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Consumption of Water, Environmental Awareness and Class Consciousness: Mismatches in the Praxis

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Abstract

If there is an inequality in the supply and consumption, would there be an equality in the duty of its preservation? That is the central issue of the paper. The objectives of this study were: i) to analyze water consumption; ii) to assess the environmental awareness of water consumption; and iii) to discuss the class consciousness regarding water supply between socioeconomic classes in the municipality of Recife, State of Pernambuco (Brazil). Households, as a sampling unit, were analyzed in this work in a census form. Per capita water consumption is unequal between socioeconomic classes. Formation for environmental awareness does not prepare individuals for environmental praxis, and to discuss inequality of rights and justice for access to primary resources, but teach them to respect equalities in duties. Class consciousness, by those least favored, should be the first step in environmental education for not only equalizing water consumption, but also eradicating the usury in its use by classes with higher purchasing power. The continuous reproduction of socioeconomic classes that have environmental awareness and do not have the environmental praxis shows that something is wrong since the formation of the subject that maintains the status quo, legislation that does not make social and environmental justice.

Keywords: Class Struggle, Inequality, Education, Water Resources

1. Introduction

The per capita consumption of water indicated by the United Nations is 110 L day⁻¹ (Un, 2016), to meet basic needs that involve hygiene, nutrition and hydration of the individual, as well as other uses inserted in the home environment (e.g. cleaning, gardening, steaming, etc.). There is a worldwide inequality in this per capita consumption, there is country, like the United States, that per capita consumption is 575 L day⁻¹, and there is country, like Mozambique, that per capita consumption is 4 L · day⁻¹ (Data 360, 2023). The countries that are most politically and economically able to abstract, store and distribute water are the ones that consume the most, as seen by the record of consumption on a decreasing scale of developed countries, passing through the emerging ones (e.g. Brazil: 185 L day⁻¹), until reaching the developing countries (Hoekstra & Chapagain, 2007). These inequalities are also perceptible at municipal levels, correlated mainly to the space in which the individual resides

(Hussien et al., 2016). The spaces with the highest index of urban development (availability) and with a population with higher income, consume more water, for their purchasing power of the product (water) and their services (e.g. cleaning of the environment) (Chenoweth et al., 2016).

In urban spaces, with the urbanization of capital (Harvey, 1985), real estate speculation and pressure define water supply policies not only spatially but temporally (quantitatively) and qualitatively (Willis et al., 2013). Inequality is perceptible in infrastructure and in the quality of services provided related to water supply, in different spaces marked by socioeconomic segregation (March & Sauri, 2016). Lower water pressure, turbid color, physical and chemical contamination, biological contamination, different forms of consumption measurement (upwards), and rupture in pipes were constantly recorded in regions with lower Human Development Index (HDI) (Abubakar, 2016).

Nonetheless, government advertising campaigns encourage everyone to reduce water consumption and collaborate in maintaining supply infrastructure (Brondizio & Le Tourneau, 2016). If there is an inequality in the supply and consumption (inequality in rights), would there be an equality in the duty of its preservation? That is the central issue of this work. Not only in the formation of a reproductive culture and without criticism (publicity campaigns) does equality prevail in duty when there is no right, and also in the curricula of elementary education to higher education (Giroux, 2014), which mainstream the theme of environmental education. The construction of a society of order, alienated and consuming (concept of citizenship in the present world) (Bauman, 2007) also goes through the so-called construction of environmental awareness (role of environmental education).

With the reification of nature (Marx, 2013), the so-called “ecological subject” seems to approach more of a consumer of products with a ‘green seal’ than a being integrated into nature and its holistic complexity. The “ecological subject,” epistemologically disciplined, is an object of ecological marketing, which is not interested in mitigating and eradicating local and global environmental impacts, but in a circumstantial activist appearance or in the profit of its brand (Peattie & Crane, 2005). The ecological being would be the one who through the affective and collective memory visualizes changes of scenery and situations of scarcity, and, envisions an inhospitable future, in which by taking this awareness in this articulation of time, or potentially a new lifestyle for itself, for the other and for the planet as a whole (Steil & Carvalho, 2014). However, this environmental awareness does not lead to a potent individual in a praxis (Gilg et al., 2005). The individual in question, who possesses the environmental awareness and even skills for it (e.g. diplomas), is full of the knowledge necessary to practice sustainable in the environment (holistic relations), so that it maintains a habitable planet without anthropic dystrophisms. The individual who knows and who is ‘competent’, most of the time, is distant from the one who is pleasant and commits the action: the pleasant subject (Santana, 2016).

Environmental education with the homogenization of the individual’s duty to environmental issues, and with the distance from formation to action, does not reflect and is not critical, such as for example, the so-called ‘pedagogy of the earth’ that even “avant la lettre”, its subjects focus on the practice and reduction of socioeconomic inequality rather than on the construction of a disciplinary ontos that will be accommodated to the capital system (Freire, 1983; Boff, 2004). This system, which naturally produces inequality in production, consumption and alienation (Santos, 1970). The alienation of all, and especially of the most exploited socioeconomic classes in their workforce, widens inequality in the use of primary resources (e.g. water), and expands the definition of socioeconomic superstructure (structuring of culture, institutions, political power, social role, rituals and the State, Marx, 2004) in the unequal supply of resources without questions by the socioeconomic classes.

