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ABSTRACT

The main objective of this research was to understand how the access and governance of water takes place in a rural community in the agreste region of Paraíba, Brazil. The study was guided from the social and political perspectives, aiming to identify how this peripheral community has access to water, and to assimilate how social actors participate in the water governance process. In order to achieve a multidimensional and integrated understanding of the social, political and governmental dynamics of the observed community, a qualitative-quantitative methodological approach of social research was applied. In this perspective, a documentary investigation, participant observation and semi-structured interviews were carried out. Among the results found in the investigation, the absence of water quality monitoring stands out; the significant coverage of the One Million Rural Cisterns Program; and the non-existent political participation of the community's residents regarding water governance in the region. The diagnosis indicated possible weaknesses in the adopted water management model, which can serve as a comparative basis for other regions, and also support a possible formulation of new water governance policies.

Keywords: Access to water. Rural communities. Paraíba semiarid. Water governance.

INTRODUCTION

The imbalance in access and scarcity of water affects a significant part of the world's population. This conjuncture is interpreted from different perspectives, with emphasis on issues such as the irregular distribution of water on the planet, climate conditions, the growth in demand as the population increases and the change in consumption patterns associated with the current capitalist model in force. In the 20th century, the world population tripled, and the global human consumption of water was multiplied by 8 in the same period, thus demonstrating that the gradual reduction in water availability is explained more and more by the increase in the per capita consumption than by the demographic explosion. (MARQUES, 2015).

The water crisis is multidimensional and encompasses demographic, meteorological, environmental, political, economic, educational and even cultural factors. However, its main determinants are concentrated in the socio-political dimension. This understanding is supported by the perception that, due to its importance and limited availability, water is an instrument of power, and its management is vulnerable to political decisions (CASTRO, 2016). In this perspective, instituted policies and actions of public authorities tend, to a great extent, to privilege some over others, accentuating social inequality.

The context of political interferences has an impact on the weakness of management processes and promotes instability and insecurity regarding adequate and regular supplies for the population. Faced with the crisis, the centrality of the decisions from different governments, as water regulating agents in the vast majority of countries, is now having its effectiveness questioned, especially with regard to threats of social and political conflicts over the social appropriation of water.

In Brazil, the current water policy governed by Federal Law 9433 (BRASIL, 1997), adopts governance as a guiding principle, incorporating, in this context, characteristics such as the decentralization of actions and the inclusion of the civil society in decision-making processes.

Although the Brazilian territory is considered abundant in water, its distribution is not homogeneous. The northeastern semi-arid region shows the greatest evidence of water related problems, associated with a context of deepening structural inequalities.

Rural communities, geographically dispersed, have historically been on the margins of large investments, being served precariously, and with emergency measures concentrated in periods of drought. The main water policies and projects have generally been directed towards urban areas or regions with high economic density. The accentuated concentration of land in the region also results in a corresponding concentration of water structures.

In this crisis scenario, the State of Paraíba is one of the Brazilian States mostly affected by water scarcity. According to the Territorial Areas definitions by the Brazilian Institute of Geography and Statistics (IBGE), the State has about 90.91% of its territory included in the Semiarid Region (IBGE, 2021). In addition, almost 33% of the population is concentrated in the rural area, an index higher than the national average of 15.28%. The State has one of the worst human development indexes (0.718), ranking in 24 in the country's index (IBGE, 2021).

In the context of the political water crisis, this study sought to understand the process of water access and governance in rural communities in the semi-arid region. The investigation tried to describe the reality of a rural community in the semi-arid region of Paraíba, regarding water access, as well as to analyze how the population participates in the management and governance of this common good.

This work is justified by its political and social contribution, since the diagnosis can broaden the understanding on the different configurations of social participation, citizen action, individual awareness about the collective space and sharing of interests imbued in the water governance process. The understanding these social and political arrangements is essential for decision-making in management processes and the construction of public policies aimed at local/regional development.

This article is organized into three theoretical and contextual subsections, which address the situation of the global water crisis; the emphasis on management and governance in this scenario; and, a historical synthesis on the issue in the Brazilian semi-arid region. Next, the methodological procedures used in the research are explained. The results are shown with a description of the study site, the characterization of water access and the analysis on the social participation of local actors in water governance.

GLOBAL WATER CRISIS

Water is the subject of discussions worldwide, representing a growing concern in academic, environmental, economic, social and political debates and agendas. The reason for the world prominence of this debate is the imminent threat of water scarcity in many regions for significant populations. This reality is evidenced in the Water Security for All report published by UNICEF: currently, 1.42 billion people live in areas of high or extremely high vulnerability due to water scarcity, which corresponds to approximately 20% of the planet's inhabitants (UNICEF, 2021).

