

Analysis of water consumption and reuse in public school students' homes in Nova Xavantina - MT

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ABSTRACT

In a few years, water recycling will be a practice that will gain many supporters. The importance of encouraging students to develop a critical consciousness and to become aware of the future of this water resource that is so important for our planet is one of the means that educators can subsidize in their subjects, regardless of the area of knowledge. From this perspective, the objective of this study was to analyze the

consumption and reuse of water in the homes of students from the Escola Estadual Coronel Vanique in Nova Xavantina - MT, in addition to promoting the awareness of students and their families about the water issue. This study was carried out in Nova Xavantina, Mato Grosso, at Escola Estadual Coronel Vanique. The data were collected by applying semi-closed questionnaires to elementary and high school students. The results presented in this article show us that the school can serve as a channel for the distribution of useful information for the preservation and conservation of the environment, besides serving as a base for educational and ecological purposes. It is hoped that, after the development of this work, students will become even more sensitive to water problems and change their attitudes towards saving water, and that they will become multipliers of this awareness in their families and in the community.

Keywords: environmental economics; natural resources; waste.

1 INTRODUCTION

Learning occurs as a whole, causing a change, "whether in a person's behavior, in the orientation of his future action, or in his attitudes. It is a penetrating learning, which is not limited to an increase in knowledge, but which deeply penetrates all portions of one's existence" (ROGERS, 1982). Learning that engages the person or learner in existential or educational experience is meaningful learning. This learning is dynamic and spreads in such a way that "the student involved in the process of meaningful learning participates in it actively, assimilating contents that are meaningful to them, transferring them to subsequent situations" (GUEDES, 1981).

In this context, Reigota (1998) states that environmental education points to pedagogical proposals focused on awareness, behavioral change, development of skills, evaluation capacity and participation of students. For Padua and Tabanez (1998), environmental education provides an increase in knowledge, change in values, and improvement in skills, basic conditions to stimulate greater integration and harmony

of individuals with the environment. According to Reigota (1998), if the teaching of environmental education does not have a political, economic, cultural and social approach, it will be considered as the teaching of biology and/or ecology, in which, most of the time, man is presented as one more element in the energy chain.

According to Telles (2002), the strategies used to achieve the goals of Environmental Education are very varied, and it is up to each educator, within his or her reality, to choose the most suitable one.

According to Sato (2004), the environment cannot be considered an isolated object of each discipline. It must be approached in a dimension that develops activities in physical, biological, social, and cultural aspects. Environmental Education must be inserted in all subjects. It is up to the teachers, through interdisciplinarity, to develop activities that favor the implementation of Environmental Education, considering local and current problems as examples.

For the environmental movement of awareness about the need for preservation, recovery and conscious use of natural resources must occur in all segments of society. This perspective must permeate all content and related methodologies, as well as special activities that develop this facet in the formation of the individual with a sense of citizenship, because teaching environmental education is primarily, to teach respect for life and what is related to it (KOFF, 1995). And one of the great targets of Environmental Education has been water.

The planet earth is made up of about 70% of its surface by water, but a small portion, referring to fresh water, can be used for human consumption (BARROS & AMIN, 2008).

Water is one of the essential elements for our survival and for all living things; drinking water is becoming more expensive and scarce every day. Some predictions say that drinking water will be in short supply in the very near future. The most common way of collecting water is, in general, from rivers, which are becoming more polluted every day, requiring more and more treatments for its consumption (RODRIGUES, 2003).

There is a lot of talk lately about the threat of water shortages to meet the demands of the next century, and the issue is dramatized by insinuating that water, or the lack of it, could be the cause of wars in the 21st century. The concern makes sense when one observes the neglect of water management by governments and society in general. It is enough to look at any urban stream to feel the drama of the water, soiled by domestic sewage, industrial waste, and garbage of all kinds. In rural areas it is not much different (ZALAUF, 2000).

Water recycling, within a few years will be a practice that will gain many supporters. Water, this product that we need to consume so much, will become a very expensive product as the years go by (JENKINS, 2005).