The alienation of individuals by the commodification of the relation to nature (false consciousness as ideology, Lukacs, 1960), would make them conform to the crisis of water supply (rationing) and its unequal distribution? Would those who are deprived of water be conformed because they did not have the money to own the resource? Here the link between politics and economy for deprivation of the resource is ‘legal’ and ‘just’ (Lukacs, 1960; Agamben, 1995). The crisis in water supply is a relevant scenario to be studied, because in this scenario it is possible to observe possible imbalances in the distribution of this resource in relation to the different socioeconomically segregated spaces (Santana, 2016; 2017). Would there be a false democracy in water supply,

and in times of crisis would the value of the natural resource for selectivity in use increase? (New oppression and false bourgeois democracy, Lukacs, 1960).

Therefore, the objectives of this study were: i) to analyze water consumption; ii) to assess the environmental awareness of water consumption; and iii) to discuss the class consciousness regarding water supply between socioeconomic classes in the municipality of Recife, State of Pernambuco.

2. Method

The study was carried out in the municipality of Recife (8°02'S and 34°52'W – Figure 1), State of Pernambuco, Brazil, which occupies an area of 218,435 km², with an estimated population of 1,625,583 inhabitants, and distributed in 499,183 domiciles (Ibge, 2023). The volume of water that supplies this municipality comes from the Pirapama Dam, with a maximum capacity of approximately 61 106 m³.

Households, as a sampling unit, were analyzed in this work in a census form (Ibge, 2013), in which they were divided into three sample groups defined by socioeconomic classes with minimum wage bands (Ibge, 2023): Upper Class, in which the residents of the household in their total received more than ten minimum wages, Middle Class, between four and ten minimum wages, and Lower Class below four minimum wages (Minimum Wage: 2019 = R\$ 998.00, 2020 = R\$ 1,095.00, 2021 = R\$ 1,100.00, 2022 = R\$ 1,212.00), adjusted for the years analyzed (Kamakura & Mazzon, 2016; Losurdo, 2016).

In order to determine the socioeconomic inequality and to compare the areas (neighborhoods), the Gini coefficient of household income per capita (Gini, 1921) was calculated using the model:

$$G = 1 - \sum_{k=0}^{k=n-1} (X_{k+1} - X_k)(Y_{k+1} - Y_k) \quad (1)$$

where: G = Gini coefficient; X = cumulative proportion of the variable “population”; and Y = cumulative proportion of the variable “income”. The Gini coefficient consists of a value between 0 and 1, where 0 corresponds to the complete equality (in the case of income, for example, the whole population receives the same salary) and 1 corresponds to the complete inequality (in which one person receives all income and the rest receive nothing).

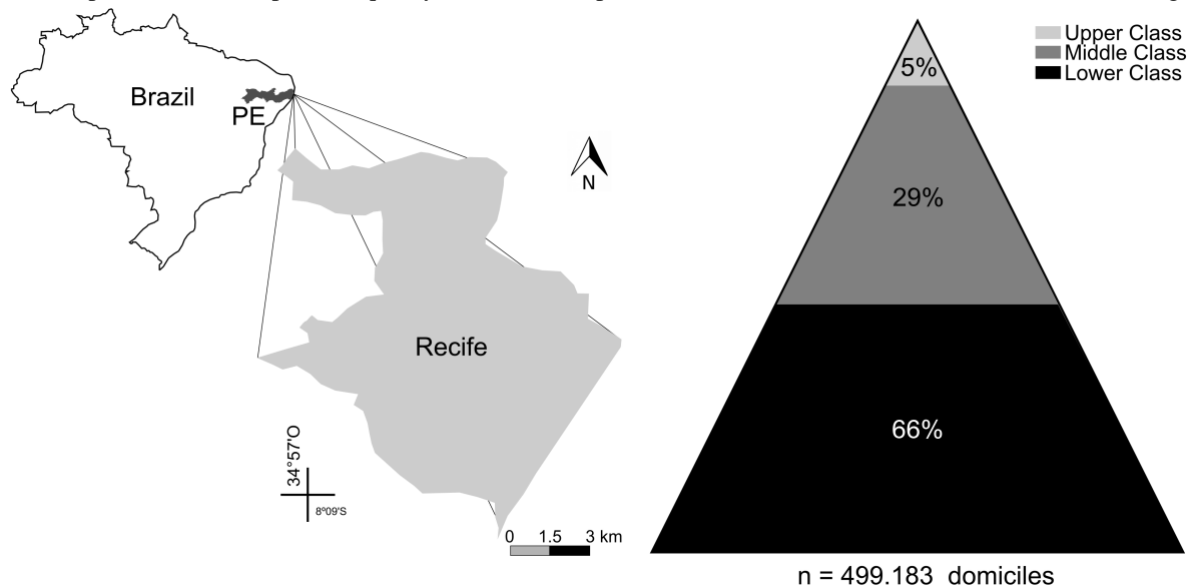


Figure 1: Distribution of socioeconomic classes per number of households in the municipality studied: Recife, State of Pernambuco.

