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Regional Development and the Socio-Environmental Vulnerability of Small Cities in the Amazon: A Study of Afuá, Pará

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Abstract
Regional development and sustainable development are intrinsically related. A region cannot achieve economic development without considering environmental sustainability. In relation to the Amazon Region, these principles are the difference between growing and effectively developing with quality of life. In this sense, the paper presents an analysis of the socioeconomic and sanitary conditions of Afuá, a small city in the Intermediate Region of Breves, located in the state of Pará, based on a discussion on socio-environmental vulnerability and regional development. Information from government websites, (Municipal, State and Federal), DATASUS, satellite images, data from the Ministry of the Environment (MMA), National Sanitation Information System (SNIS), Instituto Trata Brasil, Federation of the Industries of the State of Rio de Janeiro (FIRJAN) and Human Development Index (HDI) data was used. The data presented confirm that although the economy is reflected in improvements in indicators, this does not translate into better public health or even a better offer of urban services. This urban area has deficiencies, mainly in urban infrastructure, such as access to drinking water and sewage, issues which present challenges in relation to its development.
Keywords: Regional development. Health vulnerability. Small cities. Afuá.

Desenvolvimento Regional e a Vulnerabilidade Socioambiental das Pequenas Cidades da Amazônia: Um Estudo de Afuá, Pará

Resumo

O conceito de desenvolvimento sustentável foi proposto em 1987, o qual buscava um desenvolvimento que encontrasse as necessidades das gerações, daquele momento e futuras; em 2023, a ONU propôs os Objetivos de Desenvolvimento Sustentável. Um dos objetivos propõe "Assegurar a Disponibilidade e Gestão Sustentável da Água e Saneamento Para Todas e Todos". Neste aspecto, se insere a Região Intermediária (RegInt) de Breves, Pará. A região apresenta grande fator de vulnerabilidade socioambiental. Neste sentido, este artigo tem como objetivo apresentar uma análise das condições socioeconômicas, sanitárias da cidade de Afuá, uma pequena cidade da Região Intermediária de Breves, a partir de uma discussão sobre a vulnerabilidade socioambiental. Foram utilizadas informações de sites governamental, Municipal, Estadual e Federal, informações do DATASUS, imagens de satélite, dados Ministério do Meio Ambiente - MMA, Sistema Nacional de Informações sobre Saneamento SNIS, Instituto Trata Brasil, Dados FIRJAN e IDH. Apesar de vários indicadores econômicos terem avançado, os indicadores de infraestrutura e saúde demonstram uma cidade que não alcançou o desenvolvimento sustentável.

Palavras–chave: Desenvolvimento regional. Vulnerabilidade Sanitária. Pequenas cidades. Afuá.

Regional Development and the Social and Environmental Vulnerability of Small Cities in the Amazon: a Case Study of Afuá, Pará

Abstract

The concept of sustainable development was proposed in 1987, which sought a development that met the needs of generations, at that time and future ones; In 2023, the UN set the Sustainable Development Goals. One of the objectives proposes "Ensuring the Availability and Sustainable Management of Water and Sanitation for All". In this respect, the Intermediate Region (RegInt) of Breves, Pará, is included. The region presents a great socio-environmental vulnerability factor. In this sense, this article aims to present an analysis of the socioeconomic and sanitary conditions of the city of Afuá, a small town in the Intermediate Region of Breves, based on a discussion on socioenvironmental vulnerability. Information from government, municipal, state and federal websites, DATASUS information, satellite images, data from the Ministry of the Environment - MMA, the National System of Information on Sanitation SNIS, Instituto Trata Brasil, Data FIRJAN and IDH were used. Although several economic indicators have advanced, infrastructure and health indicators demonstrate a city that has not achieved sustainable development.

Keywords: Regional development. Sanitary Vulnerability. Small towns. Afuá.

1 Introduction

What are the relationships established between regional development and sustainability, or sustainable development? To answer this question, it is important to understand that there are differences between economic growth and development. Alves and Knorek (2012, p. 14) mention that growth is related to an increase in production, consumption, and Gross Domestic Product (GDP), while development is more complex once it involves "changes in the structure of production and the distribution of wealth more fairly". The authors explain that, therefore, growth corresponds to changes in economic data, while there is only development if these changes have repercussions on social life in general" (ALVES; KNOREK, 2012, p. 14).

According to Corrêa, Silveira and Kist (2019), the idea of development, over the years, has presented varied meanings, even metaphorical propositions, such as the elephant, according to which it is a concept "easy to recognize, however, difficult to understand" describe (ROBISON, 1962 apud CORRÊA, SILVEIRA, KIST, 2019, p. 4), for the authors, the situation reflects conceptual complexity. The authors explain that economic development occurs associated with the "expansion of human freedoms", however, without avoiding economic aspects and it can contribute to overcoming social barriers" (*Idem*, p. 12). They also comment that there is no distinction between the economic development of a country and the development of a region/regional, as in both cases profound social transformations are desired (CORREA; SILVEIRA; KIRST, 2019, p. 07). Nevertheless, the explanation of these processes is differentiated, depending on the scale of analysis, "the socio-spatial characteristics and the differential historicity of the territories, or even administrative autonomy" (*Ibidem*).

