrition and school performance, some authors assert that even if no nutritionist could affirm that learners

who have good nutrition are performing better, good feeding guaranties a healthy brain and a better retentive memory which already gives room for good studying ability.

According to Georgia E. Hodgkin<sup>4</sup>, the body needs water. About 50 to 60% of our body weight is made up of water. Food sources of water include liquid foods (yogurt, ice cream, custard etc), drinks (water, beverages), and solid foods (fruits and vegetables contain 73 to 95% water). Therefore, a child needing 1000 calories has to drink 1000 millitres or 4.3 cups a day. Also, for a better school performance, schools should have good drinking water sources necessary for the hydration of the children with canteens serving the required liquid foods.

As many studies show, education and health work together: malnutrition or malaria have an influence on learning participation in schools. As shown below, pupils' participation in lessons depends on the type of school attended. From Table 1, schools owned by religious bodies have their pupils very active in the classrooms. From our observations, these schools have adequate infrastructures that provide a good learning environment for the children. This adequate learning environment serves as a motivating factor for learners. It is however, strange to obtain better results and hence, high performance from pupils coming from such schools where the teaching staff receives low wages compared to their colleagues in government owned schools. Probing to know reasons accounting for these performance disparities, authorities of this category of schools made us to understand that the follow-up strategies developed for their teaching staff has compelled them to perform their duties well and therefore, producing the expected results.

Data show that in all the regions of the world, improvement of food and health conditions could give rise to better results in school. For instance, some food programs have had remarkable results on schooling and school results (Levinger, 1994). Moreso, food interventions such as micronutrients and treatment of intestinal worms have a positive effect on the concentration of pupils, their ability to solve problems and their scores in tests. This is because education is the

<sup>1</sup>“Sociodemographic and anthropometric characteristics in relation to school performance in the rural school of Kenitra city ‘(Morocco)”, p.26, in [www.didac.ehu.es/antropo](http://www.didac.ehu.es/antropo)

<sup>2</sup>Sociodemographic and anthropometric characteristics in relation to school performance in the rural school of Kenitra city ‘(Morocco)”, p.26, in [www.didac.ehu.es/antropo](http://www.didac.ehu.es/antropo)

<sup>3</sup> Ibid.

<sup>4</sup> Georgia E. Hodgkin, “ Nutrition et performance scolaire : y-a-t-il une relation entre les deux ? ”, p.2, in [www.dialogue.adventist.org](http://www.dialogue.adventist.org)

**Table 2.** Distribution of pupils according to geographical zone.

<b>Agro-ecological zone</b>	<b>% representation of pupils in the sample</b>
Sudano-Sahelian	31
Savanna zone	29
Equatorial Forest zone	27
Coastal zone	13

Source: Field data, May, 2012.

transmission of what is worthwhile to those who become committed to it. This must involve knowledge and understanding and some sort of cognitive perspective which is not inert (Schofield, 1982). Education is any other aspect of public health which provides people with sufficient information by telling them how notification of diseases can help individuals and the community (Lucas and Gilles, 1982).

Studies done by the Partnership for Child Development in Ghana have recently showed that iron supplement administered by teachers significantly improved upon school results for a duration of six months. In Malawi, when school feeding was complemented by iron and iodine, gains of IQ were more important than what iodine could (Shrestha, 1994). Studies argued by Pollitt (1990) have equally shown that children suffering from iron anemia and having mediocre results at the beginning of schooling have seen their incapacity disappear after much iron support from the supplements is given.

According Radriamahanina Finaritra Harijaona<sup>5</sup>, the rate of schooling increased in the world during the 1990 in all the regions, with an average of 81% of school children in schools in 2002. In poor countries and especially in countries where populations are increasing rapidly, hunger and malnutrition often pose critical problems.

This is so because one of the factors that influence school performance is malnutrition. From the above facts from diverse literature explaining the link existing between education, nutrition and health, one can deduce that an important potential gain of educational efficiency could be obtained by the improvement in nutrition and health of children from the ages of 6 to 14 years.