Source: The author

From the household socioeconomic classification considered for this study, the variables collected were: i) per capita consumption of water (L day⁻¹) and price paid for water consumed (R\$ · 10,000 L⁻¹), evaluated by the data

in the water accounts of domiciles sampled; ii) monthly income per property (R\$ · month⁻¹) and % schooling of residents over 25 years old per questionnaire; iii) HDI - human development index of the neighborhood in which the domicile is located (Undp, 2023); and iv) price (R\$) per m², based on data from the real estate market for purchase and sale transactions (Vila Real, 2016) in the period studied. All variables mentioned in this study were collected over a period of three years between October 2019 and September 2022.

In the sampled households, we examined the level of knowledge about twenty-two themes and thematic axes addressed by the Brazilian Environmental Education, required for the formation of an environmental awareness thought in a given space-time context (Pritchard, 1968), namely (Cnea, 2021): i) environmental education in schools; ii) biogeography and biodiversity; iii) causes and effects of climate change; iv) geoecology of landscapes and ecosystems; v) environmental education and health; vi) environmental education in communities; vii) public policies, programs and actions; viii) challenges and innovation in the urban environment; ix) recycling of consumer goods; x) environmental law and social responsibility; xi) solidarity and creative economy; xii) environmental impacts, risks and disasters; xiii) tourism and the environment; xiv) environmental education and management in protected areas; xv) agroecology, extractivism and soil conservation; xvi) productive systems in the green economy; xxvii) management of water resources; xviii) renewable energy sources; xix) ecopedagogy and environmental perception; xx) environmental education, ethno-culture and citizenship; xxi) food security and sovereignty; and xxii) waste treatment and sanitation.

The level of knowledge was determined by a structured questionnaire, closed in response, in Likert Scale, the weight of the answer ranged from 0 to 10, in which 0 indicates the interviewee considered to have no knowledge about the theme, even had never heard about, and 10, total knowledge, that is, the individual could talk about the theme, articulate with reality and create hypothesis about it (Santana, 2014; Santana & Petrova, 2016).

Other information was also collected, such as the total volume of water available in the Pirapama Dam (Apac, 2023), and the number of days per year in which there is water supply per household (Ana, 2023), above two hours within 24 hours. Possible correlation between variables was estimated by Pearson Correlation Coefficient (r), and possible significant differences of data between socioeconomic classes were calculated by the χ^2 Non-Parametric Test (Zar, 2010).

3. Results

In Recife, the majority of households (329,461) were classified as residents of socioeconomic lower class, and in descending order, with residents of middle class (144,763) and upper class (24,959) (Figure 1). On the contrary, the number of residents per household was increasing from upper class (4 ± 2 residents) to middle class (5 ± 3 residents), to lower class (8 ± 3 residents) (Figure 2).

The variable per capita consumption of water in the households studied was directly correlated ($r > 0.800$) with the HDI of the neighborhoods where the households were established, with the per capita income and the educational level of the residents (higher education). Upper class consume on average 513 ± 79 L day⁻¹ of water, differently from middle class (135 ± 51 L day⁻¹) and from lower class (71 ± 19 L day⁻¹) (Figure 2).

Per capita income classified the distribution of households into socioeconomic classes. The distance between upper class (R\$ 27,000 \pm 15,000) and middle class (R\$ 3,300 \pm 1,100) and lower class (R\$ 850 \pm 250) was approximately 300% higher than the mean (Figure 2). And this directly interfered with where they live (HDI: Upper Class = 0.90 ± 0.10 , Middle Class = 0.65 ± 0.30 , and Lower Class = 0.45 ± 0.25), and the schooling level (higher education) of adults older than 25 years of age (Upper Class = 78% on average, Middle Class = 21% on average, and Lower Class = 2% on average). The price of water paid by each class varied. The class that paid the most for water consumption per capita was middle (R\$ 11 · 10,000 L⁻¹), followed by upper class (R\$ 8 · 10,000 L⁻¹) and lower class (R\$ 8 · 10,000 L⁻¹).