Although some authors defend the idea that economic development is a myth (DA VEIGA, 2005, p. 244), this discussion advanced, according to different circumstances, and, in the 1970s, it was associated with the environmental issue of eco-development , until the 1980s, when the paradigm of sustainable development emerged, which "recommended economic growth as a way to reduce poverty and, consequently, environmental problems" (BELLINGIERI, 2017, p. 10). There is growing concern about the development process (of a nation or regional) and environmental sustainability. It is important to emphasize that it is imperative to formulate and put into practice public policies that "address the correct final disposal of solid waste and effluents of domestic and industrial origin, the emission of atmospheric pollutants, among others" (OLIVIEIRA FILHO; JOHN, 2018, p. 717). These issues need to be highlighted to have strong development.

Moreira and Crespo (2012) explain that the concept of sustainable development arose from the Brundtland Report (1987), published by the World Commission for Environment and Development (CMAE or WCED) of the United Nations. The authors comment that the concept mentions development, however, development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs (MOREIRA; CRESPO, 2012, p. 40). In this line of discussion, the UN proposed, in 2002, the Millennium Development Goals, a pact between nations to end poverty, which evolved into the Sustainable Development Goals (SDG) (UNDP, 2023), goals that should be achieved by 2030, an act considered by the UN itself to be heroic.

The 17 SDGs are integrated – and it is recognized that action in one area will affect results in other areas and that development must balance social, economic, and environmental sustainability (UNDP, 2023). One of the objectives presented refers to "Ensuring the Availability and Sustainable Management of Water and Sanitation for All". The UN (UNDP, 2023) explains that water scarcity affects more than 40% of people, an alarming number that is expected to increase as the temperatures of the planet rise. The UN also mentions that, although 2.1 billion people have improved sanitation since 1990, the decrease in the supply of drinking water is affecting all continents (UNPD, 2023). The UN also mentions that to reach this goal, that is, guaranteeing access to universal and safe drinking water for all, it is necessary to improve accessibility for more than 4.5 billion people in the world who do not have access to managed sanitation services safely (excrement properly

disposed or treated), in 2015, or 2.3 billion that even lacked basic sanitation (UNDP, 2023).

In Brazil, it is estimated that 84.2% of Brazilians are served with a treated water supply and 55.8% have a sewage system. In the North Region, which brings together 7 states of the 9 that make up the Legal Amazon, these values do not reach the mark of 60% of the population with access to treated water, and 14% have connection to the sewage network, of which 20% of this total has treatment (TRATA BRASIL, 2023). Specially, in relation to domestic sewage, the Region lacks social investments and, mainly, improvements in universal access to treated water and basic sanitation. In other words, improving health issues in the Region are seen as a "*sine qua non*" condition for achieving regional development *per se*. The Region presents itself as a paradox between abundance, quality, and access to the resource "treated water".

The Intermediate Region (RegInt) of Breves, one of the 30 Intermediate Regions of the Brazilian Amazon, is an example of the situation mentioned. The Region presents a great vulnerability factor, as it concentrates the worst indicators: income, work, urban and health infrastructure in the state of Pará, in addition to low HDI. According to data from Brazilian Statistics Institute (IBGE - 2023), the following municipalities have the worst HDIs in Pará and Brazil: Melgaço (0.418), Afuá (0.489), Chaves (0.453), Bagre (0.471), Porto de Moz (0.503), Portel (0.483), Cachoeira do Piriá (0.473) and Anajás (0.484), and among these, 6 municipalities are from the Intermediate Region of Breves (Melgaço, Afuá, Chaves, Bagre, Portel and Anajás).

The sanitary conditions of all the host cities in the Intermediate Region of Breves are quite precarious. For example, there is no domestic effluent treatment station in any of the Intermediate Region cities, nor is there any sewage collection (IBGE, 2010). Particularly, the Region, in addition to having low-income generation opportunities for the population, presents precarious sanitary conditions, which compromises the achievement of regional development. However, despite this situation, these cities continue to grow and attract population.

It is in this sense that this paper was proposed. It aims to present an analysis of the socioeconomic and sanitary conditions of Afuá, a small city in the Intermediate Region of Breves, located in the state of Pará, based on a discussion about vulnerability socio-environmental and the conditions for regional development. In addition to this introduction, the paper has four more sections: the first dedicated to presenting the methodological procedures for preparing the research that gave rise to this discussion; the second presents the area of study, the small city of Afuá; in the third, data and an analysis are presented on the Regional development and environmental vulnerability of small cities in the Intermediate Region of Breves, with a subsection that deals with the health and environmental vulnerability of Afuá; in the last section, the final discussions of the paper are presented. These sections are presented below.

2 Methodological procedures

For this paper, resulting from exploratory research, it presents data and analyzes from a qualitative and quantitative research. Satellite images were used, made available by National Institute for Space Research (INPE), United States Geological Survey (USGS)®, European Space Agency® which made it possible to calculate the growth of Afuá.

