CONSUMPTION OF SACHET WATER BY STUDENTS IN THE CITY OF AKANDA (GABON)

Abstract

The sachet water consumption has substantially increased among the population. The present work is based on a sample of students from a four secondary schools in the commune of Akanda. This survey was carried out in order to determine the students' criteria for choosing sachet water, their perception of taste and the quality of water. It resulted that students mainly drink sachet water after school: 52.70 % of the students surveyed drink about one to two sachets per day. However, a majority of students (56.57 %) complain about the taste of sachet water, often considered unpleasant, or associated with a taste of soil or bleach. They think that the bad taste of sachet water is related to the poor manufacturing and production conditions. Furthermore, 45 % of students surveyed deplore the unsanitary conditions in which sachet water are sold. In addition, a lack of hygiene has been observed among students. Indeed, 88.5 % of them admit to not washing their hands before consumption and 44.88 % also admit to throwing the sachet on the ground after drinking. Finally, the students surveyed bemoan the absence or insufficiency of health checks in the sachet water production units and the lack of information on the numerous brands found in stores. Thus, sachet water is considered to be the cause of many diseases.

Key words: Sachet water, daily consumption, secondary school students, Akanda.

Introduction:-

The access to drinking water is a topical issue faced by many African countries. Indeed, according to the WHO, the population without access to an improved water source has increased from 319 million in 2015 to 400 million in 2017 in Africa (WHO, 2019). However, access to quality water and sanitation has been recognized as a fundamental human right since 2010. This right constitutes objective 6 of the Sustainable Development Objectives by 2030 and aims to "Guarantee access to water and sanitation for everybody and ensure sustainable management of water resources". In Benin, water supply problems cause women to walk over long distances (Azonnakpo et al., 2020). In some cases, residents build cisterns to store rainwater which is the only source of water supply (Dovonou et al., 2020). To overcome the recurring problem of water cuts in Dakar (Senegal), people draw water from the often shallow water table and consume it as it is, or with a summary treatment. It exposes themselves to water-related pathologies (Diop and al., 2021). In the Zinder region of Niger, the scarcity of drinking water resources pushes residents to obtain their water from unimproved sources, often ponds, which are not permanent (Idi, 2020). Furthermore, demographic growth has been faster than the urbanization of cities, so there are more and more new neighborhoods which are not yet supplied with drinking water. This is the case of Angondje Ntöm in Gabon. To meet their daily water needs, populations use alternative water sources such as well water, borehole water and rain water (Ndjeri-Ndjouhou and al., 2023). Thus, the difficulties encountered by populations in accessing drinking water have led to a change in drinking water consumption habits. Another consequence of these difficulties is the consumption of water packaged in sachet. Indeed, the marketing of sachet water is an activity that has significantly grown in recent years. It provides jobs for many people and stands as an important source of income for sellers (Konan, 2022; Akiyo and al., 2017). In the commune of Akanda in Gabon, sachet water is found in most small neighborhoods shops. This water is particularly popular in areas with high number of low-wage populations, such as market places.

Sachet water is also popular with students after class. But little information is available on production conditions and their quality. It is in this context that the present study was carried out. It aims to determine the students' criteria in choosing sachet water instead of any other drinking water available. It also aims to provide knowledge on the young consumers taste perception of sachet water. Finally, this study will assess the young people appraisal of possible health risks related to the consumption of sachet water. For this purpose, a survey was conducted among students from four secondary schools in the commune of Akanda.

Materials and Methods:-

Study site:

The commune of Akanda was created by presidential decree in 2013 (official journal of the Gabonese Republic, 2013). It is located in the North of Libreville (Figure 1), between latitudes 0°29' et 0°36'N and longitudes 9°18' and 9°30'E. Today it has more than 34,000 inhabitants (DGSEE, 2013) spread across different neighborhoods: Angondje, La Sablière, Cap Esterias, Avorbam, Malibé, Premier Campement (Official journal of Gabonese Republic, 2013). Akanda is subject to a transitional equatorial climate, with a three-month-dry season (July, August and September) and a long rainy season of nine months (from October to June) marked by frequent storms and abundant rains (Maloba, 2010). The average annual temperature is 26.3°C. The average rainfall is 1970.6 mm per year (DGMN, 2018). July is the driest month with 14 mm of rainfall while October is the rainiest with 307 mm of rainfall.

