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MANAUS AND ITS "PLASTIC WATERS": FROM NATURAL ELEMENTS TO OBSTACLE TO URBAN GROWTH AND DEVELOPMENT

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Abstract: Concern about sustainability and the impact generated by socioeconomic activity and its implications on the environment began in the last century and today constitutes a humanitarian challenge. The history of Manaus is intertwined with the history of occupation of its streams. At the end of the 19th century and beginning of the 20th, streams were the subject of dispute between the sophisticated elite who wanted a modern and civilized city versus the poor population who used them for bathing, washing clothes and other daily activities. Today the streams of Manaus are carpets of PET bottles. To this end, we aim to discuss the impact caused by the incorrect disposal of solid waste in Manaus streams in light of the SDGs. Methodologically, this is a qualitative, descriptive and explanatory research, with secondary sources, observational method and content analysis. Regarding the impacts generated by the incorrect disposal of solid waste in the streams of Manaus, in addition to compromising the health of the population, they generate high costs for municipal coffers and impact mortality in the streams that cross the capital as their sources are buried by garbage or silted up. Despite the daily actions carried out by SEMULSP, little progress has been made. The solution would be to raise awareness and change society's attitude when dumping solid waste in streams, as well as correctly disposing of it, which would contribute to generating employment and green income, reducing environmental impact and improving the health conditions of the population that resides there. on the banks of streams.
Keywords: Plastic streams. Sustainability. Manaus. SEMULSP. SDGs.

INTRODUCTION

The streams that run through Manaus constitute natural elements and represented spaces for collective use by the most vulnerable population who used them for their personal hygiene (bathing), washing clothes, washing animals, means of circulation and, mainly, spaces for sociability.

The elite that inhabited the capital of Amazonas in the heyday of rubber exploitation in the region, 19th and 20th centuries, was inspired by the standards of living and modernization of Paris and sought to transform Manaus into the "Paris of the Tropics".

The "Paris of the Tropics" must present the image of a modern and civilized city, linked to urban improvement and beautification guided by a Code of Municipal Postures managed by the State and the Elite, with social and spatial rules and norms with punishments and arrests if were not fulfilled.

Such standardization had an impact on the life of the city and it is from this moment on that we began to observe the imposition of new standards, with the aim of promoting the transformation of habits and customs that denied the values, the culture rooted and lived by the population in the city. time (GLOBE, 2019).

Given the scenario of change and transformation, streams constitute obstacles to urban growth and development, as well as elements that possess and proliferate diseases. The solution found was the burial and channeling of these, as well as actions to relocate the most vulnerable population to peripheral regions of the capital of Amazonas.

As we observed, it was from this moment on that streams became an urban problem to be faced and neglected by the public authorities and the resident population. Furthermore, over time, the capital became the metropolis of the Amazon and one of the most populous

capitals in the region.

The more urbanization and population concentration, the greater the amount of urban waste generated per capita. In the case of Manaus, our object of study, urban waste can be found within the streams in a surprising volume.

Manaus, had more than 1000 cataloged streams that crossed the city from one end to the other. Currently, we have approximately 150 remaining, just a few in seaworthy conditions given the unfortunate carpet of PET bottles.

The streams of Manaus reveal a landscape of abandonment, an unbearable odor that on days of heavy rain or along the rise of rivers causes countless problems due to overflow.

The population concentration as well as the inefficiency of municipal public management in terms of adequate collection and correct disposal of solid urban waste have transformed the capital of Amazonas into a major challenge for public management and for the daily lives of Manauaras.

We emphasize that the problem of correct waste disposal is a global issue and has been worsening with the volume generated per capital/year in more populous regions that suffer from the urbanization process.

Brazil, with 213 million inhabitants, is one of the countries that generates the most solid waste in the world, 79.1 tons/year (2019 data), 379 kg/inhabitant/year. Of this total, only 3% follow the path of recycling and correct disposal.

Regarding the correct disposal of solid waste, we highlight the National Solid Waste Policy (PNRS), Federal Law No. 12,305 of 2010, which guides the disposal of waste as well as the participation of stakeholders.

Amazonas is the state in the Northern Region that produces the most urban waste. Parallel to this, its 62 municipalities dump their waste in inappropriate landfills given the lack of sanitary landfills. In other words, the municipalities of Amazonas have not yet complied with the PNRS even with the extension of the deadline.