As mentioned above, the ten regions of Cameroon were grouped for this study following the climatic or geographical criterion. From our study, 31% of the pupils are from the Sudano-Sahelian, 29% from the Savanna region. It should be equally noted that the coastal zone is less represented in the sample with a percentage of 13%, the equatorial forest zone by 27% as shown in Table 2.

<sup>5</sup> Radriamahanina Finaritra Harijaona, Etat nutritionnel et performances scolaires des élèves des écoles primaires publiques de la commune de Talata Volonondry, mémoire pour l'obtention du diplôme de Licence en Nutrition, 2007, sur le site <http://www.scribd.com/doc/51204600/Etat-nutritionnel-et-performance-scolaire-des-eleves-des-ecoles-primaires-publiques-de-la-Commune-de-Talata-Volonondry-RANDRIAMAHANINA-Finaritra-Hari>

### **Gender, marital status of the family heads and religion**

From our sample, 50.3% of the pupils interviewed were boys while 49.7% were girls. The low score for girls in our sample came mostly from the northern part of the country where the education of the girl child is not yet taken seriously by the different stakeholders especially parents. Generally, most of the pupils that were involved in this study come from homes where the family heads (86%) are either married or in free relationships. However, none of them came from single parent homes. Nevertheless, respondents' declarations on the marital status of the family heads were what we took into consideration. Concerning the religious background of the 73% respondents, of the pupils interviewed, 39% are Catholic and 34% are Protestants, while only 13% are Muslims.

### **Main source of drinking water in the schools according to socio-demographic variables**

Water as a nutritive element has an influence on the pupil's performance in school. Most of the pupils found in the schools that we visited for this study come from family backgrounds using different sources of water for the household. Therefore, concerning their knowledge about the main source of drinking water in the school, which could be different from what they know from their homes, 42% of the children assert that there are sources of drinking water in the school campuses. Taking into consideration some socio-demographic characteristics, we came up with the fact that having water infrastructure in school depends significantly on the geographical locality, and type of school as shown in Table 3.

Water is an essential, indeed crucially vital strategic natural resource for all economies. Every country's drinking water supply, food production, energy supply, and, consequently, industrial development hinge on water availability. The resource is also the sine qua non for healthy human living conditions and sound ecosystems (Scheumann and Neubert, 2006).

Table 4 illustrates the availability of water sources in schools in Cameroon. In the Savanna and coastal regions of the country, most schools (71 and 61% respectively) have adequate water facilities for the pupils.

**Table 3.** Distribution of schools according to main source of drinking water and some socio-demographic variables.

Parameter	Availability of water sources in the schools		
	School water (%)	None (%)	
Geographic zone	Sudano-Sahelian	49.8	50.2
	Equatorial forest zone	45.7	54.3
	Savanna zone	78.7	21.3
	Coastal zone	60.5	39.5
Type of school	Government	53.5	46.5
	Lay private	70.8	29.2
	Catholic school	69.6	30.4
	Private protestant	58.2	41.8
	Private islamic school	46.4	53.6
Total	58.4	41.6	

Source: Field data, May, 2012.

**Table 4.** Main source of drinking water in school.

Main source of drinking water for the pupils in school	Main source of drinking water		Chi-Square
	Water in the school (%)	None (%)	
Water in the school	71.11	0.00	Obs = 336.92 P-val = 0.000*
Water in plastic papers	1.76	0.72	
Water from the house	25.38	91.01	
Bore holes	1.76	4.68	
Wells	0.00	3.60	
Total	100.00	100.00	

Source: Field data, May, 2012.

However, other localities do not have these facilities. According to the type of school, a greater majority (53.6%) of the Islamic schools do not have any source of drinking water. This lack of available sources of water especially in the Sudano-Sahelian zone of the country is great distraction for the learners and hence, affects their school attendance and consequently the academic performance.