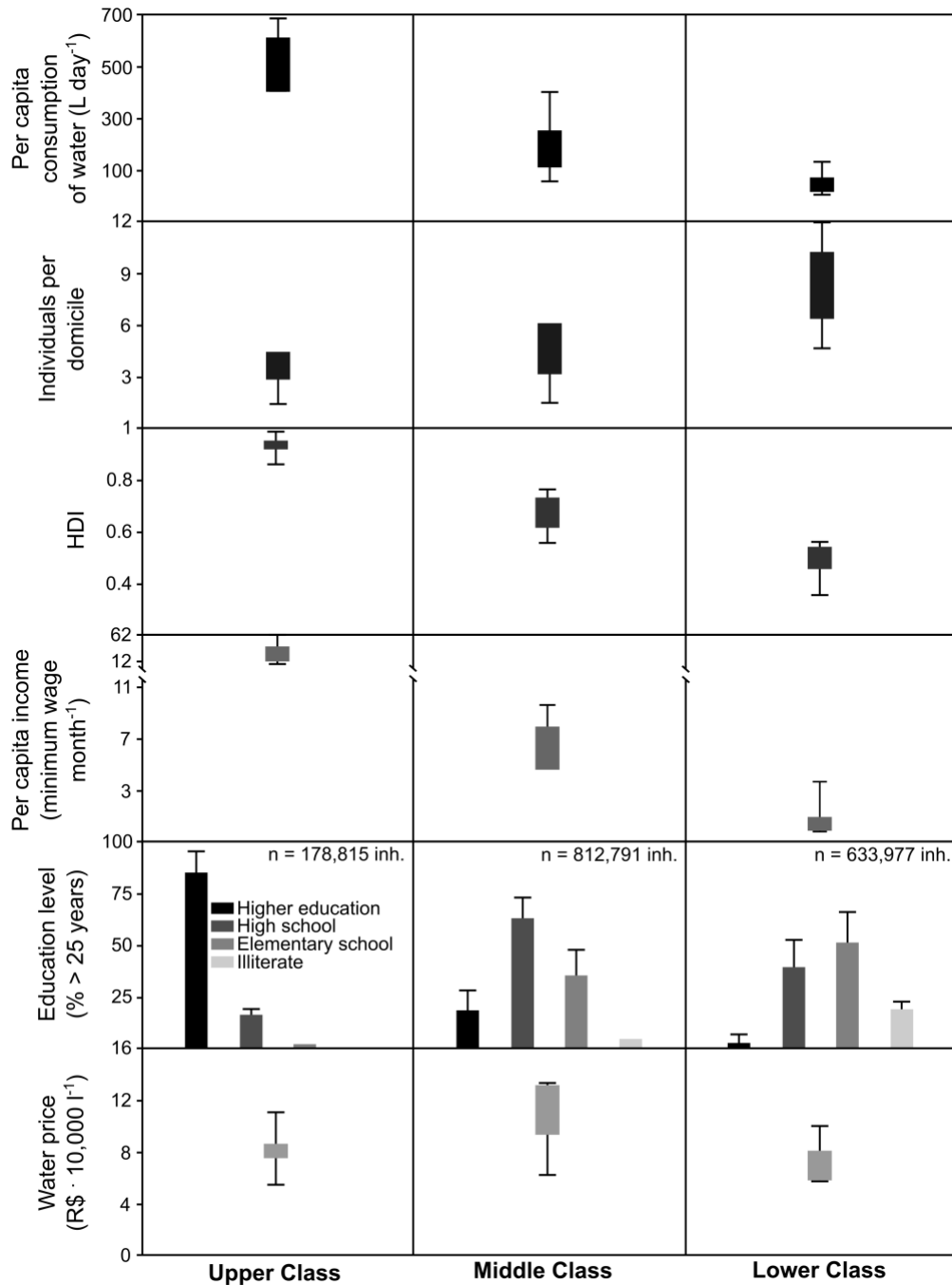


Figure 2: Results of the studied variables distributed into socioeconomic classes in Recife, State of Pernambuco.

Source: The author

When asked about the level of knowledge about twenty-two themes and thematic axes addressed by the Brazilian Environmental Education, the individuals of upper class were those who reported having more knowledge about environmental themes and knowledge (Figure 3), followed by middle class and lower class. In only three themes the middle-class individuals reported greater knowledge: solidarity and creative economy; renewable energy sources and environmental education, ethno-culture and citizenship.