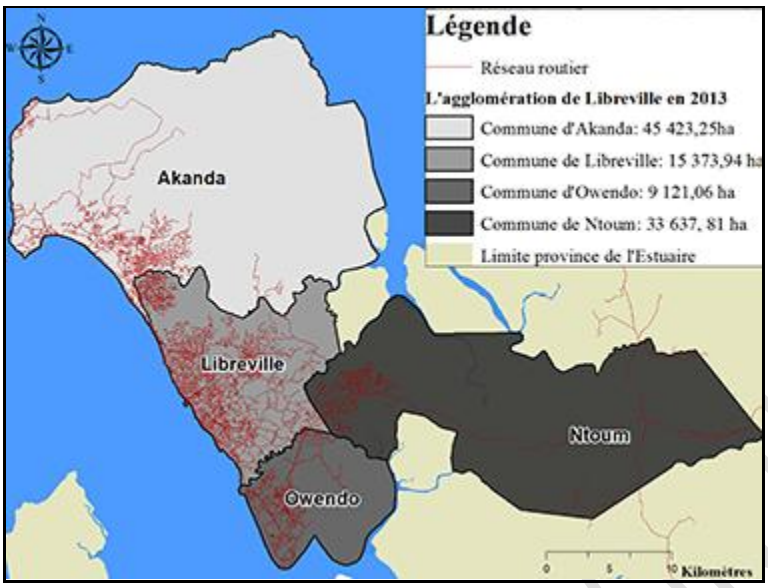

Figure 1:- Location of Akanda municipality (Essono et al., 2022)

Type and period of study:

This is a cross sectional study with a descriptive aim. The investigation was three months long −February to May 2024− in the commune of Akanda.

Choice of study site:

Akanda was chosen because it is a new municipality facing urban expansion. Its demographic growth has been faster than the infrastructures development. In fact, several neighborhoods in Akanda are not yet supplied with drinking water. Others neighborhoods often face frequent water supply cuts. Thus, we observe a quite significant consumption of drinking water from unconventional sources, such as sachet water, in Akanda.

Sampling Method:

Students are the main target of this study. A preliminary study has shown that the sachet water is popular among young people after school. Indeed, schools exits are often overcrowded places where sachet water consumption is particularly important. The questionnaire was administered to

415 student near four schools in Akanda. The representativeness of the sample size was ensured by the quota method suggested by the formula proposed by Réa (Réa et al., 1997). The significance threshold for the proficiency value of the test is 5%.

Data collection and processing:

The questionnaire is the collection instrument used in this study. It has been developed in such a way as to provide suitable answers to the various questions. A pre-survey made it possible to identify the difficulties linked to the administration of the questionnaire and to make corrections. Data collection was carried out during an individual interview. Data processing and exploitation were carried out using Sphinx and Excel software.

Results:

Socio-demographic characteristics:

The population surveyed is essentially female with 51.95 % girls compared to 48.05 % boys. About 64.8% of students (Figure 2) are in the first cycle (sixth to ninth grade) and 35.2 % are in the second cycle (tenth grade to upper sixth form). The sixth grade class has the most students (26.30 % of the population surveyed) while the upper sixth has the lowest students rate (4.94 %).