The natural water availability for human survival corresponds to 2.5% of global water. From this percentage of fresh water, only 0.3% is considered easily accessible, being found on surfaces, such as lakes and rivers, most of which is concentrated in glaciers or underground aquifers (SHIKLOMANOV, 1993). Although this proportion appears to be minimal, this amount of water accessible for consumption is sufficient to meet the need six to seven times of the annual minimum amount every human being needs (RICARDO; CAMPANILI, 2007).

However, the actual availability of water for the population is not equal, as its distribution is quite irregular. The amount of water on each continent is not proportional to their populations. For example, Europe has 13% of the world's population and 8% of the total fresh water; South America, however, has 26% of global water and 6% of the population (WWF Brazil, 2006).

Uneven water distribution is also a reality observed in Brazil, which despite having comfortable water supply in global terms, with 13% of all fresh water available on the planet (ANA, 2013), the country has areas with water scarcity, more expressively in the semi-arid region and also in the urban concentration areas of the Southeast.

In addition to the irregular geographical water distribution, another factor that implies its (un)availability is the increase in its demand. Global water consumption is expected to grow by approximately 25% by 2030. The UN also states that the demand for fresh water has expanded 6 times in the last century, an increase caused not only by population growth, but also economic development and changes in consumption patterns (UNESCO, 2021). Brazil follows these estimates, with an 80% increase in demand in the last two decades and a forecast of 24% increase by 2030, a context related to the country's economic development and urbanization process (ANA, 2019).

Understood as a situation of water scarcity that occurs when demand exceeds supply in a region (CUNHA, 1998), water stress is a problem that is directly related to climate change. This scenario is already observed in most less developed countries, which do not have regular periods of rain. Furthermore, weather forecasts indicate that climate change will imply an increasingly unpredictable supply of water (MARENGO, 2008). By changing the rainfall regime, climate change is capable of causing extreme events, such as floods or prolonged droughts. Under these circumstances, water scarcity is aggravated, thus implying social and economic losses, promoting conflicts and migration movements (WORLD BANK, 2018).

> Climate change will affect water availability, quality and quantity necessary for basic human needs, threatening the human right to water and sanitation access for potentially billions of people. The hydrological changes induced by climate change will add challenges to the sustainable management of water resources, which are already under severe pressure in many regions of the world (UNESCO, 2020).

The climatic consequences are also highlighted in the latest report of the Intergovernmental Panel on Climate Change and indicate the worsening of extreme heat, droughts, fires, floods and hurricanes. Most of the Brazilian territory is identified by scientists as one of the regions where climate change will continue to intensify, as well as the risk and severity of droughts, including the Amazon region (IPCC, 2021).

In Brazil, since the early 1990s, the effects of climate change on water availability have been noticed. The country is losing its water surface at alarming rates, considering that in 30 years there has been a reduction of 15.7%. These losses were verified in 23 States, in the period between 1990 and 2020, and the monthly historical series indicates a growing trend of reduction of water surfaces in the Brazilian regions (MAPBIOMAS, 2021).

Given the data presented by water monitoring bodies, the alert to a scenario of insecurity regarding access to this common good is evident. According to UNICEF Executive Director Henrietta Fore: “The global water crisis is not just coming, it is here, and climate change will only make it worse” (UNICEF, 2021, p.1). The understanding of crisis in the social context is of an unfavorable conjuncture, an abnormal and serious situation; conflict, tension and disorder (MICHAELIS, 2022). In this context, the natural factors that add up to the problems of water access are not isolated.

The interpretations associated with water crisis have multiple scopes, encompassing both natural, political, and economic causes. The International Water Management Institute distinguishes in one of its reports the difference between physical scarcity and economic scarcity of water, while the first refers to the actual lack of water to meet the demand of the population, the second is the result of lack of investment, little infrastructure and unequal distribution of water. Economic scarcity affects around 1.6 billion people, which means that even if water is physically available, the lack of infrastructure makes it impossible for people to access (IWMI, 2007). In this sense, even in locations where water is available, social disparity means that not everyone has enough financial resources to pay for the water supply tariffs.

Therefore, the lack of water access cannot be particularly justified by its physical scarcity, but mainly by reasons related to social inequalities. The problems related to water scarcity originate mainly from the political scope, not only the technical or environmental scope. (CASTRO, 2017). The political causes for the water crisis are also evidenced by Ribeiro (2008), based on the indication that the lack of this common good in certain regions could be solved with the use of well-known storage and reuse techniques. For this author, the combination of natural and social factors enables the understanding of the political character of water.

