Solid waste management: an investigation on the current situation of the landfill in the municipality of Garanhuns – PE

Gestão dos resíduos sólidos: investigação sobre a situação atual do aterro sanitário no município de Garanhuns - PE

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Abstract

The generation of solid residues has become one of the biggest problems of humanity due to the growing demand of the population for goods and services, and it is necessary that the governments look into a way to mitigate its harmful effects on the environment. In Brazil, the problem of adequate solid waste management also became recurrent and started with the United Nations Conference on Environment and Development, which took place in the city of Rio de Janeiro in 1992, Rio-92 or Eco-92. The general objective of the work is to diagnose the current situation of the Garanhuns landfill regarding its suitability for the Intermunicipal Solid Waste Plan - PIRS of the Agreste Meridional Region of Pernambuco and the Garanhuns landfill as an instrument to combat environmental transgression. In the first moment, a documentary analysis was carried out regarding the proposed theme and in the second moment, an investigation, through an interview, about the situation of the landfill in relation to the PIRS. Despite fulfilling some requirements regarding the final destination of the waste, the municipality has not yet prepared, licensed and implemented the Degraded Areas Recovery Program-PRAD, an indispensable part to comply with the guideline of “Compliance with the National Solid Waste Policy”. However, even though there are still some obstacles to compliance with the PIRS, the importance of a properly licensed landfill operating in Agreste Meridional de Pernambuco is emphasized.

Keywords: Landfill. Solid Waste. Public Sector.

Resumo

A geração de resíduos sólidos vem se tornando um dos maiores problemas da humanidade em decorrência da crescente demanda da população por bens e serviços, sendo necessário que os governantes se debruçassem sobre uma forma de mitigar seus efeitos danosos ao meio ambiente. No Brasil, a problemática sobre o gerenciamento adequado de resíduos sólidos, também se tornou recorrente e teve seu start a partir da Conferência das Nações Unidas Sobre Meio Ambiente e Desenvolvimento, que aconteceu na cidade do Rio de Janeiro no ano de 1992, a Rio-92 ou Eco-92. O trabalho tem por objetivo geral diagnosticar a situação atual do aterro sanitário de Garanhuns quanto à sua adequação ao Plano Intermunicipal de Resíduos Sólidos - PIRS da Região do Agreste Meridional de Pernambuco e o aterro sanitário de Garanhuns como instrumento de combate a transgressão ambiental. No primeiro momento foi realizada uma análise documental atinente ao tema proposto e no segundo momento uma investigação, através de entrevista, sobre a situação do aterro sanitário em relação ao PIRS. Apesar de cumprir alguns requisitos quanto à destinação final dos resíduos, a municipalidade
Introduction

The generation of solid waste has become one of humanity's biggest problems as a result of the population's growing demand for goods and services, requiring governments to look into ways to mitigate the damage caused to the environment by the generation and disposal of waste. from this demand (CASTRO, 2004).

In this context, worldwide, debates on solid waste management, global warming, environmental disasters and pollution take shape every year, even generating international treaties on the themes, such as the Kyoto Protocol and the Global Agenda 21.

Agenda 21 brings in its body several themes on the environmental theme, including those related to solid waste. These themes are guided through axes that aim to direct countries to adopt sustainable practices that bring greater comfort to the population and the possibility of a future with an abundance of natural resources.

In Brazil, the issue of proper management of solid waste also became recurrent and had its start from the United Nations Conference on Environment and Development, which took place in the city of Rio de Janeiro in 1992, Rio-92 or Eco-92. At this Conference, the countries agreed on the challenge of internalizing these practices in their public policies, aiming to contribute to the sustainable development of society through the Local Agenda 21 (BRASIL, 2012).

Although this Conference took place in 1992, Brazil only managed to consolidate an important instrument to face environmental problems from 2010 onwards, with the creation of the National Solid Waste Policy – PNRS. This law aims to contribute to the sustainable development of the country, through guidelines for the states, Federal District and municipalities to adapt to environmental legislation.

In short, the states, Federal District and municipalities are required to prepare their respective solid waste plans. On the other hand, the Union provides resources for these entities...
to elaborate their respective public policies, prioritizing inter-municipal consortium solutions for solid waste management (BATISTA; CORREIA NETO; ALBUQUERQUE, 2017).