This study will be limited to the reality of the capital of Amazonas, Manaus. We will be based on the most recent figures regarding the amount of waste discarded in streams, the population and actions taken by the current municipal management, responsible for cleaning and correctly disposing of waste.

Regarding waste management, it is based on the precepts of sustainability (economic, social and environmental), constituting a challenge for humanity since it is based on the commitments made by member countries through the 2030 Agenda and the 17 SDGs.

Taking into consideration, the reality observed regarding the incorrect disposal of waste in the streams of Manaus, the following problem arises: what are the main impacts caused by the incorrect disposal of waste in the streams of the capital of Amazonas? To this end, we aim to discuss the incorrect disposal of urban waste in the streams of Manaus in light of the SDGs.

As for the methodological approach, it is a qualitative, descriptive and explanatory research, with secondary sources, observational method and content analysis.

The construction as well as the theoretical basis used was based on the following topics: Sustainability and sustainable development, National Solid Waste Policy (PNRS), Manaus: industrialization, urbanization and settlement, Urban solid waste and its impacts, The geography of Manaus and garbage in the streams and finally, we present the discussion based on the 2030 Agenda and the 17 SDGs.

As we have seen, the discussion about incorrect waste disposal is of paramount importance for the sustainability tripod. And when we deal with a unique environment like the Amazon, the concern takes on another

proportion, as we have the most significant freshwater ecosystem in the world, with Manaus being an urbanized capital crossed by river basins and numerous streams.

Manaus, capital of the state of Amazonas, benefits from four urban basins: Educandos Basin, São Raimundo Basin, Puraquequara Basin and Tarumã Basin, being crossed by more than a hundred streams.

Structurally, this article has: Introduction, Theoretical Foundation, Methodology, Result, Conclusion and Considerations and finally, we have the References used in the construction of the theoretical basis.

SUSTAINABILITY AND SUSTAINABLE DEVELOPMENT

Both sustainability and sustainable development are global issues. Regarding sustainable development, it consists of a learning process where public policies are guided by a national development plan (BARBOSA, 2008).

For Feil and Schreiber (2017), sustainability constitutes a reflection of the relationship between man and the environment regarding existing problems that can affect the relationship between ecology and economic development.

According to Parente and Dias (1997), the concept of sustainable development presupposes attentive and responsible economic growth, in order to extract benefits for the present from available resources and technologies, without compromising the reserves that will be bequeathed to future generations. Sustainable development, consolidated in 1987, is based on three pillars: the environment, the economy and society.

The best-known and most relevant document from the World Commission on Environment and Development (CMMAD, 1988, p. 46) defines sustainable development as "meeting the needs of the present without compromising the possibility of future generations meeting their own needs", with the Over the years, concern for nature has become increasingly present in society.

According to Barbosa (2008, p. 3) "sustainable development is a long-term social learning process, which in turn, is directed by public policies guided by a national development plan".

Still according to the author (2008), the plurality of social actors and interests present in society pose as obstacles to public policies and sustainable development.

The analyzes and recommendations of CMMAD (1988) and Agenda 21 (United Nations Conference on Environment and Development, 1996), another important document resulting from Rio 92, are focused on environmental, economic and social dimensions.

Having discussed this, we currently have the challenges established through the 2030 Agenda, established in 2015 by the (UN), which established a commitment among member countries to meet the 169 goals proposed through 17 Sustainable Development Goals (17 SDGs) by the year 2030 (UN, 2015).

About the 2030 Agenda, "it constitutes an action plan for people, the planet and prosperity. It also seeks to strengthen universal peace with more freedom. The 17 Sustainable Development Goals are interconnected and address everyone's commitment in the social, economic and environmental spheres (UN, 2015).

Among the advances in Brazilian environmental policy, we highlight: the promulgation of Law 12,305 of 2010, defined as the National Solid Waste Policy (PNRS), which guides the responsibility for the correct disposal of waste to be shared among stakeholders, as we can see in the next topic.

NATIONAL SOLID WASTE POLICY (PNRS)

The National Solid Waste Policy, defined in Law 12,305, of August 2, 2010, is considered the most successful instrument for guiding strategic actions in relation to solid waste produced in the country.

