

## TERRITORY MANAGEMENT AND ENVIRONMENTAL PUBLIC POLICIES IN RIO GRANDE DO NORTE: NOTES ON THE ISSUE OF SOLID WASTE

*Gestão do Território e Políticas Públicas Ambientais no Rio Grande do Norte:  
apontamentos sobre a questão dos resíduos sólidos*

*Gestión del Territorio y Políticas Públicas Ambientales en Rio Grande do  
Norte: apuntes sobre la cuestión de los Residuos Sólidos*



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### ABSTRACT

This article aims to analyze, considering the National Solid Waste Policy (Law No. 12,305/2010), the potential, and challenges of creating public consortium in Rio Grande do Norte/Brazil, as a territorial and environmental management strategy. To this end, bibliographic and documentary research was conducted, cross-referencing data analysis and photographic surveys to understand the impact of this legislation on waste management. The study identifies that the National Solid Waste Policy represents an innovative legal milestone, especially by introducing shared management through public consortium. However, it is observed that the implementation of this policy is limited, as no public consortium is in operation in the state, resulting in only 70 of the 167 municipalities disposing of their waste in adequate landfills. This scenario highlights deficiencies in solid waste management and challenges for the implementation of efficient and integrated waste management as recommended by law.

**Keywords:** Public Consortium; Shared Management; Land Management; National Solid Waste Policy; Rio Grande do Norte.

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## RESUMO

Este artigo tem como objetivo analisar, à luz da Política Nacional de Resíduos Sólidos (Lei nº 12.305/2010), o potencial e os desafios da criação de consórcios públicos no Rio Grande do Norte, Brasil, como estratégia de gestão territorial e ambiental. Para isso, foi realizada uma investigação bibliográfica e documental, combinando análise de dados e levantamentos fotográficos para compreender o impacto dessa legislação na gestão de resíduos. A investigação identifica que a Política Nacional de Resíduos Sólidos representa um marco legal inovador, principalmente ao introduzir a gestão compartilhada por meio de consórcios públicos. No entanto, a implementação dessa política é limitada, pois atualmente não há consórcios públicos em operação no estado, resultando em apenas 70 dos 167 municípios descartando seus resíduos em aterros adequados. Esse cenário destaca as deficiências na gestão de resíduos sólidos e os desafios da implementação de um sistema de gestão de resíduos eficiente e integrado, conforme recomendado pela lei.

**Palavras-chave:** Consórcios Públicos; Gestão Compartilhada; Gestão Territorial; Política Nacional de Resíduos Sólidos; Rio Grande do Norte.

## RESUMEN

El presente artículo tiene como objetivo analizar, teniendo en cuenta la Política Nacional de Residuos Sólidos (Ley n.º 12.305/2010), el potencial y los retos de la creación de un consorcio público en Rio Grande do Norte (Brasil) como estrategia de gestión territorial y medioambiental. Para ello, se llevó a cabo una investigación bibliográfica y documental, combinando el análisis de datos y estudios fotográficos para comprender el impacto de esta legislación en la gestión de residuos. El estudio identifica que la Política Nacional de Residuos Sólidos representa un marco jurídico innovador, en particular al introducir la gestión compartida a través de consorcios públicos. Sin embargo, la aplicación de esta política es limitada, ya que actualmente no hay ningún consorcio público en funcionamiento en el estado, lo que hace que solo 70 de los 167 municipios dispongan de sus residuos en vertederos adecuados. Esta situación pone de manifiesto las deficiencias en la gestión de los residuos sólidos y los retos que plantea la aplicación de un sistema de gestión de residuos eficiente e integrado, tal y como recomienda la ley.

**Palabras clave:** Consorcio público; Gestión compartida; Gestión territorial; Política Nacional de Residuos Sólidos; Rio Grande do Norte.

## 1 INTRODUCTION

The enactment of the Brazilian Federal Constitution in 1988 assigned new responsibilities to municipalities, especially concerning land management and the implementation of local public policies. This agenda also occupies a central position in geography. Land management, as a geographical category, establishes a fruitful dialogue with public policy, as it involves understanding how different social, political, and economic agents use, organize, and dispute land. From this perspective, it is crucial to identify how land use, in the context of environmental policy, has implications for solid waste management.



In the context of environmental policies, the shared management of solid waste through public consortium is an example of how state and intermunicipal action materializes in the territory, redefining the flows and dynamics that are inherent to its functioning. It is in this context that the present study is situated, whose objective is to analyze, in light of the National Solid Waste Policy (Law No. 12,305/2010), the potential and challenges of creating public consortium in Rio Grande do Norte as a territorial and environmental management strategy. Despite legal support, the lack of technical and financial resources still limits the ability of municipal administrations to effectively implement such policies, especially in areas related to the environment.