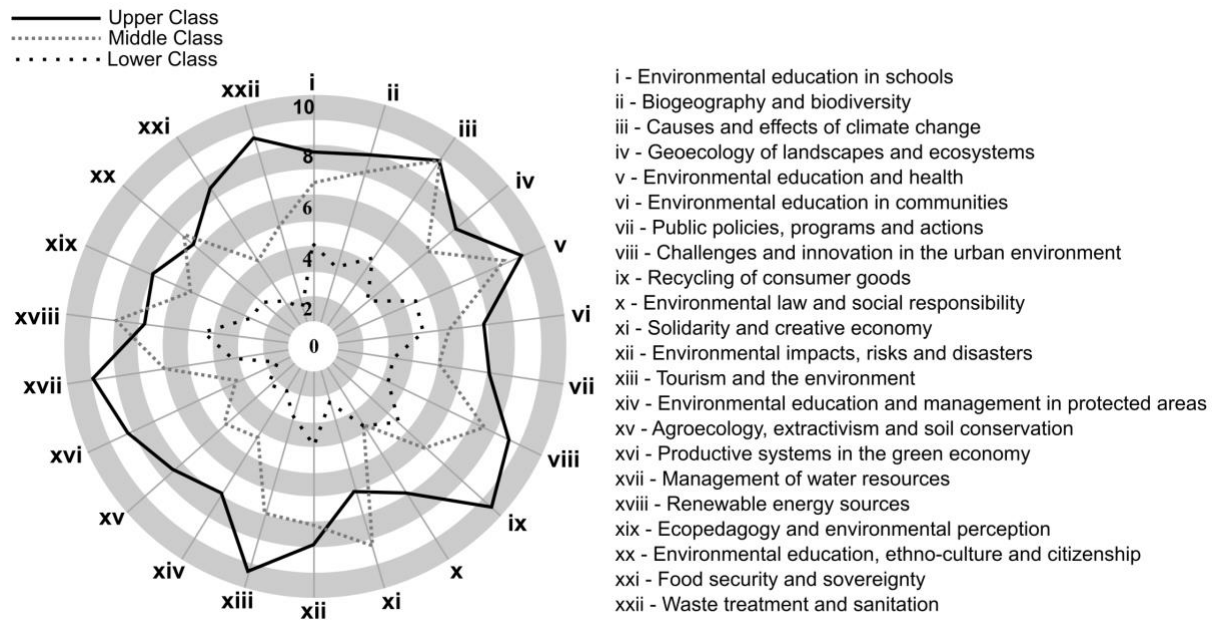


Figure 3: Likert Scale Response on the knowledge level about twenty-two themes addressed by the Environmental Education according to socioeconomic classes in Recife, State of Pernambuco. 0 = no knowledge and 10 = total knowledge.

Source: The author

The percentage of water consumed by the sampling groups defined by socioeconomic classes varies throughout the year. During the study period, 67% of the water was consumed in households of upper class, 21% by middle class, and 8% by lower class (Figure 4). In the period of greater availability of water in the year (July $\approx 68 \cdot 10^6$ m³), there is an increase in proportional consumption by middle class (33%) and by lower class (12%), differently from periods with low availability of water in the dam (December 2006 $\approx 42 \cdot 10^6$ m³), when there is a reduction in proportional consumption by middle class (10%) and by lower class (6%). Also, throughout the year, there is a variation in the price of water supplied (from 3 to 14 R\$ · 10.000 l⁻¹, on average). In the month with greater availability, the lower the price and vice-versa ($r > 0.900$, Figure 4). The frequency of water supply to households (days per year) was higher in households of upper class (360 days year⁻¹, on average) than in households of middle class (293 days year⁻¹, on average) and of lower class (119 days year⁻¹, on average) (Figure 4).