1.1 Research Problem and Purpose

As part of these efforts to properly manage solid waste, the State of Pernambuco, faced with the financial inability of some municipalities to create their own plans, prepared Intermunicipal Plans for Solid Waste, subdivided into groups by region of the state. Based on these considerations, this research aimed to answer the following question: What is the situation of the sanitary landfill in the municipality of Garanhuns in terms of its adequacy to the Intermunicipal Plan for Solid Waste - PIRS in the Agreste Meridional Region of Pernambuco (Group 04)? The general objective of the work was to diagnose the current situation of the Garanhuns landfill regarding its adequacy to the Intermunicipal Plan for Solid Waste - PIRS of the Region of the Southern Agreste of Pernambuco (Group 04). The objectives were: specific, to characterize and identify the situation of the Garanhuns landfill in terms of meeting the guidelines, strategies and goals stipulated in the PIRS; Verify whether the adequacy of the Garanhuns landfill, within the Intermunicipal Solid Waste Plan, is complying with the schedule provided for in the PIRS; To analyze, through interviews, the participation of municipalities that use the Garanhuns landfill in the implementation of the Intermunicipal Plan for Solid Waste.

Theoretical Framework

The theoretical framework will address three themes that will guide this research: i) the creation of the National Solid Waste Policy as a historic landmark in the defense of the environment; ii) the development of the Pernambuco Solid Waste State Plan; and iii) the Garanhuns sanitary landfill as an instrument to combat environmental transgression.

2.1 The Creation of the National Solid Waste Policy (PNRS) as a Historic Milestone in the Defense of the Environment

Concern for the environment has become a recurring theme at major world conferences, such as the United Nations Conference on the Human Environment, held in Stockholm in 1972; Eco-92 or Rio-92 (United Nations Conference on Environment and
Development or Earth Summit), held in 1992; Rio+10 (World Summit on Sustainable Development) in 2002; and Rio+20 (UN Conference on Sustainable Development), in 2012 (BOFF, 2017).

These meetings served to discuss the directions to be adopted by the participating countries, aiming to cause the least possible impact on the environment and promote the quality of life of current and future generations.

In Brazil, an important milestone for solving environmental problems related to waste disposal was through Law 12,305/2010, which established the National Solid Waste Policy (MMA, 2018). As can be seen in the excerpt below:

Art. 1 This Law institutes the National Solid Waste Policy, providing for its principles, objectives and instruments, as well as the guidelines relating to the integrated management and management of solid waste, including hazardous waste, the responsibilities of generators and public authorities and applicable economic instruments (BRASIL, 2010).

This Policy established important instruments aimed at strengthening the country's development, however, always in compliance with environmental legislation, putting into practice the shared responsibility in the generation and disposal of these products. Another important point to highlight is that this Policy creates and imposes goals for States and Municipalities to eradicate dumps, forcing them, as federal entities, to plan the proper disposal of solid waste through State Plans for Solid Waste and Municipal Plans for Integrated Solid Waste Management (MMA, 2018).

§ 1° Individuals or legal entities, public or private, responsible, directly or indirectly, for the generation of solid waste and those who develop actions related to the integrated management or management of solid waste are subject to compliance with this Law (BRASIL, 2010).

It is still possible to highlight two more important actions arising from the creation of this Law, one linked to the imposition of individuals being obliged to prepare their respective Solid Waste Management Plans and another resulting from the recognition and inclusion of recyclable material collectors in the process (BRASIL, 2010).

In this direction, all states of the federation were imbued with the responsibility of preparing their waste management policies, aiming to respond to society's call for an environmentally sustainable country.
2.2 The development of the State Solid Waste Plan (PERS) of Pernambuco

In the State of Pernambuco, responsibility for planning and implementing the PERS was the responsibility of the Environment and Sustainability Secretariat, the Cities Secretariat (SECID), the Zona da Mata Development Support Program (PROMATA), the State Agency for Environment and Water Resources (CPRH), the Pernambuco Institute of Technology (ITEP) and the Pernambuco State Planning and Research Agency (CONDEPE/FIDEM), resulting in the State Plan for Solid Waste, consolidated through State Law No. 14.236/2010:

Art. 1 The State Policy on Solid Waste is established, which provides for the general guidelines applicable to solid waste in the State of Pernambuco, as well as its principles, objectives, instruments, management and management, responsibilities and economic instruments. (PERNAMBUCO, 2010).