The implementation of the independence chi-square test shows that the main source of drinking water for the pupils depends on the availability of water in school. Therefore, lack of water in school has a negative impact on the pupils. This explains why in some zones, pupils abandon classes to go and fetch for drinking water in the surroundings. In schools where there are water structures most of the children (71%) drink this water when they are thirsty and only 25% drink water brought from home. For schools with no water infrastructures, pupils are obliged to fetch water from elsewhere. Also, 91% of the pupils bring water from their homes while 8% drink from constructed wells and from bore holes found in the school surroundings.

### Type of toilet

Barriers to education for school aged children in rural areas are numerous and widespread. Among these impediments, we can cite many factors including disability, gender, ethnicity, conflict, poverty, exploitation through child labour, and lack of basic sanitation. And even when they do get a chance to go to school, most of the children in rural areas are forced out of school for sociocultural reasons, especially girls. Lack of access to separate and decent toilets at school is equally a concern to girls everywhere. However, most schools that we visited are built without sanitation and other toilet facilities. This makes them a serious threat to children's health and threatens girls' attendance.

Table 5 shows the type of toilets found in the schools considered under our study. We realize in a general manner that about 7 out of 10 schools do not have constructed toilets while 16% have no toilet facilities at all.

From Table 5, 68.7% of the schools use pit toilets, 16.1% have no toilets while 14.4% are using modern

**Table 5:** Type of toilet according to the geographic zone and type of school

Parameter	Type of toilet				
	Modern toilet (%)	Pit toilet (%)	No toilet (%)	Unkempt toilet (%)	
Geographic zone	Sudano-Sahelian	3.3	54.1	42.6	0.0
	Equatorial forest zone	23.5	63.4	10.4	2.7
	Savanna zone	5.1	94.4	0.5	0.0
	Coastal zone	43.0	57.0	0.0	0.0
	Government	11.3	61.4	26.2	1.0
Type of school	Lay private	29.2	63.7	6.2	0.9
	Catholic school	17.9	82.1	0.0	0.0
	Private protestant	9.0	91.0	0.0	0.0
	Private islamic school	0.0	100.0	0.0	0.0
Total	14.4	68.7	16.1	0.7	

Source: Field data, May, 2012.

toilet facilities. The schools with modern toilet facilities are schools constructed and equipped by non-governmental organizations in the domain of school health. It is important to note that 31.8% of primary schools in rural areas have no access to drinking water sources and the proportion of schools that possess flushing toilets has almost doubled between 2004 and 2010 (increasing from 8.7% in 2004 to 16.0% in 2010). But the situation in rural areas remains critical (only 2.4% of schools dispose of a flushing toilet) (National Institute of Statistics, 2010).

## Health condition and nutrition

### School canteens

Most children in the school going age do not eat before leaving their homes for school. Parents who are aware of the nutrition needs of their children often give their children money to buy what is being sold in school during recreation periods. In schools where no food is being sold, it still becomes difficult for the learners to provide for their food through this means. However, in most of the schools in rural Cameroon, there are dinning sheds where food is being sold to both the pupils and the staff. Yet, others have canteens managed by the school authorities. Concerning the existence of these school canteens, 68% of the schools have canteens in their campuses. It seems however, that there is a non-negligible gap between schools in rural and urban areas on the one hand and between schools in the Sudano-Sahelian and other zones on the other hand. In effect, we realize that the proportion of schools having canteen in their campuses is 87% in all the rural areas. This proportion is more than 80% in the Sudano-Sahelian region and coastal zones but less than 57% in other zones. Focus group discussions and in-depth interviews with the different stake holders indicate that pupils from

schools with adequate feeding facilities perform better in public examinations than those in schools without these facilities. These schools with high performances are found in the Equatorial and Savanna zones respectively. According to the type of schools, private Islamic (46.4%) and protestant (32%) schools respectively provide more feeding facilities on campuses than other schools.