Such legislation constituted a shared agreement resulting from 20 years of discussion regarding integrated management and solid waste management, originally including a period of four years for the environmentally appropriate final disposal of waste, with municipalities being responsible for the waste generated. in their territories. Deadline that was not met and is being extended.

The PNRS has the following principles: the search for significant results in sustainable environmental development, inclusion and social organization, generation of work and income, research and introduction of new technologies, management mechanisms that value waste as capital goods, identifying economic opportunities associated with reuse, recycling, energy use and appropriate forms of final disposal (2010).

Solid waste management plans are the main management instruments for the various producing sources and must seek to: a) reduce the waste produced; b) selective collection and recycling with the participation and inclusion of workers; c) responsibility of the production and consumption chain for the disposal of waste through shared responsibility and reverse logistics mechanisms; d) eradication of landfills by the end of 2014.

Law 12,305/2010 is an important instrument that provides many benefits, especially for companies. Furthermore, it puts the country on the path to improving quality of life, environmental preservation and sustainability.

Among these wastes are some more complex ones, such as civil construction, hospital, radioactive, agricultural, industrial and mining waste, but also household waste, originating from domestic activities in urban residences, and urban cleaning waste, originating from sweeping, cleaning public places and roads, classified as Urban Solid Waste (MSW).

Still in relation to the National Solid Waste Policy (PNRS), it provides for waste management and must not be seen only as an obligation on manufacturers, importers, distributors and sellers to correctly dispose of waste. It must be understood as an instrument that positively influences the entire chain, society and the environment (Law 12,305/10).

A relevant instrument presented from the PNRS is the guidance for the preparation of the Solid Waste Management Plan (PGRS), of high relevance for municipalities and companies, which follows the determination of the PNRS, section V, art. 20 to 24, constitutes a document that identifies the type and quantity of waste generated. It also indicates environmentally correct practices for handling, packaging, transportation, transshipment, treatment, recycling, destination and final disposal.

To prepare the PGRS, measures and procedures are defined for the correct handling and management of waste, which, when applied, make it possible to minimize environmental impacts and the construction of sanitary landfills.

URBAN SOLID WASTE AND ITS IMPACTS

According to SENIR (2022), Urban Solid Waste (MSW) originates from urban domestic activities (household waste) as well as that originating from sweeping, cleaning of public places and roads and other urban cleaning services.

For ABRELPE (2020), the organic fraction covering food leftovers and losses, green waste and wood is the main component of MSW

with 45.3%. Dry recyclable waste totals 33.6%, consisting mainly of plastics with 16.8%, paper and cardboard with 10.4%, glass with 2.7%, metals with 2.3%, multilayer packaging with 1.4% and others with 21.1% (textile waste, leather, rubber and rejects).

In the next topic, we will present the discussion about our object of study, Manaus, capital of the state of Amazonas, a city with urban and industrial characteristics that since the 70s has received a significant contingent of people and families in search of employment and income linked to industrial activity of the Manaus Industrial Pole (PIM) and which, like other Brazilian capitals, has the challenge of giving the correct destination to urban waste.

MANAUS: INDUSTRIALIZATION, URBANIZATION AND SETTLEMENT

The Manaus Free Trade Zone Industrial Pole – PIM, created through Law. n. 3,173 of June 6, 1957, is the result of a regional integration policy that aimed to meet two relevant demands: creating regions with infrastructure that would attract people to densely sparsely populated spaces and decentralizing the industrialization process that was centralized in the southeast region of the country. Thus, the Manaus Free Trade Zone model met both demands and sought to promote and stimulate productive and social association in the Amazon region.

Ten years after the enactment of the Law, in 1967, the model was implemented and structured based on three hubs: commercial, industrial and agricultural, with the industrial hub as the supporting pillar.

Today, with 56 years of activity, it has overcome numerous challenges, including crises, changes in economic plans, economic and political restructuring and more recently the Covid-19 pandemic, surprising the market by recording growth and the creation of 108 thousand jobs, including permanent, temporary and outsourced), revenue of R$ 158.6 billion (annual growth of 31.9%), exports totaled R$ 449,084 million (increase of 14.22%) (SUFRAMA, 2022).

According to the State Secretariat for Economic Development, Science, Technology and Innovation – Sedecti (2022), the Gross Domestic Product (GDP) of Amazonas, for the year 2021, recorded figures of R$ 126.31 billion and nominal growth of 16.93% compared to 2020 (SEDECTI, 2022), with a significant weight coming from PIM activity.