The importance of instigating the student to develop a critical consciousness and to become aware of the future of this water resource that is so important for our planet is one of the means that educators can subsidize in their subjects, regardless of the area of knowledge.

From this perspective, the objective of this study was to analyze the consumption and reuse of water in the homes of students at the Escola Estadual Coronel Vanique in Nova Xavantina - MT, and to raise the awareness of students and their families about water issues.

2 MATERIAL AND METHODS

2.1 STUDY AREA

The municipality of Nova Xavantina is located in the eastern part of the state of Mato Grosso, a region also called Médio Araguaia, and is part of the Legal Amazon, the geodesic center of Brazil (IBGE, 2009).

The present study was carried out in the State School Coronel Vanique, founded on June 08, 1980, by Decree No. 831 of 12/02/1981. The school operates in the three periods, morning, afternoon and evening with the modalities: Regular Cycled Education and EJA, serving approximately 600 students, with a staff of 23 teachers.

2.2 DATA COLLECTION

The data were collected through the application of 149 semi-closed questionnaires with elementary and high school students (EJA and Regular Education). The questionnaires were filled out with the help of parents and returned later.

The questionnaire aimed to find out the average size of the interviewed families, as well as the profile of water consumption, water reuse, and the concern of the target audience with saving water.

The students were taken to the school's computer lab, so that they could search on the internet in specialized sites about themes related to the waste and reuse of water, in order to produce didactic material about the subject.

A visit was also made to SETAE (Nova Xavantina's Water and Sewage Treatment System) to collect information about water consumption in the municipality of Nova Xavantina.

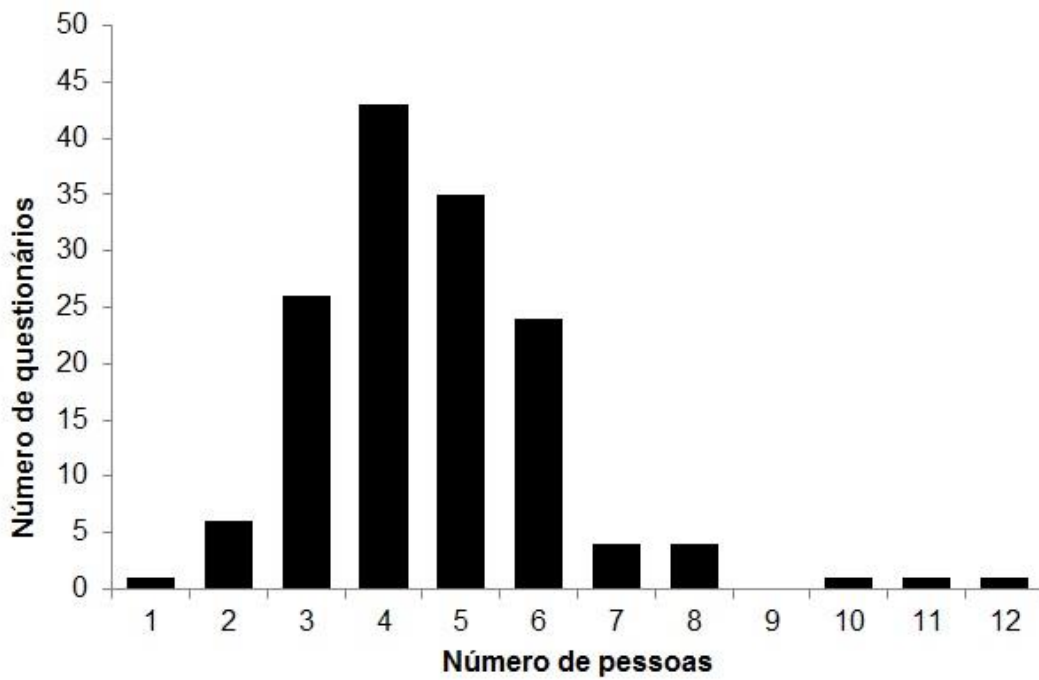
3 RESULTS AND DISCUSSION

3.1 NUMBER OF PEOPLE PER HOUSEHOLD

Of the total questionnaires analyzed, 43 reported that there were four people living in the residence, followed by 35 questionnaires that reported five people (Figure 1).