Considering politics as the basis for solving the water crisis, it is necessary to draw our attention to water management models adopted by other countries. The changes resulting from the tension between progressive human consumption (industrial, agricultural, domestic, energy...), whether caused by the pollution of water sources or unplanned use, which result in the reduction of water reserves, require political management to readjustment of the models in order to guarantee water access (OLIVEIRA, 2011). For the

World Bank (2018), the deficiency or absence of water management policies aggravates the effects of the water crisis, while efficient water management has the capacity to prevent many of the consequences of this context.

MANAGEMENT AND GOVERNANCE

Water, like air, seems to belong to the unique category of common good, however, it is also qualified as a public good. As a common good, it does not belong to anyone by nature; as a public good, it cannot be appropriated by an act of public law, an institutional and permanent instrument authorizing citizens to object to its private use (DARDOT; LAVAL, 2017). Inseparable from the environment, water is considered a public good, a good for common use by the people, which also gives its domain a public character (WHATELY; NEVES, 2016).

Conceived as a public good, water depends on the creation of mechanisms that ensure equity in its access. In this perspective, the State assumes the role of society's representative, as a structuring and regulating agent of the political and social dynamics of water, exercising the guardianship of this public good (GRASSI, 2006). The State must therefore provide for the public management of water, contemplating, in addition to the fair distribution of this good, its rational use, the qualitative and quantitative conservation thereof, as well as the protection of its natural sources.

Configured as an essential element of society, water requires greater publicity in its treatment and guarantees for its universal access. These assumptions are advocated based on established regulations and State protection (GRANZIERA, 2001). The absence of well-defined and effectively enforced rules on water use makes the poorest populations even more vulnerable (CASTRO, 2016).

Human consumption, as highlighted by Grassi (2006), is the most important use of water and should therefore be considered a priority in public management. "Governments cannot grant or authorize uses that harm the quality and quantity of water, just as they cannot act without promoting equity to water access." (MACHADO, 2018, p.51). The water access crisis, whether due to natural or political factors, highlights the need for efficient management, which must guarantee this common good for current and future generations (PEREIRA JÚNIOR, 2004).

The crisis scenario and the need for effective water management raised questions in the society about the ability of States to exercise this attribution centrally (CAMPOS; FRACALANZA, 2010). Contemporary political and social demands presuppose a State focused on decentralization and expansion of social participation, which is based on two complementary concepts: governance, which corresponds to the systemic conditions for the exercise of power in a given society; and governance, which refers to the

government's ability to implement public policies and meet collective demands (DINIZ, 1996).

> Water governance refers to the range of political, social, economic interests and administrative systems that are in place to develop and manage water resources and the provision of water services, at different levels of society (PETER; HALL, 2003, p.7).

The importance of water governance, as highlighted by Tundisi (2013), is a strategic component of great relevance for achieving efficient management. In turn, the success of governance depends on the integration, participation and cooperative effort of all actors interested in water management, and at all levels, considering the complexity of the context of regional development inequalities and the occurrence of duplicity in waters domain. (MACHADO, 2018).

In most cases, the inadequate management and inefficient governance are the determining factors of the most harmful effect of the water crisis, which is the lack of water for human consumption, whether in urban or rural areas (WHATELY; NEVES, 2016). In the 2nd World Water Forum, the water crisis is directly related to management and governance crisis, referred to as one of the priorities for action, based on the integration of all levels and the involvement of all stakeholders in water management. (WWC, 2000). In Brazil, an ineffective governance has a particularly perverse effect on society, marked by high degrees of social inequality and deficient democracy in terms of guaranteeing equality and full citizenship (DINIZ, 1996).

Water governance has been widely perceived as a solution to improve water management performance in different territories. For this, it requires paradigm shifts that involve the social and political conjuncture of water, and not just small adjustments in government practices (MINERO, 2007). In this sense, water related issues must be solved through a process of political and social negotiation, which includes all different levels of government and social actors. In addition, it is essential that public policies are integrated into this process, so that the existing social and economic disparities are minimized, and consequently, inequalities in water access (CAMPOS; FRACALANZA, 2010).

The territorial and political scope of governance processes does not imply the existence of a model or standard, as water governance depends entirely on the social, cultural, environmental, economic, political and institutional context. However, for it to be considered socially fair, it is necessary to have collaboration, cooperation, trust, learning and experimentation in the territories and actors involved (RIBEIRO and JOHNSSON, 2018).

The Sustainable Development Goal 6 (SDG 6), which makes up the 2030 Agenda, an action plan agreed upon by 193 countries in 2015, is based in this perspective of decentralization and social participation in water governance. The SDG 6 states "to ensure the availability and sustainable management of water and sanitation for everyone". To achieve this goal, the UN foresees the need for countries to develop capacities such as integrated water management and effective governance or "good governance", factors considered fundamental for eliminating inequalities, guaranteeing equitable access to water in sufficient quantity, in safe conditions and at an affordable price for everyone, in compliance with the motto "no one is left behind" (UN, 2015; 2018).