This Plan was based on a set of guidelines resulting from the integration of existing environmental policies in the State of Pernambuco, with the other sectoral policies of the government, the productive sector and civil society and was built from the participation of society through public consultations, such as also through technical meetings involving the various government sectors (SEMAS, 2012).

Just as the PNRS establishes guidelines for other federal entities to adapt to environmental legislation, the State Plan also establishes guidelines, goals and strategies to guide municipalities to comply with this specific legislation and, consequently, the federal legislation on solid waste.

The guidelines and strategies contained in the State Plan emphasize the issue of economic and environmental sustainability, with special attention to the closure of existing dumps, in addition to the social inclusion of recycled material collectors (SEMAS, 2012).

Despite the obligation to prepare municipal plans being the responsibility of the municipalities, as established in the PNRS, these were also contemplated through the PERS, with the creation of 12 Development Regions - RD to assist in the preparation of Intermunicipal Plans for Solid Waste. These RD are intended to operationalize the PNRS guidelines with the aim of meet the goals stipulated by the national policy.

Garanhuns landfill as an instrument to combat environmental transgression In the municipality of Garanhuns, as well as in so many others in the region, the area for final destination of urban solid waste has already been classified as a “dump”. This discrepancy between what is “incorrect” and what is “correct” arose in 1997 after the creation of a controlled landfill, in an area of 7 hectares, not very suitable for the disposal of this waste.
The main obstacles were related to the large number of squatters in the region, difficult access and being practically inaccessible during the rainy season (PEDROSA, 2006).

Due to these problems, the garbage that should have been deposited in the controlled landfill was deposited along the highway, which created a problem for the municipality and classified it as an environmental polluter.

With the participation of the state government and the support of the CPRH, the municipality defined a site, on the banks of Highway BR 423, for the construction of an adequate sanitary landfill. Resources for the project were made available through amendments to the General Budget of the Union. In 2014, the landfill started its activities with an area of 17 hectares and a forecast of 15 years of operation (GARANHUNS, 2019).

From that moment on, in line with what is established in the National Solid Waste Policy, the municipality started to have access to the “Ecological ICMS”, established by State Law No. 11.899/00, namely:

Art. 2 - The participation of each municipality in the ICMS revenue allocated to it will be determined by applying a percentage index corresponding to the sum of the following portions: [...] III - from 2003, 15% (fifteen percent), which will be distributed among the municipalities as follows: [...] b) 5% (five percent), which will be distributed in equal installments among the municipalities that have a Composting Unit or Controlled Sanitary Landfill, based on information provided annually by the CPRH; [...] § 2 The reduction referred to in the previous paragraph, in relation to the portion provided for in item III, of the "caput", will be distributed among the criteria established therein, observing the following: I - the percentage provided for in item “a” is maintained; It is II - the percentages referred to in items "b", "c", "d" and "e" will become, respectively, 4% (four percent), 2% (two percent), 2% (two percent) and 1% (one percent). (PERNAMBUCO, 2000).

Pedrosa (2006) reports that this transfer of the state ICMS, in the form of an “ecological ICMS”, which allocates a percentage of this tax for the proper treatment of solid waste, is a way of “helping” municipalities to eradicate dumps and develop actions that reduce the environmental impacts caused by the generation of waste and, consequently, comply with the provisions of current environmental legislation.

According to news published on the Garanhuns City Hall website, four other municipalities that make up the Southern Agreste Development Region use the landfill as part of an agreement, namely: Caetés, Capoeiras, Lagoa do Ouro and São João. According to data from IBGE (2016), together, these 5 municipalities have an estimated population of 223,352 inhabitants, which generate approximately 5,219 tons of waste per year.

In order to meet the growing demand for waste disposal in these municipalities and make it possible to operate for a longer period of time, the landfill is being expanded with the
construction of a new cell, with an approximate area of 1 hectare (GARANHUNS, 2019).

Methodological Procedures

The study was carried out in two moments: a theoretical and a practical one. In the first moment, a documentary analysis related to the proposed theme was carried out and in the second moment, an investigation, through an interview, on the situation of the sanitary landfill in relation to the PIRS.