According to the IBGE (2010), the average size of Brazilian families is 3.3 people, much smaller than that recorded in 1981, where the average size was 4.3 people, and in 1990, 3.9 people. This suggests an exponential decrease in the average size of Brazilian families.

Figure 1: Number of people per household of the interviewed students.



Caption: Horizontal: number of people, Vertical: Number of questionnaires

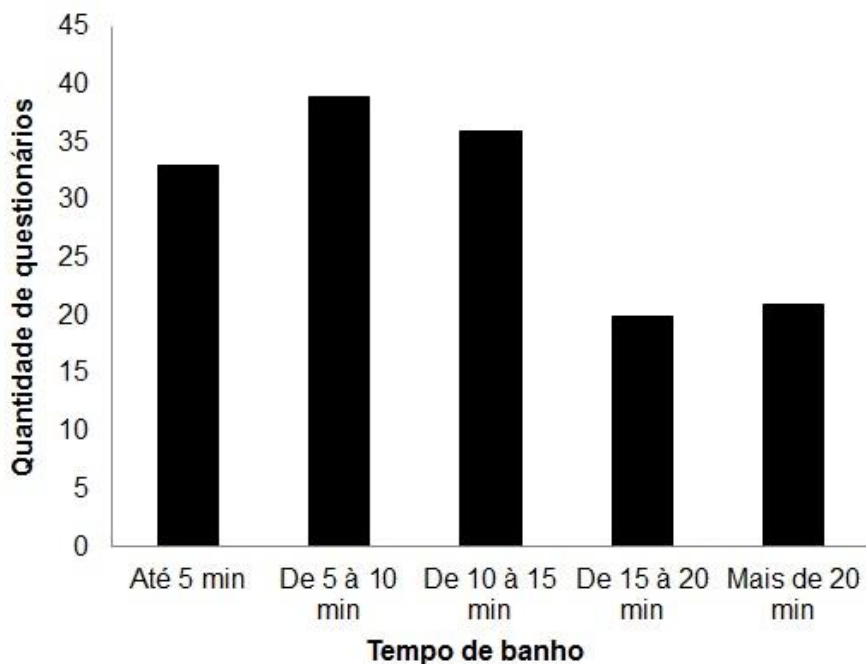
In the present study, the average size of the interviewed families was 4.6 people; this increase was certainly caused by the large number of households with five and six people in the family (Figure 1). It can also be explained by the fact that the school mainly serves students from low-income families, often characterized by a larger number of people per family.

3.2 WATER CONSUMPTION PROFILE

As for the time the shower is on during a bath, the period from 5 to 10 minutes showed the highest number of records, with 39 questionnaires. Followed by the periods from 10 to 15min and up to 5min, respectively, with 36 and 33 records (Figure 2).

The average bath time of the members of the families in this study is 11.1min.

Figure 2: Bath time of the members of the interviewed students' families.



Caption: Horizontal: Bath time, Vertical: Number of questionnaires

Observing Figure 2, it can be seen that although the average bath time was 11.1 minutes, there is a large number of people who still take a long time to take a bath. A 15min shower with the register open spends an average of 45 liters of water, while a 20min shower spends an average of 60 liters of water (SANEAGO, 2010).

Also according to the above reference, bathing accounts for about 30% of the consumption of the water bill. This is why it is so necessary to change the behavior of the population, who should adopt shorter and more rational showers.

When asked about the habit of leaving the tap running when brushing teeth and washing dishes, in both situations, the majority did not leave the tap running (74% and 72%, respectively).