From an environmental perspective, public policies and the issue of solid waste, it can be observed that in Brazil, the problem of waste management is related to the constant increase in waste generation and its diversification, a consequence of increased production and consumption, with a significant portion of this waste being dumped in open dumps, known as landfills, without proper treatment.

According to the Brazilian Association of Waste and Environment (ABREMA, 2024), in 2023, approximately 81 million tons of solid waste were generated in Brazil, corresponding to a per capita generation of 1.047 kg/inhabitant/day. The final disposal of waste is a problem, since, of the total collected, 28.7 million went to dumps, while 5.7% or approximately 4.6 million tons were dumped in rivers, streams, and burned on the same property where they were generated.

In response to this problem, after nineteen years of debate in the National Congress, Brazil's National Solid Waste Policy (PNRS) was approved in 2010 through Law No. 12,305 (Brasil, 2010). Added to this is the New Legal Framework for Sanitation, established by Federal Law No. 14,026 of July 15, 2020 (Brasil, 2020). Subsequently, Decree No. 10,936/2022 (Brasil, 2022) introduced substantial changes to the initial text of the PNRS, redefining deadlines for municipalities to comply with the legal aspects of the Law regarding waste management services with sustainable solutions, as well as granting greater prominence to waste picker entities.

This set of legal milestones represents a turning point in waste management in the country, bringing together and consolidating fundamental guidelines for the proper handling and management of these materials. Even with legal advances, 15 years after the publication of the PNRS, solid waste management still needs to meet the stipulated goals. It should be noted that in the context of planning, the challenge is urgent, especially for



municipalities with small populations, which face problems such as the lack of consolidated and constant sources of financial resources and low technical and institutional capacity, a fact that hinders the conduct of technical studies to understand their realities and management needs.

Thus, for the study in question, the PNRS was chosen as a central document for the analyses presented in this article, as the Law, as mentioned earlier, and its provisions contribute to the guidelines for solid waste management in Brazil. In addition, the shared management strategies outlined in this legal framework, such as the adoption of public consortium, contribute to the debate on the implementation of environmental territorial management at the national level.

The article is divided into an introduction and three other sections. The following section presents the research methodology, indicating the main sources of data and information collection for subsequent analysis. The second section deals with the relationship between public policies and land management, the main categories that provided the basis for data analysis. Finally, the concluding remarks reflect the local and institutional landscape of the PNRS.

## 2 METHODOLOGY

The study is based on bibliographic and documentary research (Creswell, 2010), including the identification, selection, and synthesis of relevant works on solid waste management in Rio Grande do Norte, analyzed from the perspective of environmental public policies.

With regard to bibliographic research, it was based on the contributions of Farah (2008), Souza (2006), Arretche (2004), and Frey (2000) to address public policies as a category of analysis, whose reflections highlight their multidisciplinary nature and the consequent need for more integrated and shared public management models. This perspective is particularly relevant in the context of the formation of intermunicipal solid waste consortium, especially among small municipalities, which are the focus of this study.

To deepen the territorial dimension of the analysis, references from geography are incorporated into the discussion, which are considered fundamental for addressing the relationship between public policies and territorial management. Among them, Gottmann (1952), highlighting the importance of the location of actors/agents and objects in the



decision-making process and territorial planning; and Souza, M. A. A. (2021), emphasizing the relevance of principles such as solidarity and the construction of less unequal futures in the context of territorial planning and management.

Based on this theoretical framework, solid waste management is examined not only as an administrative or technical task, but as part of a process of spatial organization that involves coordination between distinct levels of government, waste transport and treatment flows, forms of land use and the socio-spatial inequalities that condition the effectiveness of public policies.

To address the concept of land management, authors Gottman (2012), Santos (2005), and Souza (2000) offer their systemic analyses of transformations in the territory based on the induction, or lack thereof, of public management in the territory. Documentary research, as Cellard (2014) points out, is also important for the robustness of academic work, and thus, an analysis of the PNRS documentary sets was carried out: the National Solid Waste Plan (PLANARES), established by Decree No. 11,043/2022; the State Plan for Integrated Solid Waste Management of Rio Grande do Norte (PEGIRS-RN), published in 2012, the State Solid Waste Plan (PERS-RN) published in 2017, and the Intermunicipal Solid Waste Plans of Rio Grande do Norte (PIRS), published in 2015, all prepared by the State Secretariat of Environment and Water Resources (SEMARH-RN).