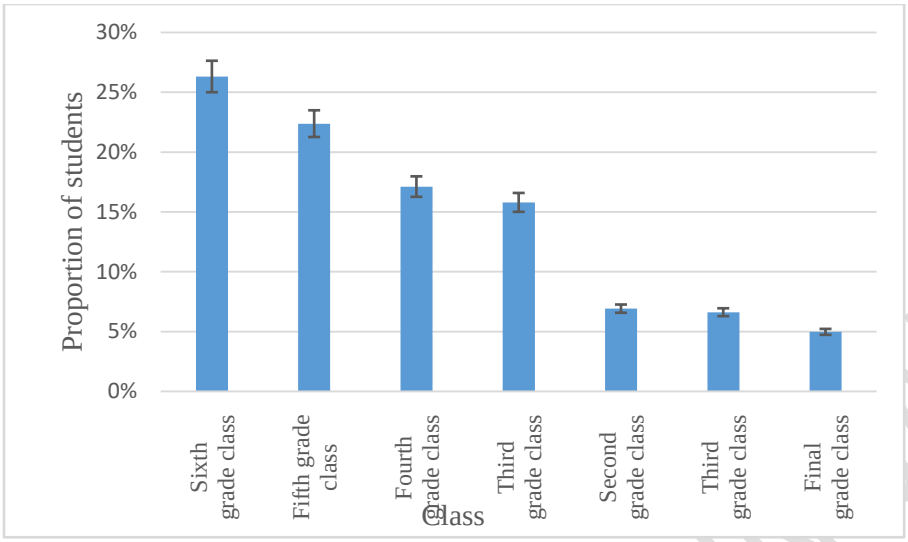

Figure 2: Average number of students per class

According to the study carried out, the ages of the students range from 9 to 19 years old. In the sixth grade class (Figure 3a), the students are mainly 11 years old (35 %) and 12 years old (25 %). Only 10 % of the sixth graders are 9 years old or 15 years old. In the final grade class the age varies from 17 to 20 years old (figure 3b).

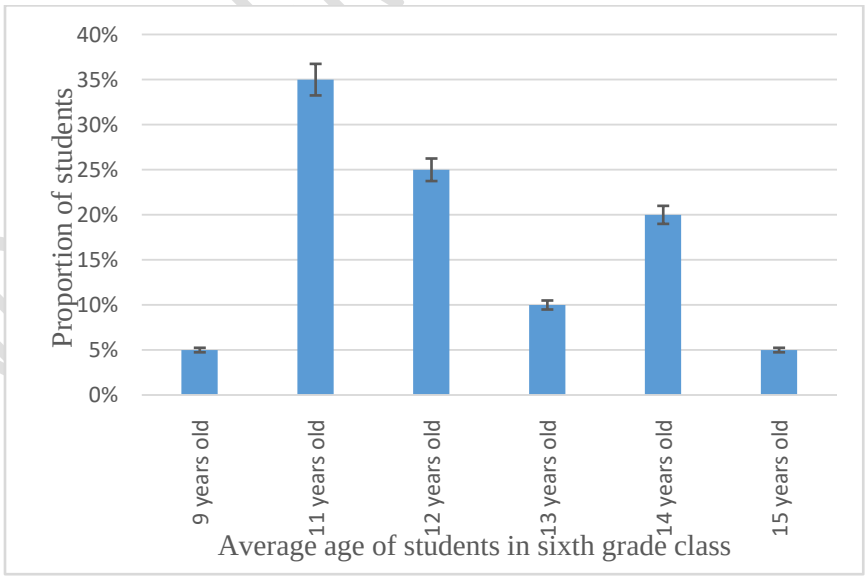

Figure 3a:- Average age of students in sixth grade class

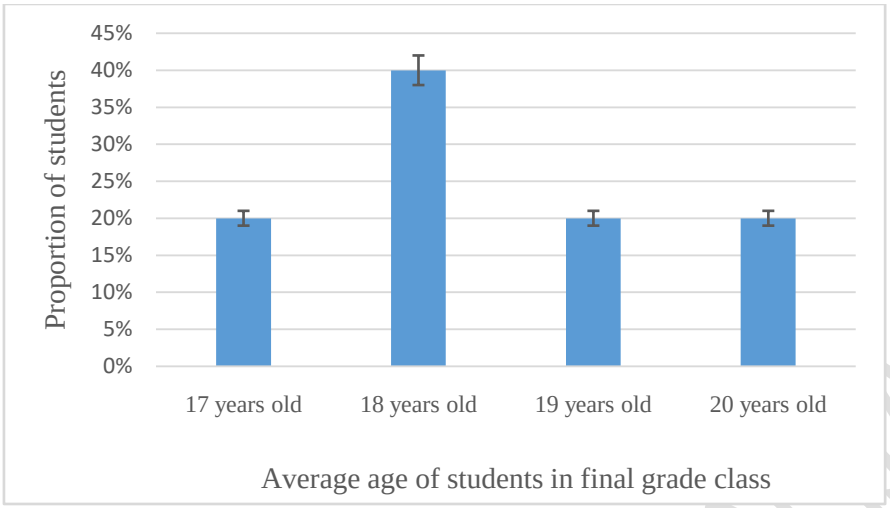

Figure 3b:- Average age of students in final grade class

Consumption of sachet water among students:

The survey reveals that 100 % of students have already drunk sachet water. This mostly happens at the end of classes, near the school. During school holidays, the consumption of sachet water decreases sharply. Indeed, 98.6 % of students surveyed say they don't drink sachet water at home. They only consume drinking water available at home (bottled mineral water, filtered or unfiltered tap water and drilling water). The quantity of sachet water consumed varies from 1 sachet per day to 6-7 sachets per day on average (Figure 4). More than half of the students (52.70%) say they consume 2 or 3 sachets water per day. The others say they consume on average 4 or 5 sachets water per day (22.10 %) or even 6 to 8 sachets water per day (5.20 %). Nearly 10 % of the students surveyed say they have stopped drinking sachet water. The survey also reveals that few sachet water brands are known to young people. In fact, they drink sachet water without having a preference for a particular brand.