Census data were used, on the number of urban households and access to infrastructure, at the sector scale, made available by IBGE (2010). Data were collected through the application of 300 forms to urban households, representing 15% of the total of 1,992 households (IBGE, 2010), and 2 semi-structured interviews, carried out with representatives of local public authorities and civil society, obtained in the period from 2017 to 2022, during fieldwork. Both procedures were approved by the USP Research Ethics Committee, under Process No. 3.100.314. The form applied aimed to survey the socioeconomic profile of the urban resident, access to infrastructure and access to public services.

Information from government, municipal, state and federal websites was used, and they are served for document analysis, in addition to information from DATASUS, IBGE (2010). Data from the Ministry of Health (MS), Ministry of the Environment (MMA), National Sanitation Information System (SNIS), Instituto Trata Brasil, Atlas Brasil, PNAD and TerraClas were also used. Information on the variation in the Firjan Municipal Development Index (IFDM) and the Human Development Index (HDI) was collected in the FIRJAN System (CONFINS, 2020) and IBGE (2022).

The IFDM, according to Confins (2020), "is a study of the FIRJAN System (Federation of Industries of Rio de Janeiro) which annually monitors the socioeconomic development of all Brazilian municipalities in three areas of activity: employment and income, education and health" based on official public statistics, made available by the Ministries of Labor, Education and Health. The index varies from 0 (minimum) to 1 point (maximum) to classify the level of each location and its methodology makes it possible to determine whether the improvement relative occurrence in each municipality results from the adoption of specific policies, or if the result obtained is merely a reflection of the decline in other municipalities. Four concepts were agreed for the IFDM: 1) municipalities with IFDM between 0.0 and 0.4: low stage of development; 2) municipalities with IFDM between 0.4 and 0.6: regular development; 3) municipalities with IFDM between 0.6 and 0.8: moderate development; 4) municipalities with IFDM between 0.8 and 1.0: high stage of development.

3 The small city of Afuá

The flows that take place in the territory, which was also populated, caused "transformations to take place in the national territory and it add to the production framework of cities" (SPOSITO; JURADO DA SILVA, 2013, p. 26). Thus, the emergence of cities has always been driven by a force of concentration, whether the factor is political, economic or that of an inherited territory, that is, cities are forged by political, economic, social, and territorial processes. At the same time, when we focus on urban studies to discuss small cities, the territorial production of a space that does not have metropolitan disparities is emphasized.

Corrêa (2011, p. 10) comments that, predominantly, some small cities maintained their dynamics linked to the functionalities of the countryside and only from the 20th century onwards, there were incentives and modernization of agriculture, which reached part of these cities. Since then, there has been a significant change in the natural landscape, roads, air, and port traffics, the development of telecommunications, connecting small towns to large metropolises and even abroad. Corrêa (*Idem*) further explains that the relative homogeneity that

characterizes small cities was fragmented by the transformations that occurred in Brazilian society making these cities to become more differentiated, even more unequal from each other.

In this context, small Brazilian cities are notable for their regional differences, territorial domains, and inherited cultures. Nonetheless,

> the analysis of "differences between the regional types of small cities alerts us to the care that must be taken in the empirical studies to be carried out, considering the relationships between small cities and their hinterlands" (CORRÊA, 2011, p. 7).

Small Amazonian cities must be studied considering the relationship between their population and the forest and water, elements that must be the starting point and not the arrival point of any study (OLIVEIRA, 2006, p. 8). In the Amazon Region, these cities corresponded to more than 60% of the total number of cities in the Region, as demonstrated by the 2010 Census (IBGE, 2010). In this urban territorial group, riverside cities are included, which are small in population size and urban perimeter, and they have predominant commercial life in the lower circuit of the economy and formal jobs dominated by the public sector, which move between primary and tertiary labor activities, and it must be considered within the context of regional development (MONTOIA, 2018). For Trindade Jr, Silva and Amaral (2008), the riverside city in the Amazon is characterized by: having a small population size and small territorial size; be traditional regarding spatial planning; and have urban functions at a local level, with a strong connection with the surroundings, the forest and the river. These small urban centers, with less than 20,000 inhabitants, were growing, despite the timid State or Federal presence.

According to this, it is noteworthy that, in this paper, Afuá is the study of case, considering the context of the Intermediate Region of Breves, belonging to the Marajó archipelago, located in the estuary of the Amazon River, state of Pará (Figure 1). In this Intermediate Region, cities with less than 20,000 inhabitants predominate.

Afuá is bordered by the rivers Marajozinho (on the left), Cajuúna (on the right) and Afuá (front). The city is influenced by the movement of the tides of these rivers. Due to its geographical location, the village soon developed and became a parish in 1874, being extinguished twice, and only in 1889, it regained its status (LOMBRA; NOBRE JÚNIOR, 2013, p. 5). The municipality was only made official in 1890 and the town was elevated to city status in 1896 (COSTA, 2020).