The Manaus Free Zone model constitutes a relevant developmental integration policy and one of the Federal Government's main initiatives in the Amazon region. Its presence triggered a virtuous productive and competitive connection with other Brazilian states as well as countries on the most diverse continents (SILVA, LUCAS and OLIVEIRA, 2022).

For Pesavento (1995, p. 282-283), the modernization process of Manaus follows the interests of a mercantile and political elite in line with public and private power who wanted a monumental and civilized city with large public buildings, square landscaping, large avenues, public services, such as electricity, running water, sewage service, garbage collection, tram service, and mainly commercial and cultural establishments that resemble European and cosmopolitan culture, such as stores, restaurants, hotels, confirming the representation of a city and a distant culture.

Still for the author (1995), these improvement policies point to the social imaginary of metropolitan cities as a conceptual reference in force in the capitalist world, guiding the thinking of the "builders" of cities at the end of the 19th century and beginning of the 20th century, being guided by the "symbolic representation of desired

modernity".

The implementation of the Manaus Free Trade Zone Model through the Industrial Pole was a preponderant factor in transforming the capital of Amazonas into a city of high regional attractiveness as it received and receives daily a significant number of populations in search of employment, education, quality of life and countless other opportunities.

Population migration to Manaus results in disorderly growth and the spread of the city to the most peripheral areas. These, in turn, have little or no infrastructure (public transport, basic sanitation, housing, treated water, sewage) adequate to accommodate this population volume, which sometimes negatively impacts the green areas around the capital and close to springs and streams as they are located in areas of invasion in the peripheral zone (IPEA, 2021).

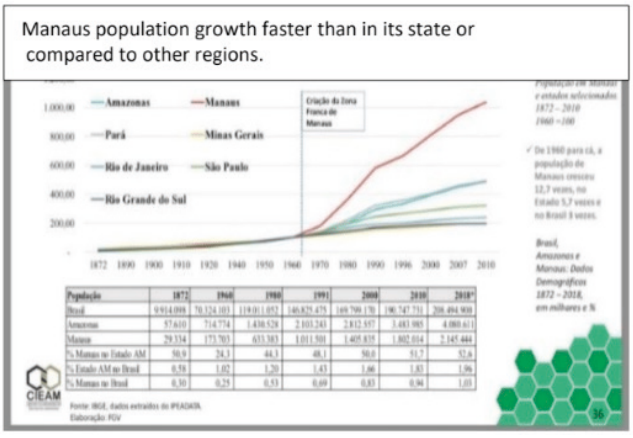

Figure 1: Population growth (1872-2010)

Source: CIEAM, (2021)

As we can see in the Figure, Manaus has shown exponential growth in its urban population in recent decades, especially since the 1990s, increasing from 633,383 thousand to 1,011,501 million inhabitants. In 2018, to 2,145,444 million and from 2020, despite the population drop caused by the misfortune of the pandemic, IBGE data indicated 2,219,580 million.

In 2021, estimates were for 2,255,903 million inhabitants in the capital, Manaus. The population of the state of Amazonas is estimated by IBGE in 2021 at 4,269,995 million inhabitants, corresponding to an increase of 13.8% of the population between 2012 and 2021.

The population contingent constitutes a relevant variable with regard to the occupation and construction of houses on the banks of the city's streams and to this day a significant part of this occupation is still at levels of illegality and has almost no basic sanitation services, treated water, garbage collection or sewage disposal, which contributes to aggravating the situation of incorrect waste disposal in streams and near springs (ONG MATA VIVA, 2020).

In the Amazon, based on Manaus and its urbanization process, the metropolis grows more than the region, reaffirming a trend of urban, population and economic concentration, which differs from the urbanization already identified as a trend for the rest of the Brazilian territory. This was especially due to the implementation of the Manaus Industrial Pole, which favored economic and demographic concentration. In this particular case, the urbanization of the territory, understood as the diffusion of the links of modernization of space, does not accompany with the same intensity the urbanization of society, marked by the diffusion of the urban way of life, which is more present throughout the region. (TRINDADE JUNIOR, 2010).