However, the existence of a school canteen in some schools does not mean that pupils are using it because of no money or because they take food to school. Sometimes the food taken to school is influenced by the cultural beliefs of the different families concerned because cultural evolution helps the selection of balanced diets (Gross, 2005) (Table 6).

### Infirmaries

Concerning the existence of infirmaries in school establishments, there is globally 58% of the schools that do not have infirmaries. If we consider this question according to some socio-demographic characteristics, we perceived that the existence of infirmaries vary significantly according to geographical zones, and type of school. Besides the schools in the coastal zone of Cameroon where a greater number have infirmaries exist, most schools in the other zones do not have this facility. The proportion of schools not having infirmaries is 47% in lay private schools and above 52% in other types of schools (Table 7). As for the pharmacy of emergency which is a health kit available in public and private schools for first care, 3 out of 4 primary schools possess it (National Institute of Statistics, 2010).

### Nutrition and health condition

On the question of knowing how nutrition influences the health condition of pupils, we came out with the fact that

**Table 6.** Existence of school canteens according to the geographical zone and type of school.

Parameter		Existence of school canteens (%)
Geographical zone	Sudano-Sahelian	19.6
	Equatorial forest	44.0
	Savanna zone	42.6
	Coastal zone	12.8
Type of school	Government	32.6
	Lay private	26.5
	Catholic	31.6
	Protestant	32.8
	Private islamic	46.4

Source: Field data, May, 2012.

**Table 7.** Existence of infirmaries in the schools according to the geographical zone and type of school.

Parameter		The presence of infirmaries in the schools (%)
Geographical zone	Sudano-Sahelian	36.2
	Equatorial Forest	30.2
	Savanna zone	47.7
	Coastal zone	68.6
Type of school	Government	39.1
	Lay private	53.1
	Catholic	43.6
	Protestant	47.8
	Private islamic	25.0
Total		42.3

Source: Field data, May, 2012.

**Table 8.** Nutrition and health condition.

Parameter		Food in school and the health of pupils (%)
Geographical zone	Sudano-Sahelian	10.5
	Equatorial forest	13.6
	Savanna zone	10.2
	Coastal zone	20.9
Type of school	Government	13.6
	Lay private	11.5
	Catholic	12.7
	Protestant	9.0
	Private Islamic	10.7

Source: Field data, May, 2012.

in a general way, pupils do not consider food as something that disturbs their health. The global health of pupils needs a readjustment or improvement on the environment and health facilities. It is only when these

components of health are put together that the health of the pupils in their learning process is guaranteed (O'Donnell, 1997).

Table 8, however, shows that the proportion of pupils

**Table 9.** Health condition and school environment.

Parameter	School environment and the health of the pupils (%)	
Geographical zone	Sudano-Sahelian	22.5
	Equatorial forest	0.0
	Savanna zone	11.2
	Coastal zone	19.8
Type of school	Government	16.2
	Lay private	9.7
	Catholic	7.6
	Protestant	9.0
	Private islamic	0.0
Total		22.8

Source: Field data, May, 2012.

**Table 10.** Health condition and climate of the locality.

Parameter	Climate of the locality and the health condition of the pupils (%)	
Geographical zone	Sudano-Sahelian	45.0
	Equatorial forest	3.8
	Savanna zone	13.7
	Coastal zone	30.2
Type of school	Government	27.2
	Lay private	19.5
	Catholic	12.7
	Protestant	17.9
	Private islamic	14.3
Total		22.8

Source: Field data, May, 2012.

whose health is influenced by nutrition varies according to the area of residence and geographical zone. Those who bring food to school come mostly from the Coastal and Equatorial Forest zones

### Health condition and school environment

Here, we want to measure the eventual effect that the school environment could have on the health condition of the pupils. Table 9 shows that the proportion of pupils affected by the school environment in terms of health is about 13% in general. Moreso, this proportion varies enormously according to the geographical zone and the type of school.