Even though it belongs to the state of Pará, the municipality of Afuá, and its headquarters, are closer to the capital of Amapá. Its headquarters are approximately 75 km from Macapá (AP). From Belém (the capital of its state) it is located approximately 275.65 km, as the crow flies. This reality makes the Afuaense population dependent on resources from Macapá Many residents of Afuá report having family members who live, study or work in Macapá. Data from the Demographic Census (IBGE, 2010) show that Afuá had 35,042 inhabitants, distributed between the urban area, with 9,478 inhabitants (27%), and the rural area, with 25,564 inhabitants (73%), and a territorial extension of 8,338.438 km^2 . In 2022, the total population was 37,765 inhabitants (IBGE, 2023).

Figure 1: Location map of Afuá - PA, in the Intermediate Region of Breves

Source: Elaborated by the Authors (2023), based on IBGE data (2022).

When approaching Afuá (Figures 2 and 3), it is possible to admire its attractive landscape, as described by Valota (2019, p. 138.), due to the colorful houses, reminiscent of a color palette. Still on the enchanting landscape, Palheta and Rodrigues (2012, p. 172-173) mention that "the city's color palette draws the immediate attention of the visitor", in addition to the "natural landscape composed of the closed green of the forest" and its muddy rivers.

Figure 2: Image of Afuá obtained with a drone

Source: Photograph obtained by team of the Laboratory of Study of Cities (2023).

Figure 3: Mosaic of photographs of the urban area of Afuá: a) images of colorful houses, typical of the city; b) square located at the entrance to the city; c) image of other colored houses; d) panel photography, highlighting the image of Afuá, as "Venice of Marajó"; e) image of another colorful house

Source: Collection of the Laboratory of study of cities (2019).

On its edge, in the front part of the city, it is possible to see several buildings that are attractive to tourists, such as hotels, clothing stores, shops and bars, haberdashery, etc., in addition to the church and the registry office (MONTOIA, 2018, p. 172). The only way to reach the city is through rivers. There are no access roads to the city, and the local airstrip does not receive regular flights. Fishing is practiced in the rivers, and bathing in their waters is customary, and is even a leisure option for this society (MACEDO *et al.*, 2018, EDO *et al.*, 2018, p. 164). The nature of the floodplain makes Afuá a unique city, built on docks, with its wooden and concrete streets, where only pedestrians and bicycles circulate, as well as creative inventions, such as the bicycle taxi (VALOTA, 2019, p. 139) and Public Power vehicles: "ambulance bike, garbage collector bike, firefighter bike and police bike".

4 Regional Development and Environmental Vulnerability of Small Cities in the Intermediate Region of Breves

The Intermediate Region of Breves, formed by 16 municipalities, is characterized by historical and structural socioeconomic problems, which give the Region a profile of social fragility. Figure 4 presents two graphs and show the variation in the Firjan Municipal Development Index (IFDM) and the Human Development Index (HDI), for all municipalities exemplifying this situation. In these graphs it is possible to observe the increasing trend of both indicators, which means, in both cases, an improvement in the indexes in the period from 2000 to 2010, for the HDI, and between 2005 and 2016, for the IFDM.

For the IFDM (Figure 4a), in 2005, only 4 municipalities in the Region of Breves were below the index average (0.2709) and 75% were above, a situation that was not repeated in subsequent years. However, in the period from 2005 to 2016, 9 municipalities (56%) showed an increase of more than 30% in rates. In 2005, 63% of the municipalities in the Intermediate Region of Breves were classified as "low development" and in 2016 all 16 municipalities were classified as "regular development".

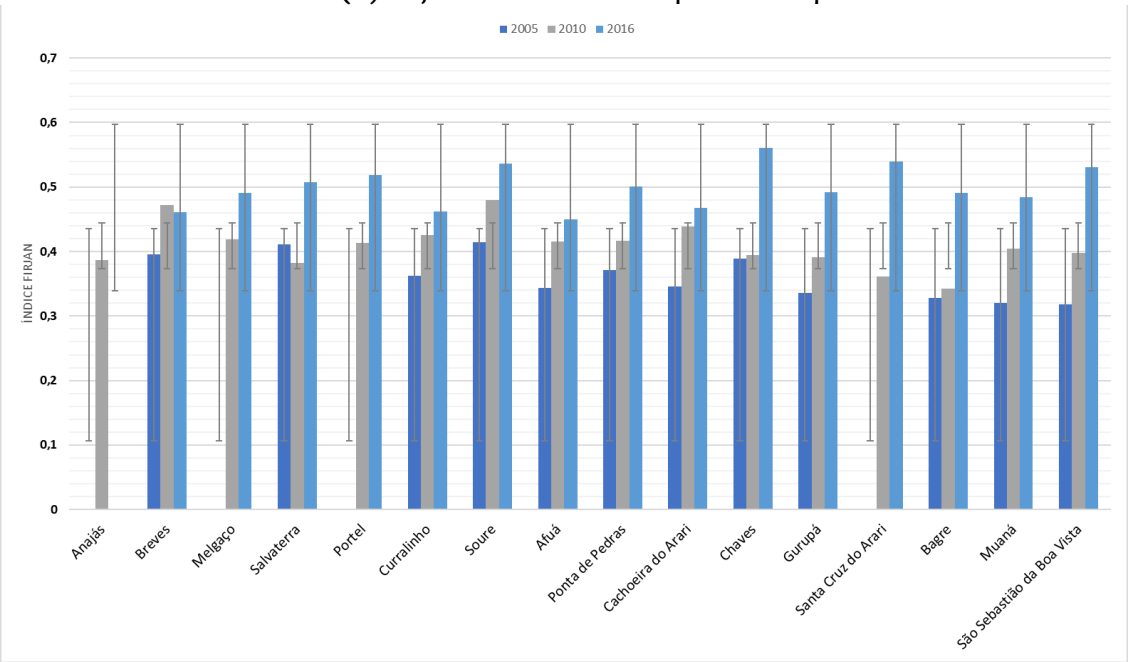
As for the HDI, all municipalities showed an increase in indexes, in the period from 2000 to 2010, greater than 20%, with 12 (75%) increasing by more than 30%, 10 municipalities (63%), showing a change in scale, changing its status from very low HDI to low or medium.