THE WATER ISSUE IN THE BRAZILIAN SEMI-ARID REGION

Historically, the Brazilian semi-arid region has had numerous crises related drought and water scarcity. The first delimitation of this territory occurred in 1936, based on a geographic region called *Polígono das Secas* that corresponded to locations subject to recurrent periods of drought (SILVA, 2006). In 2005, the Ministry of National Integration (MIN) officialized a delimitation of the semi-arid region considering criteria such as average annual rainfall equal to or less than 800 mm; the aridity index; and the daily percentage of water deficit (INSA, MCTI, 2013). The most recent delimitation comprises a total of 1,427 municipalities, becoming official by Resolution 150, of 12/13/2021 by the Deliberative Council of Sudene* (SUDENE, 2021). [* The Northeast Development Superintendence - a Brazilian federal independent agency]

The context of dependency and lack of water in the Semi-arid region pushed the population to seasonal migration processes to other regions of the country in search for survival, and those who remained in the region had to submit to the ruling classes and measures adopted by the State (OLIVEIRA, 1977). This condition shows that the vulnerabilities of this territory are not only the result of natural determinants, but above all, of its political structure. Buriti and Barbosa (2018) point out that until the beginning of the 20th century, government actions for this region, in general, were discontinuous and emergency initiatives, adopted in calamity situations and as a response to the social effects resulting from the drought period.

The problems inherent to the Brazilian semi-arid region have historically been dealt with by the State based on the idea of fighting the drought. The government intervention in this region is recent, having as a landmark the years of 1877-79, known as the period of the "Great Drought", which decimated the lives of more than half a million northeasterners (VIANA et al, 2012). The Federal Government treated the social demands of the semi-arid region as a welfare matter until the end of the 19th century, with emergency measures limited to the drilling of wells and the distribution of water trucks and food donations (ALVES, 2013).

At the beginning of the 20th century, after the "Great Drought" and the social problems associated with the phenomenon, the process of formulating public policies began, mainly aimed at guaranteeing water access. To Campos (2014, p.77): "(...) the first specific problem of the society to be solved by the government (public policy) was the low reliability of the water provided by intermittent rivers." Thus, the main policy adopted in the last century for the semi-arid region was born - the 'Açudagem' [building of water reservoirs].

The promotion of water infrastructure, especially the construction of weirs, was the main public policy adopted by the Government until the 1990s. These structures, financed by the government and adopted as a solution to the drought and its effects, were mostly installed on large estates (BURITI; BARBOSA, 2018). This scenario favored the concentration of power and subjected the population to the owner of the land where the weir was located.

> The construction of large water infrastructure works - generally concentrated and allocated near large farms (...) not only did not increase the water availability for families, but also expanded the processes of concentration of power and economic and political dependence, favoring the creation of a modernized 'coronelismo' [the concentration of political power by locally dominant oligarchs, known as colonels]. (BAPTISTA; CAMPOS, 2013, p.62)

The political and social issue of water in the Brazilian semi-arid region is better understood as of the history of government actions, which notably were not effective for the region. Cordeiro (2013, p.187) points out: "This, way, the State financed land concentration in the Semi-arid region, which was associated with water vulnerability of the peasants." In this perspective, the limitations of the State contribute to the maintenance of social structures and inequalities, originating from its constitution and resulting from a contradictory combination of interests and traditional and modern conceptions (MARTINS, 1999).

The expansion of the debate on the democratization of water access and the participation of the civil society in the formulation of public policies, promoted by the UN Conference - Rio 92, enabled a greater reflection on the governmental approach to the water issue in the Brazilian semi-arid region, as well as on the effectiveness of drought fighting policies. A new conception of policy for the Semiarid region was born: coexistence with drought (CAMPOS, 2014). Drought coexistence policies aimed at contextualized solutions based on local interests and potentials, in addition to the participation of the civil society in decision making and solutions developing processes (ASA, 2002).

An efficient water management must consider that the semi-arid region is a diverse and heterogeneous territory, which demands specific solutions for its social-natural spaces (BURITI; BARBOSA, 2018). This contextualized view, therefore, opposes the policies that emphasize technique to the detriment of human and environmental factors: "The management of water resources must take into account the physical, biotic, demographic, economic, social and cultural differences of the different regions of the Country." (MACHADO, 2018, p.40).