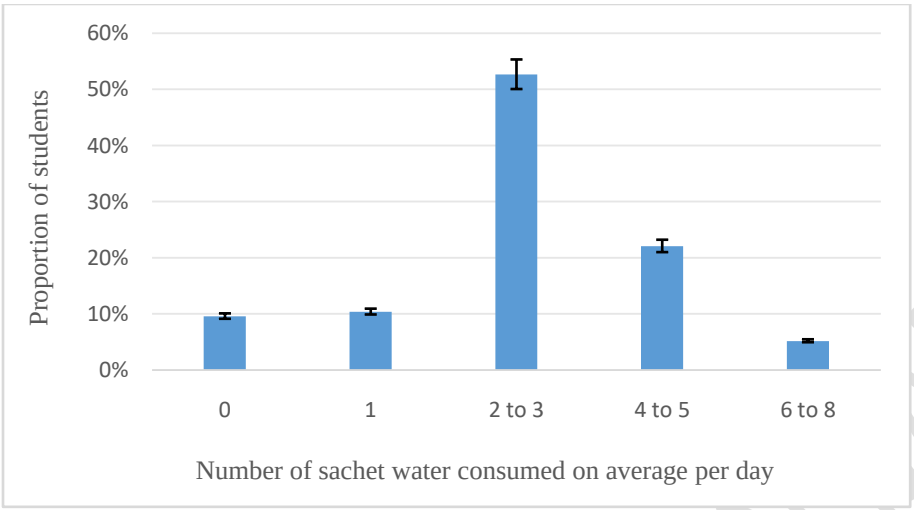

Figure 4:- Number of sachet water consumed on average per day

Sachet water taste perception:

A large proportion of the students surveyed (56.57 %) says that the sachets water are of an unpleasant taste, a taste of soil or bleach. Only 26.31 % believe that sachets water are of an acceptable taste, similar to that of tap water. Sachets water are also perceived as salty (2.94 %), as having a variable taste (8.87 %) or even an undetermined taste (5.31 %) (Figure 5).

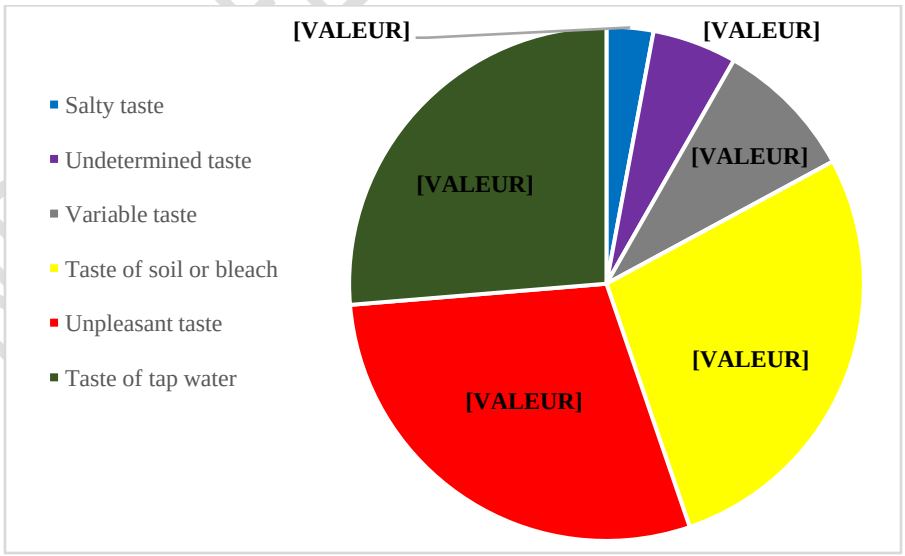

Figure 5:- Opinion on the taste of sachet water

Hygienic conditions for sachets water drinking:

In the vicinity of schools, sachets water are mainly sold by shopkeepers. The sachets water are stores on pallets placed on the ground and gradually fill the fridges to make it fresh when consumed. The survey carried out shows that nearly 45 % of students believe that sachets water is sold in unsanitary conditions (Figure 6). In particular, the cleanliness of the fridges raises doubts. In addition, 88.50 % of the students admit to not washing their hands before consuming the sachets water. 44.88 % of them also admit to throwing the sachet in their bag or on the ground after consumption. Only 55.12 % say they throw sachets water in a trashes (Table 1).