It is noteworthy that although the results in 2010 were encouraging, it is worth checking the influence of the economic crises after 2010, in addition to the COVID-19 health crisis, which occurred between 2020 and 2022. It is also reinforced, that the following municipalities obtained, in 2010, the worst HDIs in Pará and Brazil: Melgaço (0.418), Afuá (0.489), Chaves (0.453), Bagre (0.471), Porto de Moz (0.503), Portel (0.483), Cachoeira do Piriá (0.473) and Anajás (0.484), 6 of these municipalities being in the Intermediate Region of Breves (Melgaço, Afuá, Chaves, Bagre, Portel and Anajás).

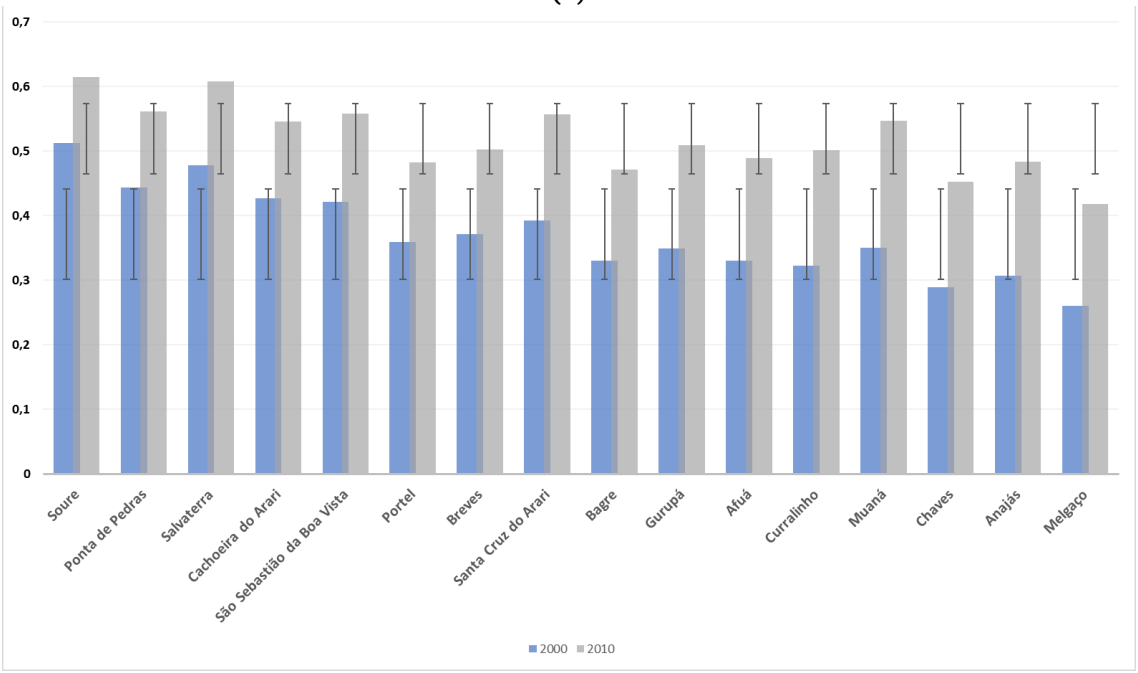
Bellingiere (2017, p. 15) explains that development policies, until 1980,

> they were characterized by heavy industrialization, centralized in large companies, located primarily in national metropolises. Large companies were not designed at a local level, but rather within the framework of the national economy. The location, seen as a depository of resources and activities, only mattered as a support for the development of the national economy.

Figure 4 – Intermediate Region of Breves, by different socioeconomic indexes: (a) HDI and (b) Firjan index of municipal development



(a)



(b)

Source: Prepared from data from FIRJAN (2020) and IBGE (2023).

Costa *et al.* (2023, p. 49) comment that:

> In relation to employment, data from RAIS (annual list of social information - MTE, 2020) show that 65% of the employed population in the Intermediate Region of Breves were linked to public administration. In all municipalities, the percentage of formal employment contracts in this sector (public administration) varies from 75 to 96.5%, except for Breves (22%) and Salvaterra (60%). The services sector is the second most important, in

> terms of formal employment, accounting for 19.4% of the employed population and the commerce sector 3 employs 9.6%. Breves is the only municipality that has 61.7% of its people formally employed in the services sector.