The first moment aimed to carry out a survey of information about the landfill of Garanhuns, in relation to what is proposed in the Intermunicipal Plan for Solid Waste. And, it sought to analyze the characteristics of the enterprise, the guidelines, strategies and goals described in the PIRS in order to confront with what determines the National Policy on Solid Waste (Law No. 12.305/2010) and the State Policy on Solid Waste (Law No. 14.236 /2010) on the proper management of this waste and its final destination.

In the second moment, an interview was carried out with the landfill manager, through a checklist and a questionnaire, where the environmental and managerial situation in which the activity is found was addressed, how the municipalities that make up the RD participate, as well as how, if the schedule proposed in the PIRS is being fulfilled.

The checklist was made up of the framework of PIRS Guidelines, strategies and goals referring to the universalization of cleaning services and public collection and final disposal of waste, being composed of three service variables, namely i) Meets; ii) Partially meets; and iii) Does not answer.

The questionnaire was prepared with six questions about landfill management, with themes addressed in the PIRS, and also with the purpose of supporting the checklist results.

Results and Discussion

The scope of this study aimed to analyze the current situation of the sanitary landfill in the municipality of Garanhuns, regarding compliance with the requirements of the Intermunicipal Plan for Solid Waste - Grouping 04. As guiding themes for the elaboration of the referred research, the guidelines, strategies and goals established in said Plan.

Meeting these requirements is an essential part of complying with laws 12,305/2010 (PNRS) and 14,236/2010 (PERS), referring to solid waste disposal. Therefore, it presents the following results:
4.1 Intermunicipal Solid Waste Plan: Information on the Garanhuns Landfill

Based on documentary research, it was observed that the municipality of Garanhuns has a population projection of approximately 142,800 inhabitants for the year 2019. According to the PIRS, this population has the potential to generate just over 4,100 tons of waste annually, with growth trend over the years.

The gravimetric analysis of these wastes indicates that the materials most destined for landfills are, respectively: organic matter, waste, plastic, cardboard and metal (Figure 1).

![Figure 1. Gravimetric analysis of solid waste from the municipality of Garanhuns](source)

According to Garanhuns (2019), the management of the landfill is shared between the municipal government, through the supervision of teams from the Public Works and Services Secretariats, Planning and Management Secretariat, the Rural Development and Environment Secretariat and the Company State of Sanitary Engineering (Empresa). The costs involved in the operation of urban cleaning services and the project are around BRL 11.2 million reais per year (PERNAMBUCO, 2017).

Faced with these high costs, the municipality can rely on another source of funds, in addition to municipal taxes, to maintain these activities. Considering that the sanitary landfill operates duly licensed by the CPRH, the city hall obtained access to the Tax on the Circulation of Goods and Services – socio-environmental ICMS, provided for in the State Policy on Solid Waste, for the correct disposal of solid waste.

After consulting the website of the Court of Auditors of the State of Pernambuco, it was verified that the city hall, in 2018, received the amount of R$ 379,038.93 and in 2019, it received the amount of R$ 379,249.06 referring to ICMS socioenvironmental. Between January and June 2020, it received the sum of BRL 616,821.51 referring to this same item, noting that the financial return for the municipality is increasing due to the practices adopted.
in the environmental area and in the treatment of solid waste.

It is important to emphasize that these resources are not exclusively reserved for the proper disposal of this waste, considering that the socio-environmental ICMS allocates part of these resources to different areas, as shown in Table 1 below.

<table>
<thead>
<tr>
<th>Year</th>
<th>Units of Conservation (1%)</th>
<th>Solid Waste (2%)</th>
<th>Total ICMS Socioenvironmental</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>R$ 6.163,23</td>
<td>R$ 372.875,70</td>
<td>R$ 372.875,70</td>
</tr>
<tr>
<td>2019</td>
<td>R$ 6.772,30</td>
<td>R$ 372.476,76</td>
<td>R$ 379.249,06</td>
</tr>
<tr>
<td>2020</td>
<td>R$ 2.958,38</td>
<td>R$ 613.863,13</td>
<td>R$ 616.821,51</td>
</tr>
</tbody>
</table>

Table 1. Resources arising from the socio-environmental ICMS for the municipality
Source: TCE, 2020. – Adapted by the authors.