The current water governance system implemented in Brazil as of Law No. 9,433/97, presents a series of challenges for its consolidation, especially for the Brazilian semi-arid region (BURITI; BARBOSA, 2018). A significant challenge for this territory is the adaptation of water legislation. In the semi-arid region, the hydrographic basin, the basic unit of water management, is difficult to perceive and use in the region, considering the number of intermittent rivers. The result of this context is that, at local level, political participation does not reach the immediate reality of water users who are far from water infrastructures or the collegiate water bodies (PAGNOCCHESCHI, 2016).

Water governance in the semi-arid region has even more pronounced challenges in small municipalities, which, in turn, have a larger proportion of rural population. The latest censuses have revealed an abysmal difference between urban and rural Brazil, in terms of water supply, sanitation and concentration of the population in extreme poverty (IBGE, 2010, 2023). The dispersion of housing and the smaller scale of population in these locations constitute an additional obstacle to the construction of efficient policies that allow access to treated and quality water (MARIA, 2020). These peculiarities and vulnerabilities suggest that the rural semi-arid region needs greater observation as to the political and social issues related to water.

METHODOLOGICAL PROCEDURES

With the intent of a deeper interpretation of the facts and phenomena associated with social appropriation and water governance processes, we carried out a field research in the studied area that reconciled the application of two techniques: participant observation and semi-structured interviews. Through the speech of the interviewed actors, we sought to obtain the information that built the basis for the analysis of the study.

The field research and local observation began in the second half of 2020, in the municipality of Mogeiro, progressively entering the configuration of the rural territory of this region. An important step was the insertion in the Juá Community.

In the routes to these communities, we tried to understand the physical and human situation of the territory, with emphasis on how these communities had access to water. The base information for the analysis of this study was constituted from local observation; informal conversations and semi-structured interviews with the social actors involved in water governance of the investigated region.

The target population of this study is the residents of the rural area in the agreste region of Paraíba. 10 houses in the Juá Community, located in Mogeiro, were visited. The studied group does not have a water supply network and, is geographically displaced from the urban perimeter, thus having alternative and private accesses to the water they consume.

The contact with the residents was carried out in two stages: the first was an approach visit to present the project and its objectives, and preparation of invitations to be part of the research, anonymously. On the second visit, a pre-structured interview was carried out, together with the photographic survey necessary to characterize the investigated object.

In addition to bibliographical research on the different aspects, determining factors and dimensions of the water crisis, the documentary survey intended to list data to outline the physical and human aspects of the region, with greater emphasis on the information linked to the waters permeating the investigated location. The Brazilian Institute of Geography and Statistics (IBGE) was one of the most referred sources to access social and economic indicators, as well as the Atlas of Human Development in Brazil by the Institute of Municipal and State Development (IDEME).

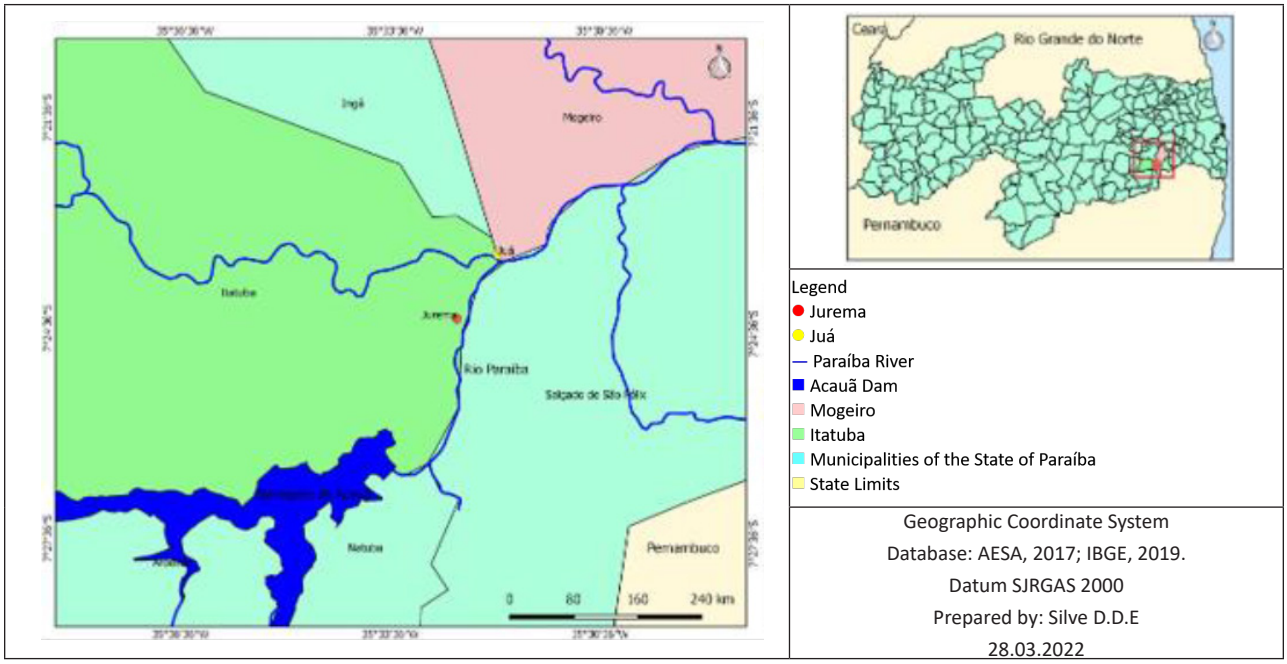
More specific data on water was obtained from the platforms of the National Sanitation Information System (SNIS) and, at local level, from the database of the Executive Water Agency of the State of Paraíba (AESA-PB). In addition thereto, several other sources were verified, such as the Geological Survey of Brazil (CPRM), Infosanbas, the National Water Agency (ANA). Data analysis took into account, to a large extent, the quantitative and qualitative nature of the research.