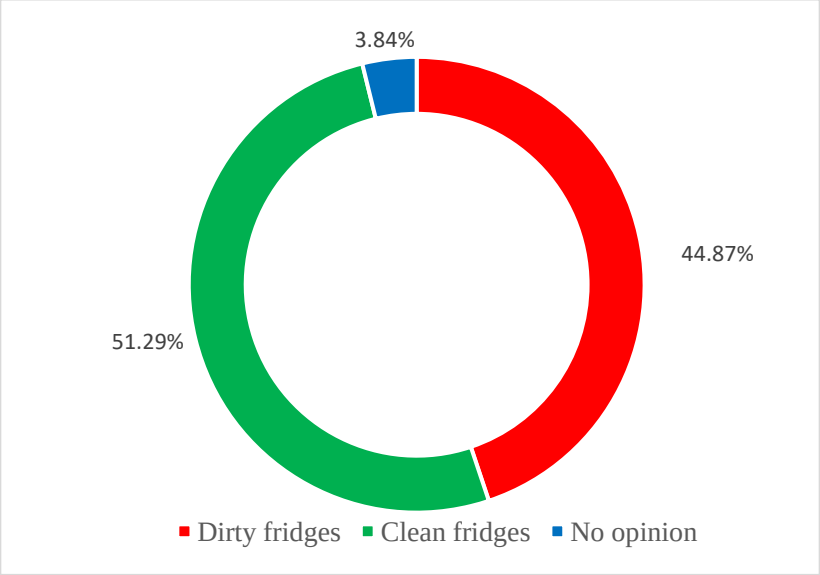

Figure 6:- Opinion on the cleanliness of the sellers fridges

Table 1:- Hygienic measures when consuming sachets

Hygienic measures when consuming sachets		Proportion of students surveyed (%)
Before consumption	Wash their hands	11.5
	Do not wash their hands	88.5
After consumption	Throw in a trash	55.12
	Do not throw in a trash	44.88

Perceived impact of drinking sachets water on health:

Sachets water are perceived as a vector of many diseases. Indeed, 77.24 % of students surveyed think its consumption can cause stomach aches, diarrhea, intestinal parasites … (table 2).

Table 2 :- Effects attributed to sachets water on health

Effects attributed to sachets water on health		Proportion of students surveyed (%)
Good for health		6.49
Unfit for consumption	Abdominal pain	44.24
	Diarrhea	9.79
	Intestinal parasites	7.11
	poisoning	4.89
	Stomach aches	3.84
	Infections	3.28
	Typhoïd fever	2.59
	Others	1.50
No opinion		16.27

Discussion:-

The classification by gender and age of students in our study reflects the socio-demographic characteristic of students in the Estuaire province where Akanda is located. Indeed, in secondary schools in the Estuaire province, a majority of girls is observed (53.14 %) and a larger number in the first cycle (73.99 %), particularly in the sixth grade. They represents 20.66 % of students enrolled in secondary schools (Ministry of National Education, 2023). The numbers in secondary education show that the higher level of education, the fewer students there are. A UNESCO report indicates that in sub-Saharan Africa 37 % of students complete the first cycle of secondary education compared to only 27 % of students who complete the second cycle (UNESCO, 2017). According to a study carried out in Ivory Coast, the average age of secondary school students (fourth to final year classes) varies from 14 years to 22 years, with an average age of 17.17 years old (Coulibaly, 2019). Students aged over 20 are found at technical high school which trains them for a profession.

According to the students surveyed, sachets water is often consumed elsewhere than at home. Indeed, in the literature, studies show that its consumption meets a one-off and temporary need for a person who travels outside their home (Valentin, 2010). Sachet water is consumed outside the household because it is easily transportable (Kouamé et al., 2024 ; Ahovey et al., 2022). In addition plastic is much lighter and less brittle than glass (Kamguem, 2023).