Despite the financial contributions of the socio-environmental ICMS for the municipality to remain increasing over the years, it is worth noting that the amount destined for these actions is still low and insufficient, since only 1% of the state ICMS is destined for the preservation of the Conservation Units and 2% are intended for the proper treatment of solid waste.

4.2 Garanhuns Landfill and Adequacy to the PIRS

Regarding the suitability of the landfill in terms of meeting the guidelines, strategies and goals stipulated in the PIRS, an interview was conducted with the municipal manager of the landfill using a checklist and a questionnaire.

For the construction of the checklist, the propositions contained in the Intermunicipal Plan that deal with the Final Destination of solid waste were used.

The guideline that must be achieved at this stage is directly related to compliance, by the municipality, with the National Solid Waste Policy – PNRS. And, to meet this guideline, six strategies were stipulated and their respective goals that the government must meet within certain deadlines. The targets stipulated for municipalities are divided into three categories of terms: immediate, short, medium and long. For this study, it was determined that the period analyzed would be the immediate one, which comprises the years 2018 and 2019.

One of the purposes of the questionnaire was to compare the checklist information and clarify the causes/reasons that led the municipality to comply or not comply with the guidelines, strategies and goals within the stipulated time. The result of the interview can be seen in table 2.
With these results in hand, it was possible to observe that several strategies for fully complying with the guideline: “Compliance with the National Policy on Solid Waste” – were not fulfilled by the municipality. This situation explains that the municipal government, despite having a duly licensed landfill, has still not managed to reach some goals that were imposed for the years 2018 and 2019.

With regard to the preparation of the Program for the Recovery of Degraded Areas - PRAD, which is part of the licensing process for activities that degrade or modify the environment, present in the PNRS. It should be noted that the absence of this important document can lead to financial losses for the municipality, such as loss of income.

In a recent case, the Public Ministry of the State of Sergipe asked the judiciary to suspend 40% of transfers from the Municipality Participation Fund - FPM, in addition to a fine in the amount of R$ 20,000.00 (twenty thousand reais) for the municipality of Itabaiana – SE, due to the failure to deliver the PRAD within the deadline stipulated to the municipality (SERGIPE, 2020).

As a consequence of the non-preparation of the PRAD by the municipality of Garanhuns, it does not comply with the following strategies: “Approve the PRAD together with the environmental agencies” and “Implement the PRAD”. And it partially complies with the strategy of “Closing activities at landfills”, since there are no more landfills in the municipality, but the closure of this activity is directly linked to the two previous strategies. These facts, as seen previously, can cause damage to the public coffers of the municipality.

In this sense, through the interview, the reasons why the PRAD has not yet been prepared, approved and implemented became evident, as shown in Table 3.
Interviewer | The Degraded Areas Recovery Program – PRAD of the landfill health, requirement of the Solid Waste Integrated Plan - PIRS, has it already been elaborated? If not, what are the reasons?
---|---
Respondent | The PRAD for Garanhuns foreseen in the PIRS has not yet been drawn up. There are several reasons why the PRAD for Garanhuns provided for in the PIRS has not yet been drawn up, mainly the lack of technical and financial resources.
---|---
Interviewer | If there is a Program for the Recovery of Degraded Areas - PRAD, it has already been submitted for approval by the Environmental Agencies (CPRH, IBAMA)?
Respondent | There is still no PRAD.

| Table 3. Responses obtained from the municipal manager of the Garanhuns landfill regarding compliance with the requirements for Final Disposal of solid waste indicated in the PIRS - Grouping 04. |
Source: Survey data, 2020. |
---|---|
Therefore, it is imperative that the public authorities, through their supervisors and in partnership with the private sector that manages the landfill, start preparing the PRAD immediately, so that it does not suffer penalties in the future for failing to comply with current legislation.

With regard to the other strategies, it can be observed that their goals were fully achieved, with: "Closing activities at dump sites", "Destination of solid waste to landfills, meeting the proposal for regionalization" and "Developing, license and implement sanitary landfill in accordance with regionalization proposals”.