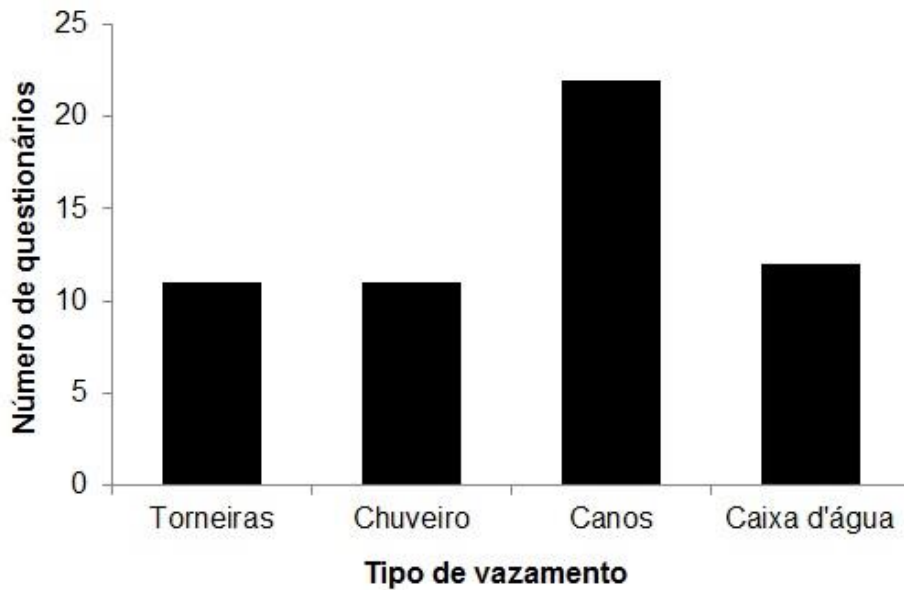
Keeping the tap closed when brushing your teeth saves up to 96% of the water that would be consumed with the tap open. Washing dishes with the tap turned off can generate savings of 75% of water (SANEAGO, 2010).

Regarding the fact that there are leaks in their homes, 66% of respondents said there are no leaks. Among those who said there were leaks, these were identified by the interviewees, and most leaks stemmed from problems with the plumbing of the homes, with this percentage being 39% (Figure 3).

A dripping faucet can consume up to 46 liters of water per day, totaling 1,380 liters per month (CAGECE, 2010).

There can be many points of waste in a home, such as plumbing, faucets, showers, water tanks, and many others. It is up to the residents to check the points of waste and fix the defects to avoid losing water.

Figure 3: Quantity of each type of leakage reported by the interviewed students.



Caption: Horizontal: Type of leak, Vertical: Number of questionnaires

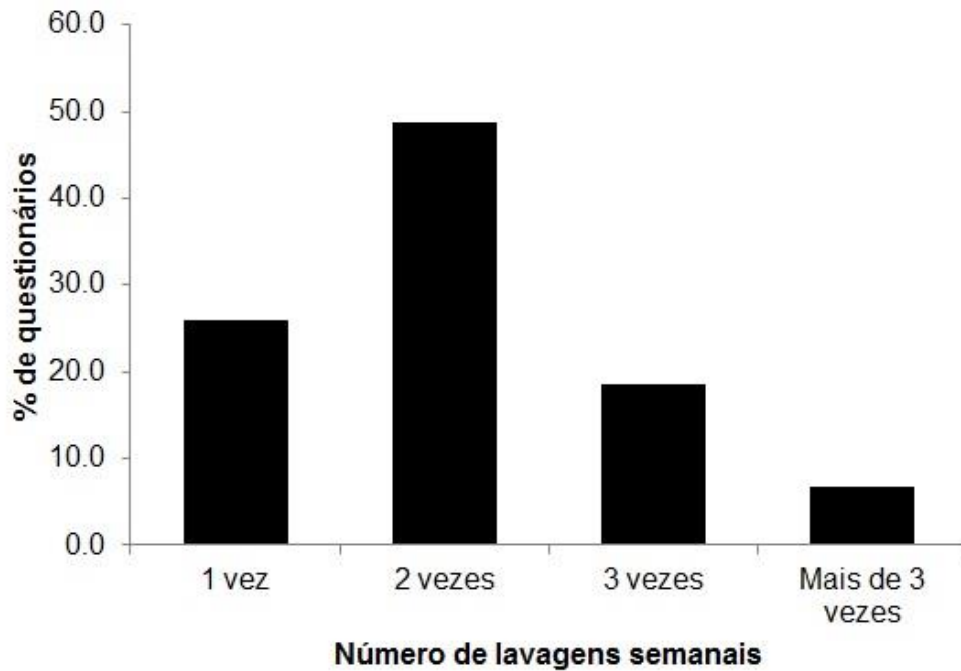
Asked about the number of times they wash clothes, 48% of respondents said they wash clothes twice a week (Figure 4).