This verified economic growth is not reflected in the sanitary condition, or even in the improvement of the environmental vulnerability indicators of the municipalities and their respective administrative headquarters. In this paper, this discussion is exemplified with the study of case of Afuá.

4.1 The Health and Environmental Vulnerability of the Small City of Afuá

The National Basic Sanitation Survey (PNSB) carried out in 2017 by the Brazilian Institute of Geography and Statistics (IBGE, 2017), reveals that the North Region has the largest national deficit in terms of water supply and sanitation, as well as exposing the Federation Units with the lowest percentage of municipalities with operating sewage supply and collection agencies: these are the states of Paraíba (10%), Pará (5%), Rondônia (4.6%) and Amazonas (4.2%), that is, three states in the North Region have the worst indicators. When this analysis refers to access to sanitation, the Region gains even more evidence given the low indicators.

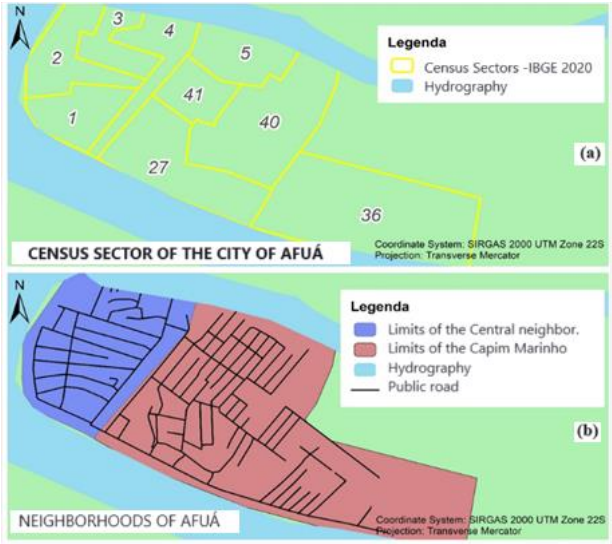
Even though the Amazon Region has great environmental relevance on a global scale, the situation is not the same for the local population, who deal with the lack of sewage services in their daily lives. This condition generates vulnerability that interferes with people's health and quality of life. Moreover, the lack of adequate basic sanitation generates a serious economic and health impact.

Given this reality, discussing sanitation and public health in the Amazon leads us to consider the countless particularities that prevail throughout its large extension (GIATTI, 2007, p.136). The North Region has the worst basic sanitation rates in the country, as previously explained, and this reality becomes more challenging in the context of small riverside cities, such as the cities of Marajó, when considering a scenario of vulnerability.

The Intermediate Region de Breves, for example, presents a great vulnerability factor, as it concentrates the worst indicators of income, work, urban infrastructure, and health in Pará (FAPESPA, 2015). Furthermore, many communities have populations that live in settlements, in communities and islands that are very far from specialized, clinical and hospital centers, that is, they are hundreds and/or thousands of kilometers away from the capitals (CARDOSO *et al*., 2020, p. 139). This reality implies a scenario of vulnerability, which directly affects the quality of life, as seen in daily life in Afuá.

Afuá has two neighborhoods (Central and Capim Marinho), which divide its urban area, and in the Capim Marinho neighborhood there are four communities, categorized by the Social Assistance Reference Center (CRAS), as shown in Figure 5.

Figure 5: City of Afuá (a) and Census Sectors (b)



Source: Santos (2022).

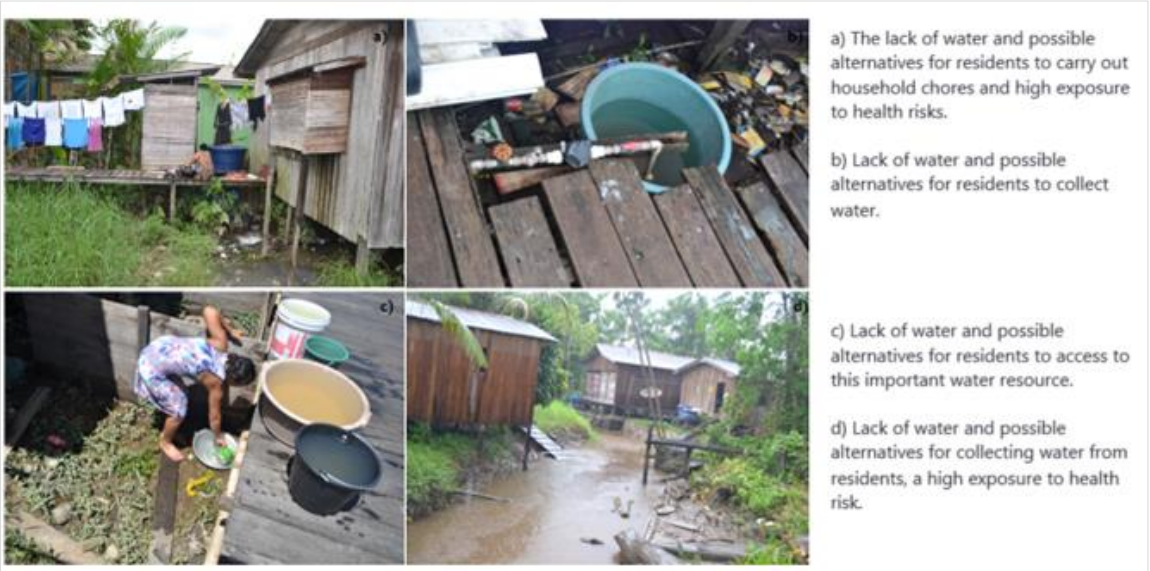
Valota (2019) comments that this area was gradually occupied by residents who came from the rural area of the municipality, with Capim Marinho originating from an occupation that began in the mid-2000s, over which the Public Authorities had no control. In studies developed by Rocha (2017, p. 218), it was observed that residential use corresponded to 70.5% of the area occupied by the city, concentrated mainly in the Capim Marinho neighborhood. The Central neighborhood, made up of the historic center, as it is older, has a more consolidated occupation and has a greater diversity of urban services and equipment. In 2022, the Central neighborhood gained some landscaping improvements on public roads, contributing to signage in the central area.