Regarding the spatial scope of the study, Rio Grande do Norte, a state located in the Northeast Region of Brazil (Figure 01), was selected, since it has implemented a process of shared solid waste management through the implementation of intermunicipal public consortium. This fact, in turn, has contributed to the state's progress in publishing laws related to waste, such as the enactment of the State Solid Waste Policy of Rio Grande do Norte, Law No. 11,660/2024 (Rio Grande do Norte, 2024), which establishes intermunicipal consortium as an economic and financial instrument of the aforementioned Law. In addition, Federal Law No. 11,107/2005 regulates Public Consortiums in Brazil (Brasil, 2005). However, the existence of regulations does not eliminate the difficulties encountered in implementing waste management in municipalities in accordance with the Law.





**Figure 01 – Location of the study area**



**Source:** Prepared by the authors (2025).

### 3 THE RELATIONSHIP BETWEEN TERRITORIAL MANAGEMENT AND PUBLIC POLICIES

The relationship between territorial management and public policies is essential to understanding the development and organization of Brazilian territory. The territory, in addition to being a physical space, is a field of disputes and decisions involving various agents, from the State to civil society. In turn, public policies, as well as changes driven by the Federal Constitution of 1988, such as the decentralization of government responsibilities, are fundamental to the process of reorganizing the territory.

Thus, we seek to understand the dynamics between territory management and public policy implementation, highlighting the challenges faced by federal entities due to regional and socioeconomic disparities, as well as how policies have been planned and executed, considering their limitations and opportunities regarding solid waste management.

The multidisciplinary field of research on public policy was initially proposed as a science aimed at improving the use of rationality in the policy decision-making process, as demonstrated by Lerner and Lasswell (1951). Farah (2008) points out that this understanding contributed to the intensification of the dissemination of public policies at the local government levels, which led to the transfer of responsibilities and duties under the responsibility of the central government. In the Brazilian context, the reconfiguration began with the Federal Constitution of 1988, which delegated to municipalities the responsibility for

implementing public policies that were previously under the purview of the federal government.

Regarding the government's capacity to coordinate public policies on a national scale, Arretche (2004) points out that in the field of housing and sanitation policies, the federal government is responsible for financing and formulating national policy. However, in sanitation policy, authority is even more concentrated than around health, given the absence of federal representation in the main decision-making arenas.

Another relevant aspect is Brazil's continental size and its marked regional and cultural socioeconomic disparities, which make the reach of public policies a constant challenge, especially regarding adaptation to local realities. Inequalities in the country's socio-environmental configuration also deserve attention, as they can influence the direction of public environmental policies, hindering their implementation.

Thus, reflecting on the territory and its forms of management implies recognizing the need to organize a system of conflicts, interests, and disputes over power over the territory. Or, in a more classical definition, the territory delimits the space of power relations, involving constraints such as historical, political, economic, and cultural issues (Santos, 2005). The concept of territory management, which is intrinsically linked to the administration and planning of space, mediated both by the responsible actors and by society, emerges as relevant in the discussion raised in this article.

In the field of public policies, which are formulated and implemented by governments, territory assumes a vital role through territorial planning, culminating in territory management, with the State playing one of the main roles in shaping these actions.

In the Brazilian case, Souza, C. (2006) highlights the country's difficulties in implementing effective policies capable of transforming reality, bringing about concrete changes and the consequent improvement of the population's living conditions, which contributes to explaining the various cases of failure and discontinuity of actions. These difficulties are substantial, as Brazil experiences a duality: a territory with "fragile democratic institutions and the coexistence of modern and traditional political-administrative behaviors" (Frey, 2000, p. 213), which is characteristic of a developing country.

Even without reflecting on the Brazilian reality, Lascoumes and Le Galès (2012), when analyzing ideas related to public action, affirm that one of its original features consists of deliberating on the territorial spaces relevant to the action and assigning powers to the intervening bodies to define the precise objectives to be pursued. The authors also



emphasize that public policies are essential because they organize society through social engineering, ensuring the principle of efficiency (Lascoumes; Le Galès, 2012).

Thus, territorial management materializes in a set of practices aimed at creating and controlling spatial organization, constituting a powerful means that seeks, through spatial organization, to enable the existence and reproduction of society, seeking to define itself as a portion of space under the control of the state or private economic agents, constituting economic, political, and social management subordinate to it, culminating in the creation and control of spatial organization (Corrêa, 1992).