With regard to the first two strategies: “Closing activities at the dumps”, “Destination of solid waste to landfills, meeting the regionalization proposal” The municipality of Garanhuns achieved these goals even before the elaboration of the PIRS by the State Government, considering that in the year 2014, the landfill came into operation (GARANHUNS, 2019).

The last stage, referring to: “Elaborate, license and implement the landfill in accordance with the regionalization proposals” was only completely satisfied in 2019, with the obtaining of the Operation License issued by the CPRH. This condition is essential for access to Union and State resources for the proper management of the enterprise.

It is worth mentioning that the implementation of this landfill was a victory for the municipality and region, which went from being an environmental polluter to a licensed receiver of solid waste, thus following the determinations present in the PNRS.

From this perspective, it was possible to observe that the planned schedule for the final disposal of solid waste in the municipality is not being complied with in its entirety, which makes it clear that even after the efforts of the state government to fund and prepare the PIRS, it does not obtain the return. expected from the municipal public manager.
4.3 Participation of the Municipalities that Use the Garanhuns Landfill in the Implementation of the PIRS

The Intermunicipal Solid Waste Plan prepared by the state government provides for decentralized management of the landfill (Scenario C). This scenario is characterized by the creation of landfills shared between municipalities, through a consortium and decentralized units (PERNAMBUCO, 2017).

In addition to the municipality of Garanhuns, which hosts a landfill along these lines of decentralized management, five others deposit their waste in the same location.

According to information obtained through the interview, the municipal manager reported that currently the municipalities that deposit their waste in the landfill are: São João, Caetés, Capoeiras, Lagoa do Ouro and Brejão. According to Garanhuns (2019), the latter was not part of the contracted municipalities until 2019, only effective from 2020.

Also according to the interviewee, the term of validity of these agreements ends with the end of the terms of mayors on 12/31/2020. This information highlights the importance of a municipal policy that brings more security to other members. Therefore, the binding of deadlines for closing agreements, linked to 4-year terms, can lead to a game of vested interests. The creation of this policy becomes even more emphatic, since the municipalities that deposit waste do not have plans to build their own landfills, as can be seen in Table 4.

<table>
<thead>
<tr>
<th>Interviewer</th>
<th>Which municipalities deposit waste at the Garanhuns landfill? There is a deadline for these municipalities outside Garanhuns to stop depositing waste and create their own landfills?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondent</td>
<td>The municipalities that currently send their domestic solid waste to Garanhuns Sanitary Landfill are: Garanhuns, São João, Caetés, Capoeiras, Brejão and Lagoa do Ouro. There are Agreements signed between the municipalities that dispose of their domestic solid waste to the Landfill of Garanhuns and the Municipality of Garanhuns, which are valid until 12/31/2020, when the terms of office of the current mayors expire. According to information, so far, there are no projects for construction of sanitary landfills in these municipalities that have an agreement with the Municipality of Garanhuns.</td>
</tr>
</tbody>
</table>

Table 4. Responses obtained from the municipal manager of the Garanhuns landfill regarding compliance with the requirements for Final Disposal of solid waste indicated in the PIRS – Grouping 04


With regard to the form of participation of these other municipalities, the interviewee was asked how the delivery, control and costs involved in this operation are carried out.

It was observed that there is a form of control, mainly to stipulate values arising from the disposal of solid waste. According to the interviewee, the landfill has a scale with a weighing capacity of 80 tons, where all trucks from the contracted municipalities are weighed at the time of "delivery" of the waste, so that the cost spreadsheet of the operation can be...
prepared later and at the end of each month, the forwarding of these worksheets to the affiliated entities. The amounts were set at R$ 75.00 for each ton of waste deposited in the landfill, with no weight limitation for the contracted municipalities. These values are essential for the operation of the sanitary landfill, in view of the high cost involved in this process.

The transcription of the interview excerpt that corroborates this information can be seen in table 5.