Using satellite images, the growth of Afuá was mapped. The urban area, in 1986, had 0.22 km², rising to 0.50 km² in 1999. In these 13 years, Afuá grew approximately 127%. After the 2000s, the city gained a more significant spatial dynamic, and in 2005 it had an area of 0.78km² (56% increase from 1999). After a decade, growth intensified, recording, in 2016, an area of 1.18 km², an increase of 50% (0.40 km²) in 10 years. Between 1986 and 2016, in 30 years, the urban area grew by more than 436%, at a rate of 14.5% per year. This growth reflects population growth. According to IBGE (2010), in 1980, the city had 2,209 inhabitants; in 1991, the urban population increased by more than 85%, reaching 4,093; in 2000, the urban population represented 23% of the total population, with 6,782 residents. In the 2010 Census (IBGE, 2010), the population of the city represented 27% of the total residents, totaling 9,478 inhabitants, having grown by 40% between 2000 and 2010.

Throughout this process of urban growth, there was no improvement in the quality of life of residents. There is a deficiency or absence of services related to health, access to water supply, and the lack of sewage facilities. The Health Vulnerability Index (IVS) calculated in studies developed by Santos (2023, p. 84), showed that residents of the Census Sectors of Capim Marinho (Sectors 5 and 27) are those who suffer most from the absence of a policy public health. All homes do not have any sewage treatment system, whether dry, black, or septic tank. The existence

of a very shallow water table is a complication for the entire city as it makes it difficult to treat domestic waste thrown into septic tanks, which causes contamination of surface water, which is widely used by residents for various domestic activities (Figure 6).

Figure 6: The precariousness of access to water for the residents of Capim Marinho



Source: Collection of the Laboratory of study of cities (2018 and 2019).

According to an interview, carried out in 2022, with a collaborator from the Secretariat of Sanitary, Epidemiological and Environmental Surveillance in Health:

> Our biggest problem, related to water transport, is diarrhea. We say this based on results, we have a very large number of hospitalizations due to diarrhea, especially in children. In 2021 there were 153 hospitalizations, but more than 1,000 people attended the unit with diarrhea or other similar symptoms [...] which is correlated to the streets of Capim Marinho that do not have treated water. There are cases where, if you notice that the person, or child, goes several times (to the medical unit), they stay in a cycle. The issue of verminosis is related to the issue of water. A municipality that is covered by water, and the city is in the floodplain. So, the child goes there, bathes in that water (*Igarapé*), drinks the water, even by consuming *Açaí*, products made with untreated water. One of our problems here is this situation, we have been monitoring these outbreaks for over 15 years, related to the issue of diarrhea, as well as hepatitis A, and several other diseases.

In Afuá, it was observed that the dependence of the urban economy on forest resources is no longer the main activity of urban residents in generating income, and it was found that, in addition to employment in the public sector, the service sector appears as the second largest employment relationship, for more than 30% of urban households. The city has grown, the urban economy is not strongly linked to the forest economy, however, health indicators have not evolved.

In 2000, 84% of households were connected to the water supply system (IBGE, 2000). In 2010, access to the water supply system remained at this level, with a 61% increase in the number of households. Access to the sewage network remained

unchanged, considering that there is no treatment or sewage network. Domestic effluents are discharged into streams or septic tanks. Data from the forms applied by this research to urban households, in 2019, demonstrate that the Central neighborhood has most households (90%) connected to the COSANPA (Pará Sanitation Company) system, and in Capim Marinho this service reaches less than 30% of households.

The report by the employee of the Health Surveillance Department reveals an endemic scenario in the city, which demonstrates a risk to the health of the population, exposed by diseases related to water transport and unhealthy environments, especially the most vulnerable, interfering with the individual's well-being.

There are, on the part of residents, problems in relation to water distribution, as to have access to resources in their homes, many use improvised pumps to connect to the river and capture the water necessary for their consumption. Some choose to carry out the treatment via decantation with aluminum sulfate, purchased from local stores. It is noteworthy that this practice is more common in rural communities, due to the lack of options for obtaining clean water for consumption (drinking and cooking), as seen in Figure 7. In urban areas, residents constantly complain about the lack of water.