Therefore, the integration of these two concepts-territorial management and public policies-should be understood as a fundamental element for the implementation of environmental policies, allowing us to reflect on territorial policies. These, in turn, have been addressed in regional development plans, as state planning activities focused on the regional approach, resulting in special projects that serve specific regions of Brazil (Costa, 2001).

#### **4 THE NATIONAL SOLID WASTE POLICY AND ITS LEGAL AND INSTITUTIONAL CONTEXT**

Solid waste management in Brazil faces challenges that reflect the country's territorial complexity and socioeconomic inequalities. Public consortia emerges as a strategic solution provided for in the PNRS, allowing coordination between municipalities and states to optimize resources, reduce costs, and implement integrated socio-environmental policies.

In Rio Grande do Norte, despite initial efforts to regionalize waste management through intermunicipal public consortium, practical progress has been limited, revealing gaps, especially between planning and implementation. This is evident in the discontinuity of the consortium's actions, ranging from holding meetings to the construction of physical works (landfills and transfer stations), to effectively comply with what was planned. As an example of the continued ineffectiveness of consortium management in the state, the solid waste consortiums covering the Seridó and Alto Oeste Potiguar regions have budgetary resources made available by the Ministry of the Environment and Climate Change for the construction of landfills. Still, to date, the landfills have not yet been built, and the waste from



the cities participating in the two consortium continues to end up in public and clandestine dumps (Silva, 2015; Rio Grande do Norte, 2024).

The following section discusses the legal and operational foundations of public consortium. It analyzes their application in solid waste management in Rio Grande do Norte, with an emphasis on the challenges and prospects for the implementation of the national solid waste policy in the territory.

#### **4.1 Framework of the National Solid Waste Policy**

According to Silva (2015), the PNRS originated in Bill No. 203/1991, which initiated discussions on the creation of a legal framework to guide solid waste management in Brazil. Initially, the focus was on the management of waste from health services. However, the scope of the project was expanded to cover other types of waste, attracting the interest of various social and economic actors.

Only in 2010, after almost two decades of debates and interruptions, was the legal framework enacted, incorporating innovative elements in solid waste management. Among these advances, the socio-productive inclusion of collectors of reusable and recyclable materials, the implementation of reverse logistics systems, and the possibility of shared waste management through the formation of public consortium between federal entities stand out.

Despite its relevance, several technical instruments provided by the PNRS have not yet been implemented. An emblematic example of this ineffectiveness is the closure of landfills, whose initial deadline for compliance was set for August 2014. Given the inability of municipalities to meet the target, the deadline was staggered according to the population size of the municipalities, following this sequence: capitals and metropolitan areas had until August 2021; cities with more than 100,000 inhabitants, until August 2022; municipalities with a population between 50,000 and 100,000 thousand inhabitants, by August 2023; and, finally, municipalities with fewer than 50,000 inhabitants, which had until August 2024 to resolve this issue (Brasil, 2022).

With the deadline for the eradication of dumps already passed, uncertainty remains about the measures that will be taken in relation to municipalities that still dispose of their waste inappropriately, causing serious environmental impacts. There is also uncertainty



about how waste pickers will be included in formal waste management, as advocated by the PNRS and, more recently, PLANARES.