<table>
<thead>
<tr>
<th>Interviewer</th>
<th>How is the participation of the municipalities that use the Garanhuns landfill? Is there quantitative control of the volume (tons/day) of solid waste deposited by these municipalities? There is counterpart financial? If yes, what form?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondent</td>
<td>The Garanhuns Sanitary Landfill has an 80-ton scale where all MSW transported by registered vehicles from the contracted municipalities is weighed and a spreadsheet is prepared monthly with the amount of MSW and sent for payment of the established amount in agreements it is R$ 75.00/ton.</td>
</tr>
<tr>
<td>Interviewer</td>
<td>There is a limitation on the volume of solid waste to be deposited by these counties by day, month or year?</td>
</tr>
<tr>
<td>Respondent</td>
<td>Não existem limitações de quantidade de RSU por município.</td>
</tr>
</tbody>
</table>

Table 5. Responses obtained from the municipal manager of the Garanhuns landfill regarding compliance with the requirements for Final Disposal of solid waste indicated in the PIRS – Grouping 04.

In summary, the last point of the interview addressed the medium and long-term planning of the landfill. It was possible to note that, to date, there is no planning of this size for the enterprise, since the landfill was inaugurated a little over 6 years ago and has a forecast of volumetric accumulation until the year 2041, with the present configuration of receiving waste.

It is worth mentioning that all municipalities in the State of Pernambuco are included in the PIRS and this insertion brings with it other guidelines that must be complied with by all DR. These propositions deal with the most varied forms of waste generation and disposal, and, consequently, the reduction, reuse and recycling (BRASIL, 2010). Hence, the importance of all public managers to engage in the implementation of PIRS in their respective municipalities arises.

The data explained are confirmed by the excerpt from the interview that follows in table 6.
Interviewer: There is medium and long-term planning for the expansion of the sanitary landfill, due to the solid waste deposited by these counties? Do these municipalities contribute in any way to the elaboration of any expansion project?

Respondent: There is no planning, on the part of the current management, for the expansion of the landfill, taking into account that the volumetric estimates of the landfill indicate that it would have the capacity to serve the municipalities of Garanhuns, Capoeiras, Caetés, São João, Lagoa do Ouro and Brejão by the year 2041, within an optimistic scenario, in which each municipality does its part (complies with the legislation) in terms of reducing the volume of waste sent to the landfill and where, in the operation of the site itself, it respects the premises of planning and occupancy.

Table 6. Responses obtained from the municipal manager of the Garanhuns landfill regarding compliance with the requirements for Final Disposal of solid waste indicated in the PIRS – Grouping 04.
Source: Research data, 2020

Conclusions

Waste management, from generation to final destination, is a recurring theme in our contemporary society. Faced with this reality, it is timely for public managers to delve deeper into this matter, and to know the real importance of drawing up and implementing their respective plans. With this study, it was possible to observe that the municipality of Garanhuns already has a sanitary landfill licensed by the CPRH, along the lines of what is proposed in the Intermunicipal Plan for Waste Management, prepared by the Government of the State of Pernambuco to meet the PNRS. Some requirements regarding the final disposal of waste, the municipality has not yet prepared, licensed and implemented the PRAD, an essential part to comply with the guideline of “Compliance with the National Policy on Solid Waste”.

Consequently, the strategy aimed at closing landfills was partially met, as the previous steps are imperative to complete this phase. In view of the pending PRAD and the partial completion of the closure of the dump, the municipality has not yet been able to comply with the schedule provided for in the PIRS for these guidelines, which places it in the condition of irregular before the PNRS. In this regard, it is extremely urgent that the municipal government take measures to resolve this conflict.

Finally, analyzing the interview feedback, it was possible to examine the participation of municipalities that use the Garanhuns landfill. As foreseen in the PIRS, which adopted a decentralized management in the management of the landfill and, therefore, receive waste from other locations, the associated cities contribute financially to carry out the deposit of their waste in the landfill, but do not have a forecast for the construction of their own sanitary landfills. However, even though there are still some obstacles in complying with the PIRS, the importance of a duly licensed sanitary landfill operating in the Agreste Meridional of Pernambuco is highlighted.

Also, as an indispensable part, the associated municipalities must comply with all the
guidelines contained in the Intermunicipal Solid Waste Plan, in order to contribute to a more environmentally sustainable management and society. The present study was limited to analyzing only the Proposition related to the Final Disposal of solid waste from the municipalities that use the Garanhuns landfill. As a suggestion for future studies, all propositions contained in the PIRS should be analyzed.

References


BRANDÃO, Adílma Lopes. Política de resíduos sólidos no Agreste Meridional de Pernambuco / Adílma Lopes Brandão. – 2016. 133 f.


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