And the consumption of 50 to 100L of water in this daily activity was the most chosen, with 36% of the questionnaires, followed by the consumption of up to 50L, with 27% of the questionnaires (Figure 5).

Considering the destination given to the "dirty" water resulting from washing clothes, fortunately, the vast majority makes use of practices to reuse this water. Of the interviewees who answered this survey, 33% reuse the "dirty" water to water their plants, 28% use it to wash the sidewalk, 9% wash parts or the whole house, 2% wet the yard, and 1% wash their motorcycle with this water.

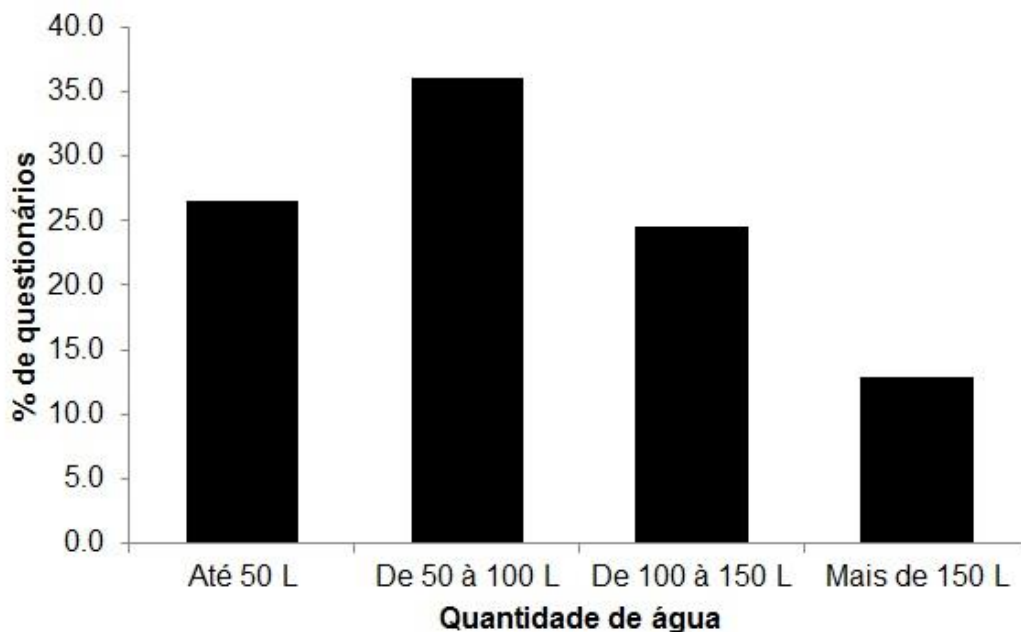
However, a large percentage of the interviewees do not reuse the water, which is thrown away, with 27% of the interviewees responsible for this attitude.

Figure 4: Percentage of the number of times clothes are washed in the homes of the interviewed students.



Caption: Horizontal: Number of washes per week, Vertical: Percentage of questionnaires

Figure 5: Percentage of the amount of water used each time clothes are washed in the homes of the interviewed students.