Industrialization and urbanization form a double but interconnected process, being conflicting faces of a joint reality where industry transforms pre-existing urbanity, threatening it, and at the same time recreates it in an unprecedented urban expansion. The city/industry shock creates and recreates contradictions: city/countryside, nature/

human work, among others and by recreating urbanity, this shock reorganizes social life largely providing the emergence of another social practice, another relationship with space and society. nature. Understanding these changes is fundamental to the debate on the city, space, urbanization and development (LEFEBVRE, 1975).

Next, we will give a brief summary of the conflictive coexistence between society and the streams.

GEOGRAPHY OF MANAUS AND GARBAGE IN THE STREAMS

For Grobe (2019), the history of Manaus is confused with the history of occupation of its streams. Since, according to the author, it was these natural elements that guided the formation and construction of the city and its imagination, "the union of man and the river is demonstrated in the mystical and generating condition of human experiences in the Amazon" (page 4).

Since the beginning of urban occupation in Manaus, streams have always had great social importance for the city, offering, with their sources, waterholes and spouts, food, through fishing, a means of circulation and, mainly, spaces for sociability (2019, page 5).

Still for the author (2019), at the same time that the igaraprés offered and met the daily needs of the city, they were seen as obstacles to the desired advancement and their use by the population was reprehensible according to the municipal Code of Posture (take baths, washing clothes, washing animals, fetching water, transportation and docking) disobedience was punished with fines and imprisonment.

The modernization process of Manaus highlighted the interests of a mercantile and political elite, articulated by public and private authorities, desiring a monumental and civilized city. Thus, streams are seen as obstacles to urban growth and development, as well as elements that possess and proliferate diseases. Even before 1880, a period in which the city materialized transformations in its life and design, the speeches, messages and reports present this accusation (2019).

> Around 1870, the streams began to suffer, with great intensity, the impacts of the implementation of urban modernization projects, imported from distant lands. Neither valued nor preserved by the city's builders, the streams were perceived and experienced as if they were actually 'barriers' to the desired urban growth and development. This way, actions to overcome these water courses are defined and guided, as well as the city's rugged terrain, which did not allow the implementation of the rational urban mesh that Modern Urbanism advocated (GLOBE, 2019, p. 139).

Urban interventions in compliance with the Code of Postures favored the construction of denial and contempt of these elements in relation to the experiences and sociability that the population presented. Thus, new ways of using and appropriating streams are projected (2019, p. 140).

> What was relevant to our research was to understand how these intervention practices in the streams, in search of dominance and discipline imposed by modern life, which the city's producers have presented to us since ancient times, reveal the war waged against these watercourses. not only as a materiality, but also against its symbolic meanings in the life and identity of society (2019, p. 142).

For Dias (1999), "beautifying and modernizing Manaus was the main objective of the administrators at that time. It was necessary for the city to appear modern, clean and attractive for immigration, capital and consumption".

The conflicting relationship between the elite, the state and society through the spaces of the streams can be observed in our daily lives, already in the 21st century, as

added to the inefficiency of public cleaning, the terrible habits of the population and the disorderly occupation in the beds of streams. These constitute a challenging scenario for municipal public administration as they are urban phenomena defined as "plastic streams".

IGARAPÉ: CANOE PATH

As relevant information we need to contextualize and define what is meant by igarapé. Igarapé, a word originating from Nheengatu or general language, is a term of Tupi-Guarani origin, whose combination ygara (canoe) and apé (path), thus formed the "canoe path". It is a watercourse characterized as Amazonian and has a long arm of a canal or river (INSTITUTO IGARAPÉ, 2022, p.2).

The term igarapé designates an Amazonian watercourse of the first or third order, a long arm of a river or canal. They are found more easily in the Amazon basin and their main characteristics are shallow and run towards the interior of the forest (IPAM AMAZÔNIA, 2015).

Still for the Institute (2015), most of the streams in the capital of Amazonas have dark water similar to that of the Rio Negro, and carry little sediment. They are navigable by small canoes and play an important role as transport and communication routes, they are the paths along which canoes pass.

According to the NGO Mata Viva (2020), more than 1000 streams were mapped in Manaus, of which the almost 150 streams that were previously used for leisure, navigation and fishing are currently polluted and are deposits of waste, mostly bottles. "pet" type plastics. Unfortunately, most are already considered "dead streams" because their sources have been buried by trash or dirt. In this case, they are already considered irrecoverable.