Sachet water is very popular with an average consumption of 2 or 3 sachet among the majority of students, according to our survey. This can be explained by its wide availability in small neighborhood shops and its low price. In fact, all the shopkeepers located near schools sell sachet water in large quantity. The average price of a sachet water is 50 fcfa (0.08 $), while you have to pay at least 300 fcfa (0.05 $) to buy a little bottled mineral water. The low cost of sachet water

allows student to quench their thirst on their small budget. This low cost of sachet water is mentioned in the literature. In the commune of Adjame in Ivory Coast, a sachet water is sold from 10 fcfa (0.02 $) to 50 fcfa (0.08 $) (Konan, 2022). According to a study carried out in Porto-Novo in Benin, 77 % of the population consume 1 to 2 sachets water on average per day. The main reasons justifying this high consumption are the wide availability of sachet water and its low price (N'vekounou, 2019).

Despite its popularity among the students surveyed, sachet water is increasingly depreciated. Its taste is considered unpleasant, associated with a taste of earth or bleach. This would require, according to the students surveyed, to improve the treatments applied to sachets water before it is marketed. In addition, the lack of information on the production conditions accentuates students' distrust of sachets water. Furthermore, health checks on producers of this water are also considered insufficient given the multitude of brands on the market place. The students surveyed recommend an effective ban on certain brands. The proliferation of sachet water brands is a problem encountered in other regions too. In the commune of Parakou (Benin) sachet water production is a highly competitive market dominated by a dozen of brands (Akiyo and al., 2017). In the commune of Adjame (Benin), around twenty brands are flooding the market. The marketing of sachets water is marked by a disorder and dangerous hygienic practices (Konan, 2022). People often deplore the fact that hygienic rules are poorly followed and poorly controlled in sachets water production industries (N'vekounou, 2019). In Lome (Togo), a survey revealed that 70 % sachets water production plants have an unsanitary immediate external environment and are surrounded by grass beds, stagnant water and garbage (Kordowou and al., 2023). According to a survey carried out in Niamey (Niger), in most sachets water manufacturing sites, sachets water are arranged in piles on terraces with apparently little hygiene (Mijitaba and al., 2020).

Sachets water raise many concerns among the students surveyed regarding its impact on health. They also complain about its bad taste, its non-compliance with basic hygiene rules such as washing hands and the unsanitary state of certain shops. For these various reasons, a significant proportion of students surveyed (nearly 10 %) no longer consume sachet water. A solution proposed by theses students would be the marketing of sachet water by Andza: the local brand of bottle mineral water which is the most appreciated for its recognized quality and its flavor (Souloungangа et al., 2023). In his study, Akiyo cites similar illnesses (cholera, stomach aches, diarrhea, typhoid fever…) attributed to the consumption of sachet water (Akiyo et al., 2017). Another study carried out in Douala (Cameroon) reveals the poor microbiological quality of sachets water from 25 different local brands, thus exposing populations to health risks (Kamguem, 2023). This poor quality of sachet water is attributed to lack of hygiene.

The significant consumption of sachet water poses the problem of the fate of sachets in the environment. Indeed, despite the clearly visible presence of garbage bins at sachets water retailers' and in schools, the sachets are often thrown on the ground. The sachets are not recycled unlike mineral water bottles which are re-used by population, particularly for the sale of locally made juices. After consumption of water, the sachets can thus constitute environmental pollution. In its study, Akiyo reports that 66.9 % of consumers throw the sachets on the ground (Akiyo and al., 2017). Another study shows that 63 % of the population throw the sachets in gutters, leading to a saturation of drainage gutters (N'vekounou, 2019).

Conclusion :-

Sachet water is a drinking water favored by populations, particularly young students, due to its wide availability from most small local merchants and its low price. The trade of sachets water has significantly developed in recent years. This has led to a proliferation of sachet water brands and an insufficiency or even absence of health controls on the conditions of production and sale of that water. Thus, concerns are being expressed more and more among young population who accuse sachets water of being the cause of numerous illnesses and who often complains about its unpleasant taste. The fate of sachets water after consumption also poses environmental problems given the incivility of many consumers who throw the sachet on the ground, in the gutters, thus ignoring the garbage bins. Many efforts remain to be made on the control of the sale of sachets water, particularly on effective application of health measures. Better awareness among young students would be useful to prevent and limit pollution caused by sachets water.

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