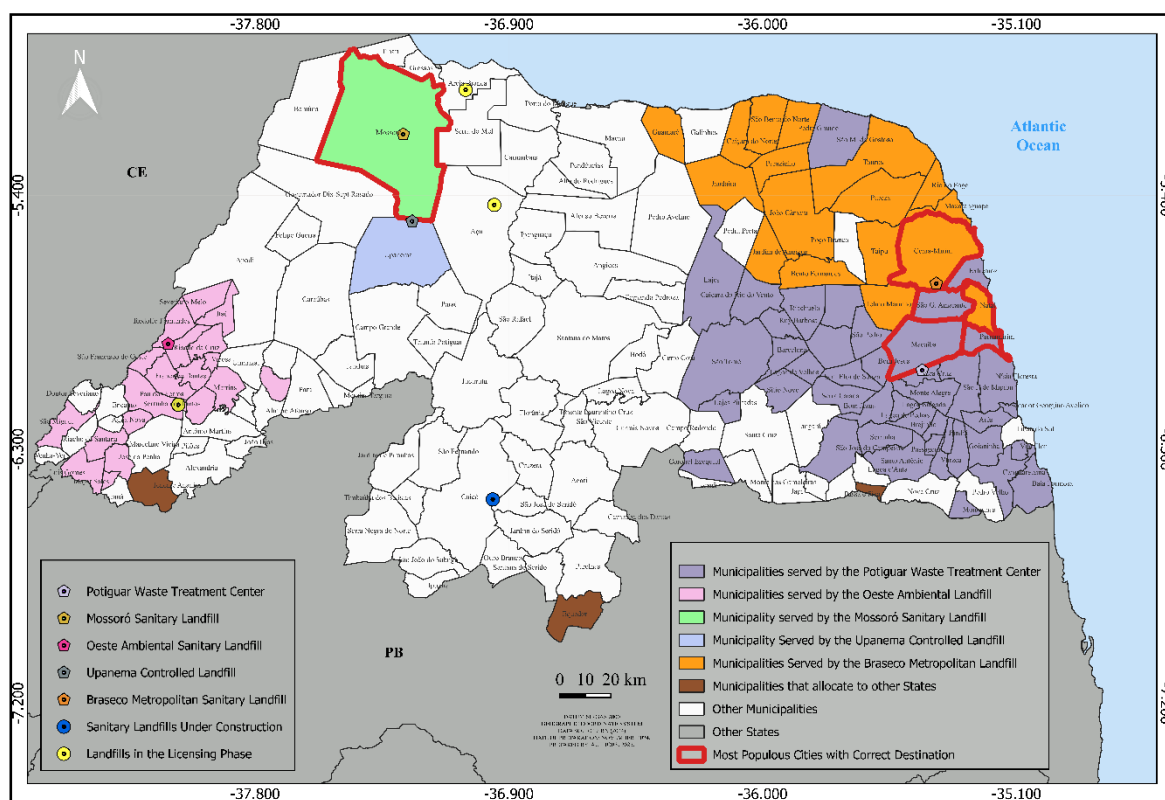
A new proposal for postponement was presented to the Chamber of Deputies through Bill No. 1,323/2024, which extends the deadline for municipalities with up to 50,000 inhabitants to adopt proper solid waste disposal by five years, i.e., the deadline would be extended to 2029 (Chamber of Deputies, 2024). Meanwhile, there are still at least 3,000 public dumps reported by municipalities (ABREMA, 2024).

## 4.2 Solid waste management in Brazil and Rio Grande do Norte

The implementation of territorial policies in Brazil, especially those of an environmental nature environmental faces challenges, particularly due the characteristics of a country of continental dimensions marked by profound socioeconomic inequalities. Regarding the implementation of the PNRS, the challenges become even more evident given that municipal scales, average income, and the economic dynamics of municipalities - characteristics that directly affect waste generation, management, and administration - vary across the country. In 2023, Brazil generated 221,000 tons of solid waste daily, or approximately 382 kg per inhabitant per year. The Northeast Region generated just over 20 million tons or 24.7% of this amount (ABREMA, 2024).

In Rio Grande do Norte, the situation reflects national problems, and data published by the state government, based on a survey reported by municipalities, indicate that 97 of the 167 municipalities dispose of their waste improperly, covering a population of about 1 million inhabitants, or one-third of the state's total. In contrast, 70 municipalities dispose of solid waste properly (highlighted in green, purple, and orange in Figure 02), which includes the most populous cities and those that generate the most waste, such as Natal, Mossoró, Parnamirim, São Gonçalo do Amarante, Macaíba, and Ceará-Mirim (Figure 02). These municipalities have a combined population of over 2 million inhabitants.

**Figure 02 – Location of landfills and municipalities with adequate solid waste disposal in the state of Rio Grande do Norte**