According to SEMA, the city of Manaus is located in a complex water system formed by four large river basins, namely: São Raimundo, Puraquequara, Educandos and Tarumã, as we can see in the Figure.

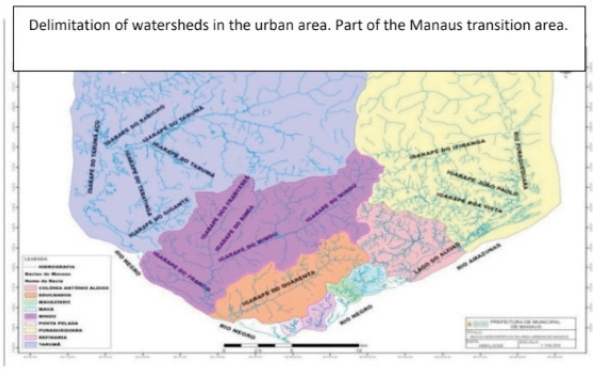

Figure 2: Location of the Manaus Microbasins

Source: Municipal Secretariat for the Environment (SEMA)

For Costa (2012), in recent years, there has been a marked demographic growth that implies the expansion of urban spatiality. This increase has made several urban problems worse, including risk areas, which are not restricted to large cities. This occurs, among other factors, because cities are not prepared from an infrastructure point of view to receive the flow of people and what they mean from the point of view of urban metabolism, including the production of waste.

For Pereira and Costa (2016), the daily collection of urban waste is beneficial for the user as they do not accumulate waste in their homes, however the collection system has a cost, with transportation having a higher price factor. This way, collection carried out three times a week becomes interesting for the system manager considering the cost-benefit ratio.

Manaus has a daily collection of urban waste that is sent to the Solid Waste Landfill and receives adequate treatment, but the volume unduly discarded by the population in the streams that run through the city is what unfortunately constitutes a "policy of drying ice" since the problem, despite being tackled daily by the city hall through the

Municipal Public Cleaning Department (SEMULSP), does not present encouraging results (SEMULSP, 2022).

According to Gil e Silva (2009), the complex basic sanitation network in Manaus also faces problems related to the management of solid waste, and according to the Geo Cidades Project (2002, p. 63): "Manaus has the majority of Its garbage is collected directly and indirectly, but a significant volume is burned or thrown into vacant lots and bodies of water, constituting one of the city's main environmental problems".

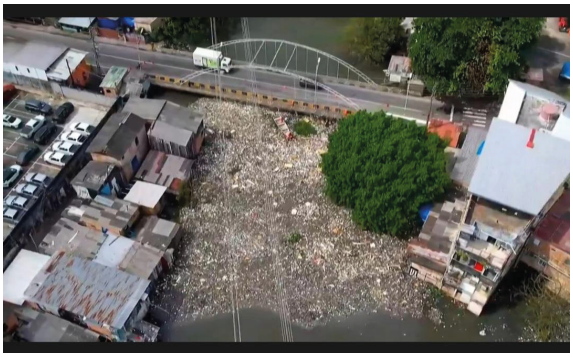

Figure 3: Garbage in the Manaus Stream (São Jorge)

Figure 4: City Hall team in Igarapés

Source: SEMULSP, (2022)

And one of the main examples of the problem of incorrect disposal is the amount of garbage that was removed from the rivers and streams of Manaus between the end of 2021 and the beginning of 2022. According to the Municipal Department of Public Cleaning (Semulsp), 900 tons of trash in just 30 days. After removing the solid waste from the rivers, the material was placed in rafts and sent to the landfill for unloading, where the solid waste is compacted and landfilled.

The method of cleaning the city's streams and waterfront removed, on average, 35 tons of trash per day throughout 2021. Much of this material removed from the waters is PET bottles, disposables and household waste that could be recycled.

According to SEMULSP (2015), pollution caused by garbage in the streams of Manaus is more critical in the streams of Quarenta, Igarapé do Franco, Igarapé do Mestre Chico. Currently, the landscape that marks the banks of the streams in the city of Manaus are occupations, built via social programs or sub-housing. In general, these places are inhabited by low-income families, being the only place with which their purchasing power was compatible at the time they arrived to live in the city of Manaus.