The main issue raised here was to know whether the school environment has an impact on their schooling process. We noted that the main reasons given by the respondents were the rowdiness of the school surroundings and unkempt toilets. This problem is most felt in government schools (60%) than elsewhere and in

the Sudano-Sahelian zone (77%).

### Health condition and climate of the locality

Table 10 shows that the proportion of pupils whose health is disturbed by climate makes up 23% globally. Further, this proportion varies significantly according to the geographical zone, area of residence and type of school.

Further analyses show that the main motive or reason given by the respondents is excess heat or cold depending on the zone where one is found. That is why almost all the pupils from the Sudano-Sahelian region (98%) believe that excess heat is a problem for their studies (causing headache, nose bleeding) meanwhile for those from the Savanna zone (70%) and those from the coastal zone (77%) it is excess cold which is the problem (causing malaria, common colds etc). However, the pupils are affected by school environmental and nutritional related diseases in different ways in all the

regions covered by this study as follows: Malaria (37.6%), stomach problems (22%), headache, (11.9%), common colds (6.9%), eye problems (6.4%), chest pain (5%), asthma (2.3%), and other diseases not specified by the respondents (6.9%). The causes of these diseases vary from the poor school environmental conditions to poor feeding including inadequate water sources in the school milieu.

### Health and nutrition state with school performance

We used a multivariate analysis including dependent variables such as health and nutrition and socio-demographic variables to come out with our analyses in this section. It is from there that we came out with another analysis using demographic and other related variables. The SPAD software was used for this purpose. The results of this analysis bring out three opposing phenomena:

1. On the one hand, children who are hardly sick are found in schools situated in the equatorial forest zone of the country and mostly in the semi-urban environment. In this environment, school establishments have infirmaries, good canteens, drinking water facilities with neither the climate nor the environment disturbing their school performance.
2. On the other hand, children who are never sick are found mostly in rural schools in the Sudano-Sahelian part of the country. In this zone the schools do not have canteens and infirmaries. Their feeding is less varied, poor with the consideration that this has an impact in their health and school performance.
3. And finally, children in the coastal areas have constant malaria provoked by excess heat which favours the breeding of malaria parasites. This has a negative effect on their studies and hence, their academic performance.

### CONCLUSION

Schools need wells within the school premises so as to reduce the difficulties of fetching water from streams and rivers which is the cause of water born diseases like diarrhoea. For children to learn well, there is a need for a good environment. This can only be guaranteed if schools are provided with well water for use in washing and cleaning of classrooms and toilets. In some cases, the well water could be used in drinking when treated with appropriate chemicals instead of drinking water from streams as is the case in most rural areas in Cameroon. The different government ministerial departments including the local Councils who are major stake holders could ensure that environmental laws and regulations are respected in the schools system. This alone could reverse the situation if the education community which

include the learners is adequately sensitized.

There is equally a great need for the improvement of health services through the provision of adequate health staff such as trained nurses sent to the schools to take care of health problems in Public and private schools in the country. This is because, most of the first aid boxes in the schools are not adequate and even when they are available, the drugs are administered by head teachers or discipline masters who lack basic knowledge on the medical treatment of most diseases. In essence, each school could have a health department to take care of environmental health issues. The introduction of toilet disinfection could help to reduce the advent of air born diseases like catarrh, cough and skin diseases. In addition, the education of pupils on the necessity and on how to wash their hands after using the toilets even though it is almost impossible in most schools due to difficulties in having water available in class rooms or around the toilet vicinities can boost the health of school pupils and hence, their academic achievement.

This study seems to be the first in its kind in this domain in Cameroon. This is confirmed by the fact that in 2013 the government of Cameroon after having received the feedback of the dissemination of the results requested that the study be carried out for the secondary schools and in 2014 the same study is being repeated at the higher education level. From this, we think that through the dissemination of results, the attitude of the policy makers and the different education partners could change and hence, leading to an improvement in the educational offer in Cameroon. As venues for further studies, this same study could be done with more emphases on the different stakeholders who have some contributions to make in this domain.

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