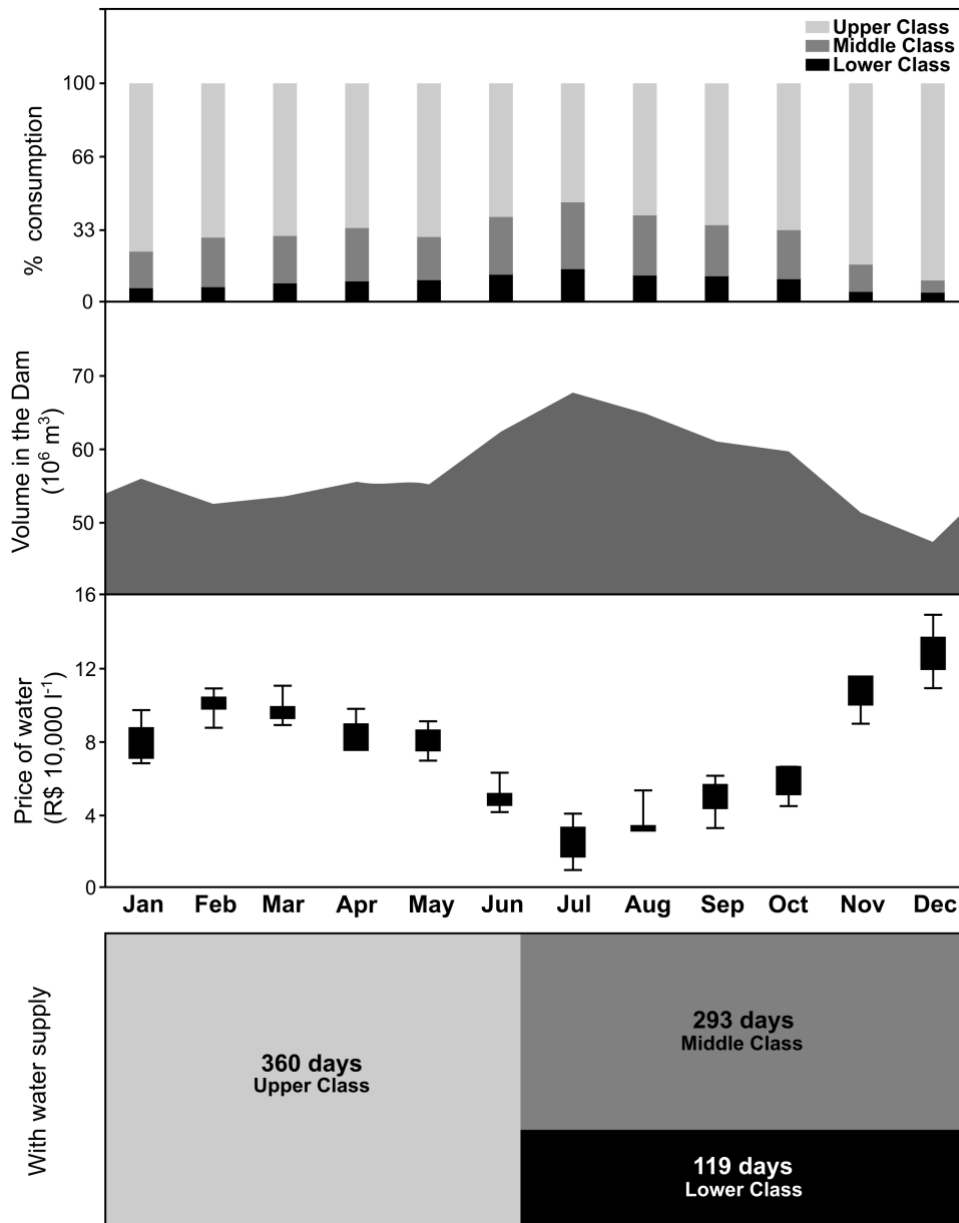


Figure 4: Percentage of per capita consumption according to socioeconomic class, volume of the Pirapama Dam, monthly water price paid by residents of households, and days with water supply, over the evaluated years: 10/2019 to 09/2022.

Source: The author

The urbanization of capital is spatially visible (Figure 5), and statistically significant ($r > 0.935$), in the correlation of the variables property price, water supply days per year, and the predominance of socioeconomic class in the region.