The impacts expressed in urban streams are immeasurable, since their flood areas are occupied, their beds are made up of domestic waste, causing silting of the channels, among others. As Costa (2012) points out, "in general, such waters do not receive any treatment, being released into the open", due to the pollution of the waters of the streams, such families are vulnerable to diseases, since the presence of heavy metals resulting from pollution in the water is significant. water from these streams (SEMULSP, 2022).

For Pereira and Costa (2016), families living in these areas are faced with multiple problems, such as: the spread of water-borne diseases, the flood and ebb cycle that exposes garbage, bad smells, among others.

The city's urban streams are polluted, taken over by waste and rejects in their course, with the decomposition of organic matter present in the garbage, the characteristics of the

environment are altered, becoming a public health problem since the environment will be conducive to disease transmission (2016).

Still for the authors (2016), the incorrect disposal of solid waste in the Manaus streams contributes to the formation of waste islands, impacts on fauna and flora, extinction of rivers and springs, favoring and proliferation of insect vectors of diseases, impacts on the water table, beaches, spas, waters unsuitable for human consumption and use, as well as the collapse of the entire system, causing its imbalance.

According to Manaus City Hall, a daily action cleans the banks and beds of streams, with the removal of aquatic vegetation and rubbish, which improves water flow, through the use of boats and rafts. This work requires the use of specific equipment, including boats, containment nets and buckets for removal, as well as material for diving cleaning agents, who often enter polluted waters.

Two rafts, five boats and a team of 60 men are working daily to clean the streams, both in areas where we can enter with the raft and in places where we cannot, but collection occurs in the same way. Manaus does not need to be polluted this way, as we have collection from Monday to Saturday (SEMULSP, 2020, p.3).

Month	Tons collected per year		Relative variation
	2021	2022	
January	984	923	-6,20%
February	1.030	472	-54,17%
March	1.120	960	-14,29%
April	970	1.038	7,01%
May	860	836	-2,79%
June	1.010	2.537	151,19%
Total	5.974	6.766	13,26%
Daily average	33,0	37,4	0,1

Figure 5: Quantity of MSW removed from streams in Manaus (2022/2021), in ton/month

Source: SEMULSP, (2022)

According to the Figure, we can observe that in June 2022 in relation to 2021 the relative variation was 151.19%. The manual removal of garbage from streams reached a collection of 5,960 tons, this service served a linear extension of 457 kilometers, with an area of 9 km2. In relative terms, densities of 27.6 tons per km and 1,401.1 tons per km2. The cost of this operation involving labor, rental of the two rafts, collection and disposal of waste reached the amount of R$18,645,614.04, a cost per ton of R$1,478.64.

For Gorziza, Ceará and Buono (2021), with data available in Abrelpe's Panorama of Solid Waste in Brazil 2020, Amazonas produces 380 kg per capita and a total of 974 tons of waste/year, being the average waste per capita in Amazonas 8% higher than the national average.

Finally, it is worth highlighting that the capital of Amazonas is geographically located in the heart of the Amazon forest and the impacts generated by urban activity unbalance the ecosystem and impact its functioning.

RESULTS

We started this text with the purpose of discussing the impact caused by the incorrect disposal of solid waste in the streams of Manaus in light of the SDGs, and we saw that population concentration, urbanization and the population's habit of disposing of waste in the stream constitute problems and challenges for municipal management and for everyone who inhabits urban space.

The discussion about the role of Manaus streams as part of the natural landscape and regional culture was impacted by a movement that occurred at the end of the 19th century and beginning of the 20th century, motivated by the elite of the time with the support of public authorities, which united they sought the process of urban beautification and modernization inspired by the modern city of

Paris. This is the definition of Manaus as the "Paris of the Tropics".

In this scenario, streams were obstacles to progress and it was necessary to change the habits of the most vulnerable population who used the space for leisure, bathing, washing clothes and cleaning animals used as a means of transport.

Modernity won and the streams were channeled and buried, giving way to avenues and progress. The population was moved to housing in regions further away from the city center, which contributed to urban sprawl towards the outskirts.

Our discussion was based on the principles of sustainability and PNRS (12.305/10) which guide the need to seek a solution for urban solid waste.

Subsequently, we take an approach to the characteristics of the capital of Amazonas. A capital that since the 1970s continues to receive an unparalleled population daily from neighboring states or other municipalities in the interior.