STUDY LOCATION

The research field corresponds to a rural community located in the agreste region of Paraíba, a semi-arid mesoregion. Juá is a village belonging to the municipality of Mogeiro (Paraíba). The area is surrounded by three important water sources: The Argemiro de Figueiredo dam (Acauã Weir), 11km from the location; the connection ducts belonging to the Acauã-Araçagi channel, approximately 300m and the Paraíba River, which runs 200m from the houses of the investigated communities.

Approximately 35 kilometers from the administrative headquarters (City Hall) of the Municipality, the community is located on the border between Mogeiro and Itatuba, with territorial division limited by the Poço Verde Stream, Which is one of the tributaries of the Paraíba, the main river in the State that runs 200 meters from the community. By crossing the bed of this river, there is another municipality, also in Paraíba - Salgado de São Félix, which makes Juá a “triple frontier” region, considering the proximity to the limits of these municipalities. The Sites adjacent to Juá are: Areial and Lagoa de Velho, in Mogeiro; Jurema, in Itatuba; and Mangue Seco, in Salgado de São Félix.

Figure 1 | Location of Juá rural community



Source: (SILVA, 2022).

Also referred to as Juá Site, the location has a public lighting network with poles and distribution to houses. There are no business establishments, education establishments or health units. The community has no proximity or relation with agricultural companies, industries, plants, etc. There is a Christian-Protestant religious temple, built more than 70 years ago and which is perceived by the residents as a local reference.

The village has about 25 houses with similar characteristics and spacing ranging from 50 to 100 meters between houses. These homes are mostly masonry with wooden roofing (a system of lines and slats) and clay tiles, with no water supply or sewage system.

WATER ACCESS IN THE COMMUNITY

As in most rural areas, the Juá community does not have a supply network, and the residents use different means to access the various waters sources for different uses. From the households surveyed, drinking and cooking water, for the most part, come from the rainwater stored in cisterns. This is the reality is found in 80% of the houses. These cisterns, which hold an average of 16,000 liters, are filled during the short rain period, characteristic of the semi-arid region, and "drinking" water is guaranteed

only for 6 or 7 months of the year for half of the families visited who have this type of water reservoir.

According to residents, when the stored water runs out, families need to buy water. Two marketing configurations were reported: the first and most common, door-to-door sales by private vehicles circulating in the region during the dry season. The water is offered as being captured in the Paraíba municipality of Pedras de Fogo, approximately 60 kilometers from the locality.

There is no proof of origin or formalization in the purchase and sale process. The water is taken from the water truck and put in 20-liter buckets belonging to the residents. Each bucket costs BRL 2.00. The second situation, and more atypical, was reported by one of the families, who pays for transporting water from a well installed in the Jurema Community. The amount charged is R$ 6.00 for two barrels of 200 liters each.

Houses without cisterns installed or with inactive ones represent 20% of the surveyed universe. Half of the households in this configuration does not buy water, as they get this common good free of charge from a nearby house with a cistern. The other part of the households buys water continuously, as the installed cistern was damaged by mesquite roots, and the family was unable to effectively repair it so that the reservoir could resume its function.

Water intended for personal hygiene and for subsistence and economic activities comes from the Paraíba River. The entire Community uses the water from this river for these purposes. It is important to emphasize that the residents themselves consider the river water unfit for drinking and cooking, as in addition to being brackish, they have the perception that the river receives debris along its course from various sources, such as human and animal waste, pesticides used in riverside crops, residual runoff from shrimp farming, clothes washing products, etc., factors that make its ingestion unfeasible.