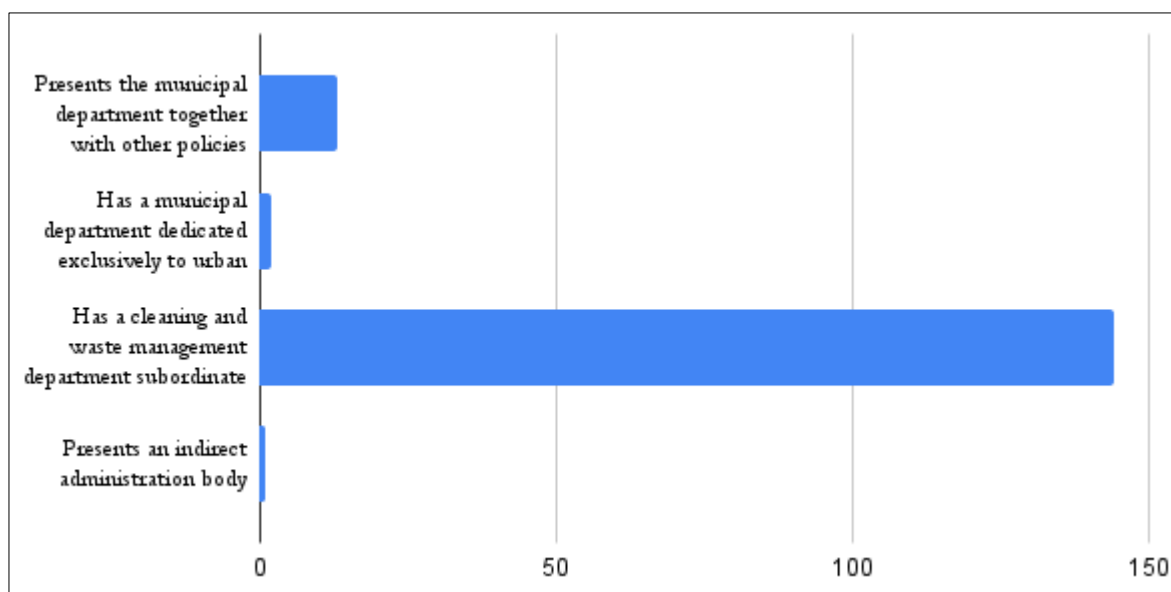


**Source:** Prepared by the authors, adapted from Rio Grande do Norte (2024) and Alves (2025).

Regarding the territorial management of urban cleaning and solid waste management services, the IBGE recently published the Sanitation Supplement to the Municipal Basic Information Survey (MUNIC) - 2023, which characterized the managing body for cleaning and waste management services at the national level.

In Rio Grande do Norte, 160 municipalities have their own organizational structure responsible for this area, while seven do not. According to Graph 01, of the municipalities that have this type of territorial management, only two have a municipal department exclusively responsible for urban cleaning and solid waste management; 13 towns have a municipal department that shares responsibilities with other administrative departments; in 144 municipalities, the cleaning and waste management sector is subordinate to another department; and one municipality has an indirect administration body (IBGE, 2023).

**Graph 01 – Institutional organization of solid waste management in the municipalities of Rio Grande do Norte**



**Source:** IBGE (2023).

The Rio Grande do Norte currently has four sanitary landfills and one controlled landfill (Figure 02). These are: the Metropolitan Landfill managed by the company Marquise Ambiental, through a public-private partnership with the City of Natal, which is located in the municipality of Ceará-Mirim and serves 14 towns, including the capital, Natal; two private landfills: the Potiguar Waste Treatment Center, located in the city of Vera Cruz, which serves 43 municipalities; and the Oeste Ambiental Sanitary Landfill, recently inaugurated and serving 19 towns, located in the city of Rodolfo Fernandes (Dantas, 2025; Alves, 2025; Silveira and Figueiredo, 2021).

There is also the Mossoró City Landfill, managed by the Municipal Government, exclusively for this municipality, which is the second largest in the state in terms of population, and the Upanema Controlled Landfill, also exclusive to its locality (Figure 02). It is worth mentioning that the municipalities of Tenente Ananias, Equador, and Passa e Fica (Figure 02) send their waste to sanitary landfills located in the state of Paraíba (Rio Grande do Norte, 2024).

Two sanitary landfills are in the environmental licensing phase – the Alto Oeste Potiguar regional sanitary landfill, to be built in Pau dos Ferros, which one of the authors of this paper participates in the Environmental Impact Study and Environmental Impact Report (EIA-RIMA) and a landfill located in the city of Areia Branca, planned to serve the municipalities of Areia Branca, Grossos, and Tibal (Qualital Ambiental, 2024). Also



noteworthy is the completion of the construction of the Seridó regional landfill, located in Caicó, planned to serve 26 municipalities in the region (Funcern, 2017).

Although not the focus of this article, one aspect that needs to be mentioned relates to the submission of information from municipalities to the Ministry of the Environment and Climate Change, as well as the local reality. According to official data and information from Rio Grande do Norte (2024) shown in Figure 02, the state capital, Natal, properly disposes of its waste by sending it to the landfill located in the city of Ceará-Mirim (Silveira and Figueiredo, 2021).

However, in recent years, the transfer station located in the Cidade Nova neighborhood (the capital's former landfill) has reverted to an open dump (Figure 03). During visits to the waste sorting center in October 2023 and July 2025, it was found that only part of the waste collected by the City Hall is sent to the landfill. A considerable part of the collected waste is dumped in the landfill that formed in the area that should be a sorting area for recyclable materials.