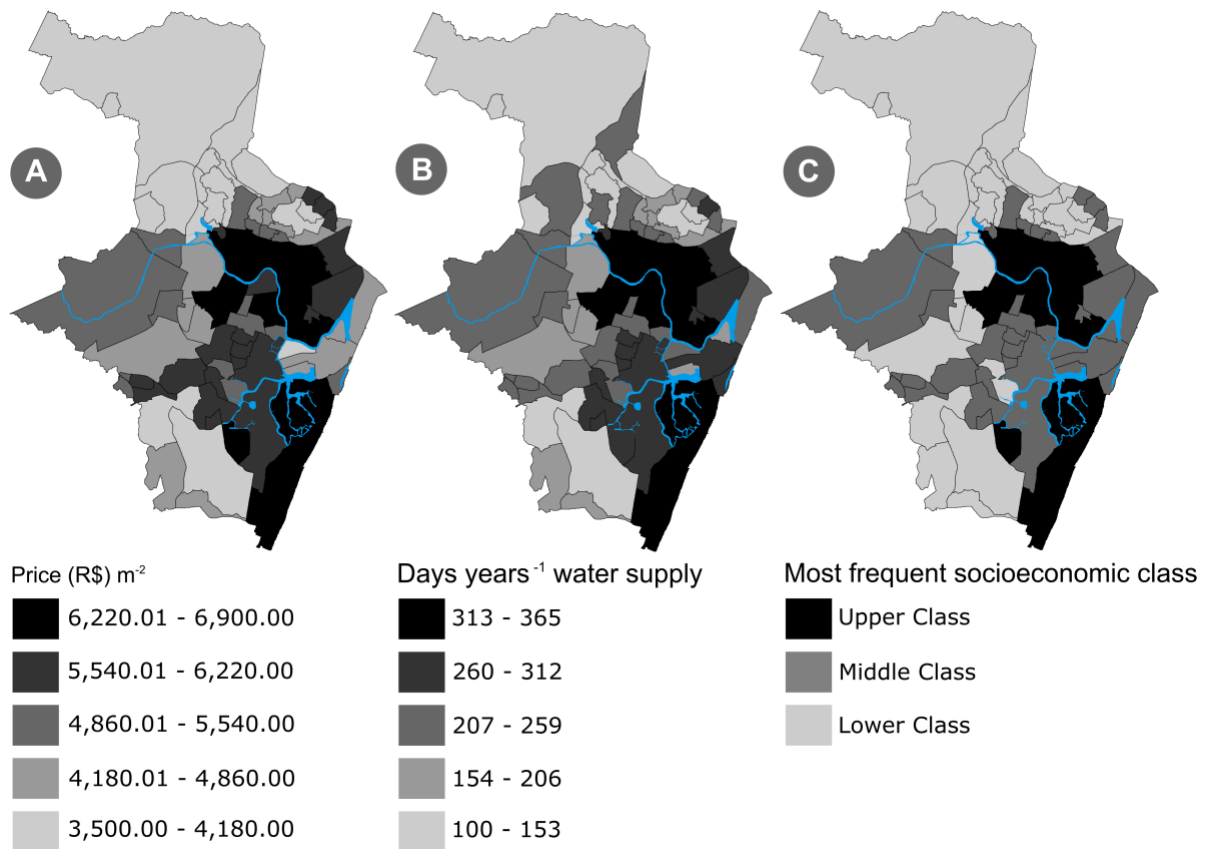


Figure 5: A) price per m² of real estate commercially purchased and sold; B) days per year of water supply to households (above two hours in 24 hours); C) socioeconomic class more frequent by neighborhood. Variation from October 2019 to September 2022, in Recife, State of Pernambuco.

Source: The author

4. Discussion

Socioeconomic inequality is reflected in the inequality in the use of primary resources. As observed in the data, and presented in the literature, the income, and consequently the socioeconomic position, define the place in which the individuals will settle down (Hoekstra & Chapagain, 2007; Abubakar, 2016; Chenoweth et al., 2016; Hussien et al., 2016). This is a place where there is little relation to a region of good environmental and climatic factors, or to legally planned regions (e.g. break environmental laws and historical patrimony), but rather to regions of real estate speculation in which private companies and public policies converge for their relationships (Rolnik, 2015). In this convergence, the myth of the ideal place (advertising construction) is created, in which the infrastructure for water supply is promised in quantity and quality (public management), as well as all variables that make up the HDI, thus closing the cycle of valuation of m², where the imputed value itself is a form of social segregation and definition of which socioeconomic profile will reside in these regions (Harvey, 1985).

Brazil is a socioeconomically unequal country (Gini coefficient 0.50, Ibge, 2023), but in Recife this inequality is still higher (Gini coefficient 0.71). This means that 71% of the income is concentrated in 5% of the population (Upper Classes). The value of the coefficient in Recife is higher than in municipalities of Botswana (0.61), Comoros (0.64), Haiti (0.61), Namibia (0.62) and South Africa (0.64) (World Bank, 2023).

Upper Class consumes more water and has the ownership of the resource (right), regardless of climatic limitations (Figure 4). Per capita consumption in these classes exceeds up to six times (> 660 L day⁻¹) the value recommended by the UN: 110 L day⁻¹ (UN, 2016), unlike the lower class, with up to 5 L day⁻¹. Negative extremes similar to the average observed in countries such as Nigeria (36 L day⁻¹), Angola (15 L day⁻¹), Cambodia (15 L day⁻¹), Ethiopia (15 L day⁻¹) and Mozambique (4 L day⁻¹) (Data 360 2023).

The problem in Recife is not the amount of water available, unlike the countries mentioned above, such as Ethiopia (Arid Climate, rainfall below 550 mm), but its uneven distribution (see Figure 4). The right to water in households is observed by the number of days per year in which the supply is maintained (Figure 4). And this reinforces the hypothesis that there is an inequality in the supply and demand balance between households, established by their position in front of a privileged place (Rolnik, 2015; Hussien; Memon & Savic, 2016). Water shortages and inequality are politically constructed (Swyngedouw, 1995; 2003; 2005; 2015; Swyngedouw et al., 2002; Menga & Swyngedouw, 2018; Williams et al., 2019). Should those who consume more water (due to its availability) pay proportionately to their income for the quantitative and qualitative use of water, and be responsible for its preservation?

The right to water is also different between socioeconomic classes when the significant differences between classes ($p > 0.050$) are detected in relation to the price paid for water (Figure 4). In addition, indirect taxation (consumption tax) ends up being more paid, and interferes more with purchasing power, in lower income classes (Melo & Campos, 2016). For example, two individuals, one of upper class (e.g. monthly income = R\$ 50,000) and another of lower class (e.g. monthly income = R\$ 900), who consume 110 L day⁻¹, pay each month the same value. There would then be a false democracy in the use of the resource, in which a right (or a law) does not make justice (Lukacs, 1960; Agamben, 1995), considering water consumption? For example, in periods of water scarcity (lack of supply and climatic extremism) in neighborhoods of upper and middle classes, there is the acquisition of water through 'water trucks'. Each truck sells 10,000 liters of water for approximately R\$ 500 at the time without water rationing, and approximately R\$ 2,000 during rationing season (Santana, 2016). The value here highlights the segregation of use, the offer for a certain price (surplus value), and sometimes prices above the average price, and only those who can afford (indirect tax), and how much they can pay, will consume determined amount of resource, or will not consume.

The socioeconomic classes that most consume water are those with a higher education level and a greater environmental awareness (Figure 3), observed by the responses to the questions about the knowledge of environmental themes and the domain of environmental knowledge, and by having longer institutional contact with the theme of Environmental Education, in their education from elementary level (National Curriculum Parameters, Brasil, 2000) to higher education (National Education Plan 2014-2024, Brasil, 2014).