In addition to rainwater, river water or water purchased in private vehicles, another water supply found in the locality was a community cistern filled through an action by the Federal Government, the Water Truck Operation. This program, carried out by the army, has an emergency nature for the distribution of drinking water in the Brazilian semi-arid region. The army fills up the cistern on a weekly basis.

Of the families visited, 60% use the community cistern, as a supplement or replacement for the water purchased from private individuals; 30% said they do not use cistern water due to distance from their houses and transportation difficulty; and 10% said they had no need to use it. As for the quality,

residents reported that the water is not brackish, but “not sweet”. Some have pointed out that the water appears to be desalinated, but they are not sure about the source.

In general, residents only access surface water, such as rain and river water. No underground collection points were found in the Community, of any kind, either in the form of a hand drilled well or tubular well. Two mechanisms to collect surface waters used by the residents were observed in 90% of the houses. The first system captures rainwater through gutters, connected to the roof of the houses and conducting the water to the cisterns. Water from the Paraíba River is collected with pumps. I one of the houses visited, the collection is still made manually, using displacement and human strength.

The water channeled from the Paraíba River is stored in water tanks and for personal hygiene and for subsistence activities. The water tanks material is fiber or PVC, and, in most houses, they have a capacity of 1000 liters. In households where fish farming and shrimp farming are practiced, the capacity of these structures reaches up to 5,000 liters, to meet the demand of the economic activity practiced. Domestic storage in all houses is also made with buckets, barrels, basins and clay pots.

There is no quality regional monitoring of the waters used in the Juá community. Residents informed that no agency inspects the quality of the water consumed. The only type of monitoring reported by the Community refers to the use of water, and registration of grants, which is carried out by the AESA-PB [Executive Water Management Agency]. In the field research, we found that domestic water treatments are not applied in most houses, 60% of families do not carry out any type of water treatment, or just rely on domestic decantation to avoid ingestion of sediments, a process popularly known as “letting the water settle”. Sodium hypochlorite is very little used, and there is no distribution by health agents in the region.

The average daily consumption of water for each resident of the Juá community considered uses for drinking, cooking and personal hygiene. Residents helped with this estimate based on the use of 20-liter buckets, a utensil present in all homes visited and also used as a parameter for purchasing water. Based on the information provided by the residents interviewed, it is estimated that in 90% of the households, the average water consumption per resident is between 31 and 60 liters/day, and for the other 10%, between 90 and 120 liters/day. As for the water use perception, the purposes considered as most relevant were: drinking and cooking, for 100% of respondents; followed by animal watering (30%); and agriculture (20%).

Regarding the destination of water after use, almost all respondents stated that they do not adopt

any type of reuse, and demonstrated that they were not aware of the importance of this practice or guidelines on how to proceed in this aspect in their daily routines. Only one residence indicated reuse, using the residual water from clothes washing for toilet flushing.

Water is disposed of through pipes a few meters from the residence and sewage is directed to a rudimentary septic tank in 90% of the houses; in the other 10%, sewage is discharged into a ditch. All houses visited have a toilet, most of them installed inside the houses. Considering this context, it is important to point out that the improper disposal of water and sewage contaminates the environment and, consequently, promoting the population's illness.

Therefore, it is observed that regarding the access to water in the community, despite the various origins described, the resource is not available in quantity, quality and adequate infrastructure, which would guarantee the social well-being of this population. Also there is no water access equity, a condition that must be guaranteed by the government according to Machado (2018), since the water purchasing capability is not isonomic among community residents.

SOCIAL PARTICIPATION IN WATER GOVERNANCE

In addition to describing the local configuration of water access, as reported in the previous item, the investigation in the Juá Community also sought to understand how the social appropriation of water and the political participation of residents in water governance processes takes place. During the interview, local actors were asked how they consider their access to water in the community. Most responses lead to the understanding that residents, for the most part, consider their access to water as acceptable, but not satisfactory.

Critics were observed in the actors' speech, such as the lack of fresh water for the whole year and the dependence on the rainy season to have secure access; the lack of infrastructure for conducting and distributing water to the houses, outlined by the resident's feeling of discomfort; and, the issue of the low volume of the Paraíba river during the dry season, a factor that also affects water quality, which is consequently more concentrated and brackish, as well as having an impact on activities depending on river water, such as fish farming and irrigation for agriculture.

Some respondents outlined perceptions related to water quality issues, especially that collected

from the river. Some residents reported that they noticed a yellowish color and a strong odor in the water. Although residents do not drink this water directly, they use it for personal hygiene and other household and subsistence activities. This water characteristic occurs mainly when there is little water release from the Acauã Reservoir, and the riverbed has little water, a situation that lasts for most months of the year in this semi-arid region.