**Figure 03** – Cidade Nova transfer station (former landfill of the capital), Natal/RN



**Source:** Prepared by the Authors (2023).

Despite the express recommendation and prohibition by municipal authorities that records be kept, some records distant from the site were captured (Figure 03). In coordination with local workers, it was observed that the situation in that area is that of a





garbage dump. The area is visited by informal recyclable material collectors, domestic animals, and visible contamination due to the large volume of solid waste dumped daily without treatment. In a later article, we will address this particular and relevant case, as Natal is the capital and concentrates almost a quarter of the state's population and has the highest per capita income among the municipalities of Rio Grande do Norte.

#### 4.3 Solid waste management in Rio Grande do Norte and public consortium

Although in-depth discussions about public consortium in Brazil are relatively recent, their origins date back to the 19th century, with the first cases of cooperation between municipalities being the embryo of what we now know as public consortium (Silva, 2022).

The Federal Constitution of 1988 already provided for the possibility of creating consortium. Still, it was with Federal Law No. 11,107/2005, which regulates the general rules for contracting public consortium, that a definitive legal framework on the subject was established (Brasil, 2005). In this sense, Silva (2022) points out that the Brazilian political-territorial organization, outlined by the 1988 Constitution, allows federal entities to coordinate horizontally (municipality ↔ municipality) and/or vertically (state ↔ municipality) to resolve specific issues.

This possibility was reinforced by the PNRS, which integrates public consortium into its scope. In fact, this legal framework prioritizes municipalities that adopt consortium solutions for solid waste management in terms of access to federal resources. The Law sought to tie this premise of consortium into its scope, since its *preamble* determines that municipalities that:

I - Opt for intermunicipal consortium solutions for solid waste management, including the preparation and implementation of an intermunicipal plan, or voluntarily participate in the micro-regional solid waste plans referred to in § 1 of art. 16, or voluntarily participate in the micro-regional solid waste plans referred to in § 1 of art. 16.

[...]

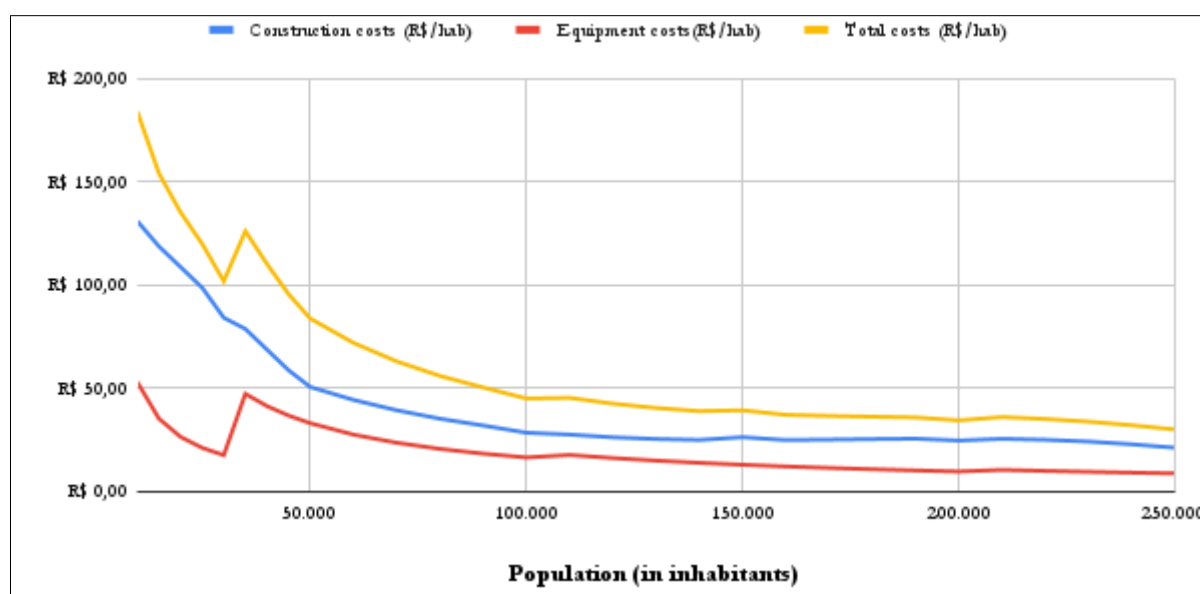
§ 2 Complementary rules on access to federal funds under this article shall be established in regulations.

III - identification of possibilities for implementing consortium or shared solutions with other municipalities, considering, in the criteria of economies of scale, the proximity of established locations and ways of preventing environmental risks (emphasis added) (Brasil, 2010, p. 01).

As stated in the excerpt from the PNRS, there is no legal obligation for municipalities and states to form public consortium; however, there is a preference for allocating federal funds to entities that wish to adopt shared solid waste management solutions to implement such territorial policies.