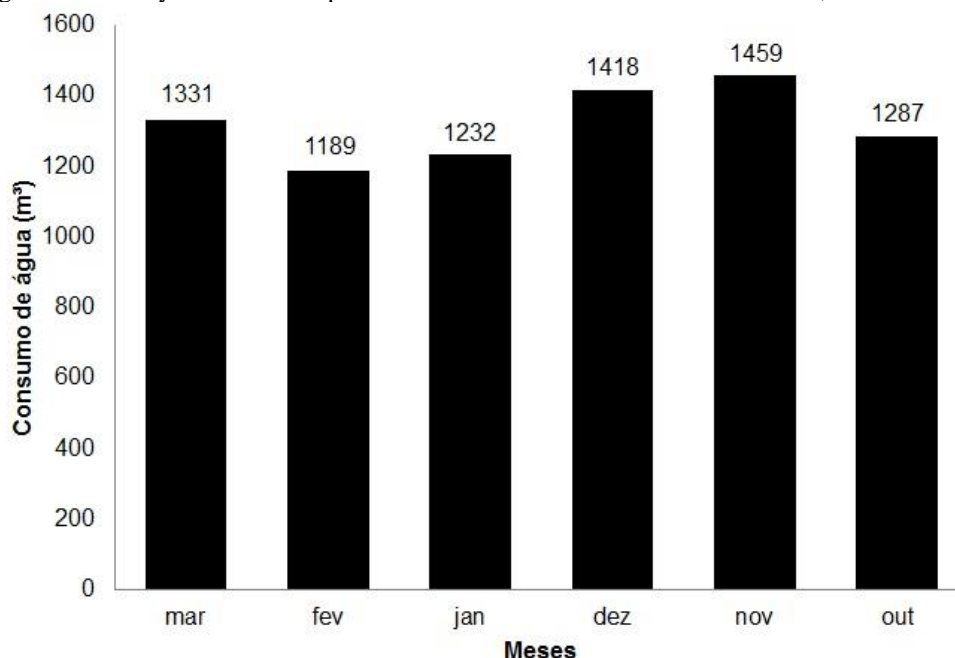
Caption: Horizontal: Amount of water, Vertical: Percentage of questionnaires

We investigated the origin of the water consumed by the residents of the study and found that 106 interviewees use water from SETAE and 43 of the interviewees use water from other sources, thus verifying that there is a variation between the source of consumption of the interviewees.

The monthly water consumption of the interviewees in the last six months was also analyzed. The data presented refer to residents who use the water distributed by SETAE. The highest water consumption was recorded in the month of November, with 1,459m³ of water consumed, followed by December with 1,418m³ consumed (Figure 6).

According to SETAE, the population of Xavantinense consumes an average of 15m³ of water per month. In the present study an average monthly consumption of 14.19m³ of water was recorded by the interviewed families.

Figure 6: Monthly water consumption of the interviewed students last semester, recorded in m³.



Caption: Horizontal: Months, Vertical: Water consumption (m³)

This decrease in average monthly consumption observed in the families of the present study may be a reflection of the population's concern about saving water.

3.3 CONCERN FOR SAVING WATER

Of the 149 respondents, 57% answered that they worry about saving water and 35% said that they worry about saving water sometimes, 4% don't worry, and 4% don't know.

Fortunately, the vast majority of respondents are concerned about saving water, and comparing with the various water reuses, it can be seen that the population uses individual attitudes aimed at saving water.

There are several campaigns in schools, TV, newspapers and magazines that aim to raise awareness among the population about the reuse of water in their homes. And the result of these campaigns can be seen in the results of the present study.

3.4 STUDENT AWARENESS

The students, who were taken to the computer lab, produced several posters with drawings and phrases about the concern with water waste, ways to avoid wasting it, the future of the planet, and raising awareness about these issues.

The students showed to be sensitive to the various problems involving water, and thus are excellent multiplier agents for awareness campaigns about rational consumption and reuse of water.

The school is able to stimulate the habit of participation and the adoption of sustainable behaviors in everyday life, at the personal, family, and community levels, fundamentally by providing a methodology, training, framework, and support in the activities that are developed (SANTOS, 2007).

The school can serve as a channel for the distribution of useful information for the preservation and conservation of the environment, as well as a base for educational and ecological purposes. It is perhaps the most appropriate place for this type of education, since it can encourage actions through plans, projects and programs of Environmental Education, as well as facilitate communication and exchange of experiences between students and environmental educators.

4 CONCLUSION

This research work has shown the importance of knowing what the student thinks and/or knows about the proposed study, so that, based on this, it is possible to develop a didactic proposal that adds something to the students' previous knowledge. It is hoped that, after the development of this work, the students will become even more sensitive to water problems and change their attitudes towards saving water, and that they will become multipliers of this awareness in their families and the community.

Individual attitudes, such as sustainable consumption, are important and necessary, but it is necessary to move forward and seek more collective actions aimed at ecological protection with environmental justice.

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