The houses visited were also asked about the programs for universal water access. 60% of the families are beneficiaries of the One Million Cisterns Program (P1MC) from the civil society organization Articulação no Semiárido (ASA) (for the semi-arid region coexistence). In addition to this program, 20% of the houses have cisterns installed by the Municipal Government of Mogeiro. The other 20% of households did not benefit from any water universalization program.

These cisterns were installed in the community more than 12 years ago, and during the interview, some residents outlined the difficulties in maintaining the structures, and reported cracks and leaks that caused the total loss of stored water. In addition to the P1MC and the Municipal Government Program, the community also rely on the Water Truck Operation, which is part of the Federal Government's emergency action program.

Regarding the awareness about the organization of water related policies and projects, almost all local actors said they had no knowledge on the matter. Only one of the residents interviewed informed that he had attended some meetings at the city hall as a community leader approximately 12 years ago, and he participated in the draw was carried out by the Municipality of Mogeiro to define the distribution of the cisterns to be installed, and which houses would be benefited.

From the interviews, we verified that no resident or local institution associated to the visited residences has any participation in the Paraíba River Basin Committee, an entity considered the main space for representation of a hydrographic basin community. In addition to not having participation, they also do not know the components that make up the Committee of which the locality is part.

The distancing from participation in water governance is also perceived on the lack of knowledge of political representatives involved with water access issues. Of the residents heard, 80% do not know any political representative involved with this issue, and 20% who claimed to know any political representative in this regard, said that the contact only took place during the electoral campaign, based on promises of

improvements to access, especially regarding the installation of more cisterns in the region.

As for the water projects of greatest reference in the region, which was the construction of the Acauã Dam approximately 20 years ago and, more recently, the east axis of the transposition of the São Francisco River, residents expressed different perceptions regarding these works. All interviewees noticed a positive change regarding water access with the installation of the Acauã Dam, relating the longer duration of the Paraíba River bed to this reservoir.

Divergently, the transposition of the São Francisco River, east axis, which runs a few meters from the community, does not seem to have the same positive impact. The residents interviewed did not inform any change or benefit in the access to local water after the installation of the project. There is no local knowledge whether it will be possible to access the water conducted through pipelines and channels. The contact made by the work executing bodies was restricted to some landowners regarding the relevant indemnities to be paid for the areas used in the work.

As for the construction of these water works, the local actors stated that they were never consulted about these installations, in any project execution period. The only contact between management bodies and the riverside people of that region, according to the residents, occurred at a meeting restricted to those entitled to compensation. Since the work was of public interest, there was no negotiation and the amounts paid were considered low, based on the comments by the interviewees.

One can presume that the contact between the community and the water management bodies seems to be distant or non-existent, since 80% of the researched households had no contact with bodies integrating the national management system, whether at local, state or national level. Only 20% of the houses visited informed that the only interaction they have with bodies linked to water management is with the AESA-PB, even though in a restricted way, only to carry out the registrations of grants for the use of river water, or when inspection takes place.

Faced with the invisibility of the community in the water governance process, the results presented validate Castro's (2017) perception, when he associates water scarcity problems with political origins. The inefficiency regarding the participation scope of the Basin Committees is also observed, a configuration already suggested by Pagnoccheschi (2016), when signaling the intrinsic relation between the low level of political participation and the distance of the river basins collegiate bodies.

FINAL CONSIDERATIONS

Studies related to the Brazilian northeastern semi-arid region point out that, historically, the water issue regarding this region is on the political, social and economic debates agenda. In this context, the most vulnerable group regarding water access is the rural population, who live with a lack of water infrastructure and subsists supported by emergency policies. The lack of an effective solution for this group reveals the distance from the UN's sustainable development goal, the SDG 6, which advocates the for universalization of drinking water and sanitation.

The results obtained from the investigation carried out in the rural community of Juá confirm the precariousness of the water access by the rural population. Despite being the main storage resource for those residents, plate cisterns do not guarantee water supply throughout the year. Furthermore, when drinking water is running out, an alternative is purchase, which is not regulated as to origin and quality. The fragility regarding the lack of water treatment and the lack of quality monitoring is latent. It is important to note that the amount/individual recommended by the World Health Organization is also not available for the significant majority of residents of Juá.

We found that the participation of the rural community in water governance is non-existent, making it clear that the process of citizenship and the democratization of water for the northeastern semi-arid region continues to be a major challenge. This portrait denotes that the reconfiguration of water policies, in the current perspective of governance, seems to have occurred only in the legal statutes. The absence of rural communities in the discussions of new paths for the semi-arid region reinforces the centralization of power by the State, of urban scenarios and economic poles in decisions, thus contributing to the maintenance of vulnerabilities in the rural semi-arid region.

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