Urbanization, excess population and the impacts of human and economic activities on urban spaces constitute global challenges and are part of the agreements signed in the 2030 Agenda based on the 17 SDGs, with emphasis on SDG 11 - sustainable cities and communities: making cities and human settlements that are inclusive, safe, resilient and sustainable but which speak very well to other challenges, with emphasis on SDG 1; SDG 4; SDG 5; SDG 6; SDG 10; SDG 13; SDG 14 and SDG 15.

Throughout the construction of the text, we sought to answer the following research problem: what are the main impacts caused by the incorrect disposal of waste in the streams of the capital of Amazonas?

Therefore, among the main impacts, we highlight: the formation of waste islands, impacts on fauna and flora, extinction of rivers and springs, favoring and proliferation of insects, diseases (dengue, zika, chincungunha), impacts on the water table, beaches, resorts, waters unfit for consumption and human use as well as the collapse of the entire system causing its imbalance.

Regarding the economic impact, we saw that the annual cost of removing waste improperly discarded in streams is 1 million reais and constitutes a never-ending action as it does not translate into concrete effects, constituting a policy of "clearing ice". Since, the more that is collected, the more the population discards the waste in the streams.

Furthermore, during the period of heavy rain in the region, garbage clogs galleries and drains, causing flooding, various inconveniences for society as a whole and urban chaos.

Manaus, capital of the state of Amazonas, which in the past was proud of being crossed by over 1000 streams, around 150 of which are navigable and have crystal clear waters. Currently, most of these spaces are completely dead and without the possibility of recovery. Since the sources of the streams are buried by garbage or silted up.

This reality constitutes a cultural and unprecedented problem as the capital of Amazonas has daily garbage collection and scheduling projects by SEMULSP for the collection of larger objects. In addition, the city hall, through partnerships with waste picker cooperatives, provides selective collection.

Regarding the research carried out, we are convinced that looking, researching, dialoguing, discussing and reflecting on the Amazon and its problems is investing in its future, is thinking about conditions that enable paths that can help reduce impacts on the environment, culture, forest people as well as contributing to generating employment and income by reducing socio-economic-environmental vulnerabilities with a focus on

the future and the preservation of Amazonian biodiversity.

In relation to future research, we will focus on surveying the number of cooperatives accredited by the City of Manaus and the amount of labor that can be added in partnership for the appropriate disposal of waste and that contribute to generating green jobs and income.

Furthermore, we will continue to monitor the transition process of the capital of Amazonas into an inclusive, safe, resilient and sustainable city in the heart of the largest tropical forest on the planet, meeting the SDGs that make up the 2030 Agenda.

CONCLUSION AND CONSIDERATIONS

The reality regarding the impacts of incorrectly disposed urban waste in Brazilian capitals, such as in the case of Manaus, must be seen as a challenge to be faced by everyone and not just by public authorities, as it is up to the population, most impacted, to become aware of their participation. to achieve a healthy and dignified environment.

A serious and efficient public policy becomes relevant in order to allocate this waste to be separated and generate green jobs and income with a focus on a market little explored by the capital of Amazonas.

And as we have seen, the impact of incorrect waste disposal in streams is countless and affects the population, the economy and the environment and constitutes a problem that is gaining proportions every year. Such impacts range from water pollution, silting of canals, air and soil pollution and contribute to worsening the greenhouse effect.

We see the need to have a city that is capable of avoiding degradation and maintaining the health of its environmental system, reducing social vulnerabilities, seeking a solution to infrastructural problems and promoting a healthy and sustainable environment for everyone. In other words, we aim for a sustainable city.

This trajectory to be followed by the capital of Amazonas joins the challenges that countless other capitals in Brazil and other cities around the world will face, as they will all be faced with increasingly inhabited urban spaces and will have to learn to live with the effects of climate change. increasingly intense.

What we know is that Manaus, 352 years old, has the peculiarities of an urban and industrial metropolis, a metropolis that houses a model of regional development with 56 years of uninterrupted activities and which is responsible for generating more than one hundred thousand jobs, with the productive weight of 15% of regional GDP and which presents a trajectory that has the origins and characteristics of a forest city and which envisions becoming a smart and sustainable city to serve its inhabitants and visitors and prepare for the challenges of the near future.

Finally, regarding the economic and environmental aspects, we are losing the opportunity for transport and tourism that could be carried out through the streams that cut through the capital of Amazonas.

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