This awareness was not reflected in praxis. Environmental education thought by Pritchard (1968) was not a concept but an action (praxis), but in the intersection there (≈ 60 s) until recently, this 'discipline' contributed and systematized knowledge and raised awareness in the human population: little practical, reflexive and engaged (Milfont & Sibley, 2012). By passing through socioeconomic classes, thinking about the finitude of primordial substances (Environmental Epistemology), listing variables and experiences (environmental practice), in which the environmental subject concomitantly becomes the object of the praxis and the research on it (Steil & Carvalho, 2014), will create this emancipated environmental subject (Environmental Ontology), educated by praxis and research (Freire, 1983; Boff, 2004), not by a conscience finished to be taught and publicized as an advertising piece (Environmental Marketing). In this fetishism of being a "green consumer" (Peattie & Crane, 2005), an individual "false consciousness" of being engaged in mitigating environmental impacts is created (critical to cultural training, Adorno, 1979). The green consumer is not a subject, but an object of the consumption system, which does not create 'guilt' or any ethical and moral imbalance (Gilg et al., 2005). The example of this is for a consumer to buy several industrialized products (e.g. canned and preserved) from several countries that do not have a desirable ethical conduct (e.g. environmental preservation, peace agreements, climate agreements, dictatorships, etc ...) and resort to using the 'plastic bag' in a supermarket, and leaving morally even (false awareness). Here, environmental education operates through the construction and denial of guilt (ideologization) (Lin, 2016).

Would the most consuming classes be willing to have the awareness to reduce their consumption and equalize them with the other classes? Would these classes be willing to equalize rights and duties? The answers to these questions could be the key to reducing and mitigating environmental impacts and adherence to a minimalist lifestyle (Georgescu-Roegen, 1979), equalized in the common right (access) and owed to all socioeconomic classes.

Taking class consciousness in relation to the water consumption (quantitative and qualitative), historically, by the classes that consume little ($< 110 \text{ L day}^{-1}$), beyond the false democracy and the false awareness, one could think not only in an increase in consumption of lower class ($= 110 \text{ L day}^{-1}$), but mainly in eradicating usury of consumption by the classes that commit this abuse. The way to equalization of socioeconomic classes for water consumption, if the more educated classes do not engage in environmental praxis and a minimalist lifestyle, is the per capita 'hourglass turning' of consumption (Brondizio & Le Tourneau, 2016), that is, rationing and price increase for those who have higher incomes, and, supply and reduction in price for those who have little water availability. This method of equalization causes a dialectic in the intellectual groups, but an aversion in the conservatives of the status quo (see Kehl, 2010).

The analyses developed above when read hastily seem to be a positivist line between variables (income $>$ right $>$ housing $>$ consumption), but distances from a positivism when the contradictions between rights and duties between the social classes studied are concretely verified, in their experiences, in the sense that is given temporally, far from any biased translation (Lukacs, 1960). It is clear that there is no universal class spirit (Maar, 1992). There are among the most consuming classes, individuals who seek environmental praxis, and among less consuming classes, individuals who boast. What is emphasized is that with the urbanization of capital, the substantial conception of the subject of the class approaches more of a historical rather than an anthropological conception (Lukacs, 1960).

Thus, to form subjects in which their narratives represent their historical role with their class (consciousness itself), and from this, they can recognize in a non-alienating way (material and concrete) the construction of the reification of nature (here represented by water), their labor, the means of production, the desires and the means of consumption, from the logic of capital. From this, there is no procrastination of utopia (equality in right and duty), especially when it comes to primordial substances to life. Consciousness is not something outside, but the revelation of the immanent sense of the dialectical process that only occurs in the class (Lukacs, 1960). When observed the distribution of water between classes and their acceptance of it, it shows the acceptance of different rights and equal duties by the subjective nature of the masses, absorbed without resistance by social rationalization (Habermas, 1981).

5. Conclusion

Per capita water consumption is unequal between socioeconomic classes. Our results certified the reification of water as a product in which the purchasing power of individuals directly influences the right to its consumption. This income power establishes in which region individuals will settle down in the urban space, where public management is responsible for not lacking infrastructure and water supply in quantity and quality. Over the years analyzed, and when passing through dystrophisms (e.g. drought events), the socioeconomic classes with higher income continued to receive water in their homes, and when they did not, they acquired by other means (e.g. water truck), means that classes with lower purchasing power or cannot access or access at a lower volume.

Formation for environmental awareness does not prepare individuals for environmental praxis, and to discuss inequality of rights and justice for access to primary resources, but teaches them to respect equalities in duties (false democracy or false awareness). Class consciousness, by those least favored, should be the first step in environmental education for not only equalizing water consumption, but also eradicating the usury in its use by classes with higher purchasing power. The continuous reproduction of socioeconomic classes that have environmental awareness and do not have the environmental praxis shows that something is wrong since the formation of the subject that maintains the status quo, legislation that does not make social and environmental justice.

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