Figure 7 – Floating Basic Health Unit of Afuá: (a) Floating Mobile Health Unit brought to Afuá in 2019; (b) Unit stopped due to lack of resources

Source: Collection of the Cities Study Laboratory (2023).

According to information provided by the Department of Health, the City Hall offers a salary of more than BRL 3,000 to doctors who can work at least 3 times a week and, even so, there is a lack of care in several specialties.

In one of the interviews with the Government, during fieldwork in January 2022, a report from the Primary Care Coordinator of Afuá, which presents an analysis of the demographic increase in the city and the impacts of this number on the public health of the municipality:

> The growth is visible. The data is showing us. We feel this in our daily lives, in our actions, in our service offerings. Because I, as coordinator, working with our other coordinators, our secretary, we have this vision. The one in

> Capim Marinho (UBS) completed a report last month, which was to serve 4 thousand people, it already serves 10 to 11 thousand people, due to their production, you know, of service there in that unit. As well as the center team that served more than 10 thousand people, because it takes this part of the center here, and it takes the entire surrounding region, and ends up taking this (rural) area here too, which is uncovered by health services and then he ends up coming to the city.

Afuá has 8,338.438 km², with 8 basic health units in the municipality, 2 in the urban area, plus 13 Mixed Units and 12 Floating Mobile Units, totaling 33 health establishments, according to the Ministry of Health (2022). In total, there are 25 rural communities, and there is often no health support, due to geographic distance, one of the biggest obstacles to this service. An alternative for riverside communities is floating health units[1]. In field research, it was found that there is only a single floating mobile health unit in Afuá, which was stopped due to its high maintenance cost (Figure 6), with the cost of travel varying from BRL 80,000 to 90,000, depending on the services offered on board (BRASIL. MINISTÉRIO DA SAÚDE, 2023).

The data presented confirm that although the economy is reflected in improvements in indicators, this does not translate into better public health or even a better offer of urban services. The precariousness of access to basic infrastructure continues, decade after decade, in a city that grows at rates greater than some medium or large cities in the country, without access to public resources that could contribute to reversing this situation.

An alternative is to improve the local economy, through incentives for the green economy seeking for the association between production and distribution, with environmental preservation, conscious consumption, and concern with social inclusion. The search for better social indicators, efficient production, with low carbon emissions and the use of forest resources can signal changes in the standard of living of this population. In other words, these possibilities can become virtual for local development reverberating regionally.

5 Final Considerations

The results presented in this paper demonstrate that discussions about economic growth and quality of life in small cities still need to advance, mainly in the sense of realizing that this relationship is not direct. Although we believe in the maxim proposed by José Aldemir de Oliveira, that contemporary reality, full of complexity, does not allow us to understand small cities "only by relating them to the crisis, emerging in the diagnosis of needs, but also as virtualities, as possibilities" (OLIVEIRA, 2006, p. 29), we also understand the difficulties of meeting the smallest, most basic needs, such as access to adequate sanitary conditions, with access to

[1] The Floating Basic Health Units (UBSF) are vessels that accommodate Floating Family Health Teams (ESFF), provided with the ambiance, furniture and equipment necessary to serve the riverside population of the Legal Amazon (Acre, Amapá, Amazonas, Mato Grosso, Pará, Rondônia, Roraima, Tocantins and part of Maranhão) and South of Pantanal, guaranteeing care for their populations as provided for in the National Primary Care Policy (PNAB). Source: BRASIL. MINISTÉRIO DA SAÚDE (2023). Available at: https://www.gov.br/saude/pt-br/composicao/saps/ubsf .

treated water for consumption and an environment free from contamination by fecal coliforms, among others.

In this sense, this paper made it possible to identify the lack of infrastructure for the population and how much this process directly affects the environmental conditions and health of the population. The lack of dialogue between federal, state and municipal managers leads to fragile public policies that do not meet the demands of the population, especially those most in need.

The reduction in the supply of investments in basic sanitation infrastructure and drinking water treatment generates vulnerability conditions, especially in an environment as fragile as the Amazon floodplain. Existing environmental problems do not allow for social advances and, therefore, neither do local/regional development.

Data from the Firjan Municipal Development Index demonstrate that some municipalities in the Intermediate Region of Breves still present "low development", and it is noted that this reality interferes with the condition of health and environmental vulnerability, or vice versa. When studying the urban space of Afuá and its sanitary conditions, the urgency to think about public policies that can mitigate damage to health and the environment, which become obstacles to economic advances, is highlighted.

Afuá, the docks built over the flood plain demonstrate the way of the population of adapting to the environment and the creation of an intertwined relationship between environment and growth. In other words, Afuá represents the urban connected to the forest.

As in other Brazilian cities, this urban area has deficiencies, mainly in urban infrastructure, such as access to drinking water and sanitation, issues that present challenges in relation to its socioeconomic development. In any case, this theme does not end here, and this discussion, about health vulnerability to which the population of a small Amazonian city is subjected, can be expanded.

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