The economies of scale that can be achieved in the public budget are a key factor in encouraging the formation of public consortium. The reduction in financial costs is directly proportional to the increase in the population served and the volume of solid waste managed, making it feasible to implement sanitary landfills, which are considered appropriate for the Brazilian socioeconomic and environmental reality, as shown in Figure 04.

**Figure 04 – Per capita costs for the implementation of sanitary landfills in relation to the population**



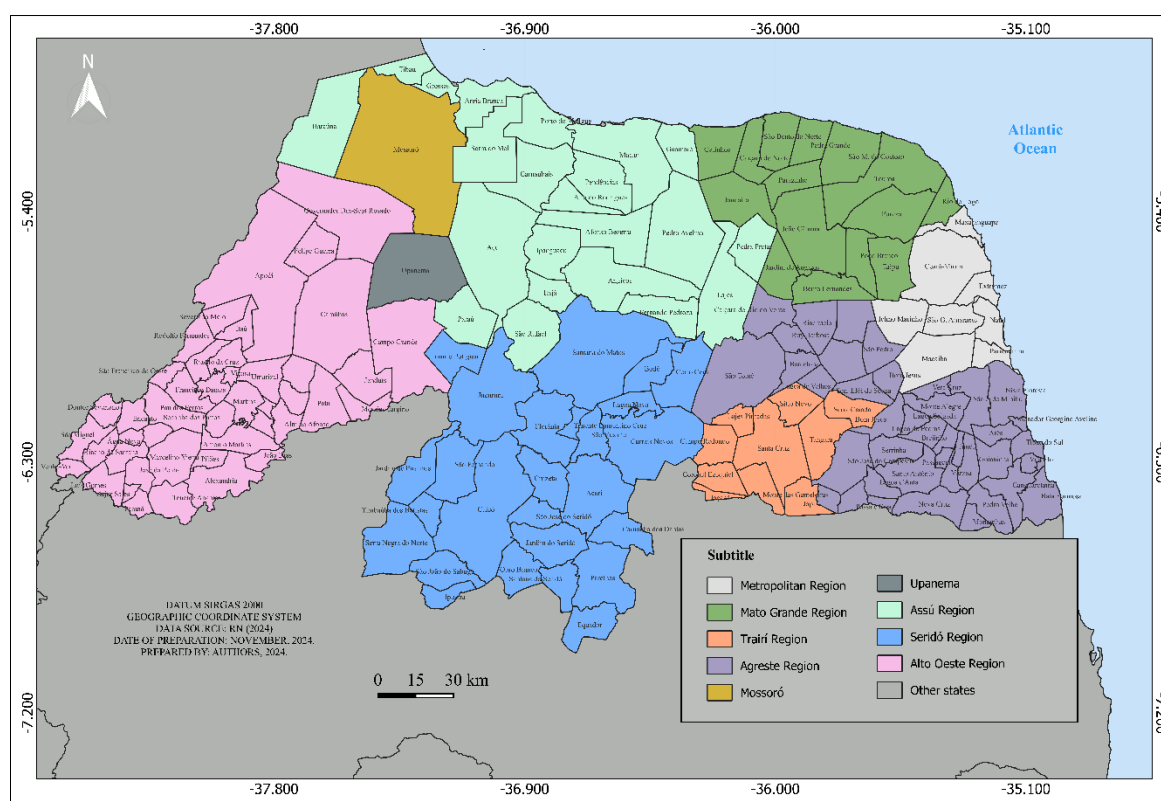
**Source:** Prepared by the authors, adapted from Silva Neto *et al.* (2011).

Santos's (1979) concept helps us understand the necessary requirements to implement a solid waste consortium, which depends on a set of structural elements for their operation. These elements include technical objects (such as landfills and waste transfer stations), strategic location choices, boundary delimitation (location of landfills and areas covered by consortium), population occupation and distribution (which influence the territorial and population coverage of the consortium), and socioeconomic dynamics (which directly impact the volume of waste generated).

In Brazil, according to data from the National Solid Waste Management Information System (SINIR), there are 148 public consortia focused on solid waste management, covering 1,979 municipalities and serving a total population of 53,512,859 inhabitants (Brasil, 2019).

In Rio Grande do Norte, efforts to implement consortium strategies began in 2010, with the division of the state into seven regions, according to reports by SEMARH-RN, as shown in Figure 05 (Rio Grande do Norte, 2012). These regions were to be structured with sanitary landfills and transfer stations, as well as selective collection of reusable and recyclable materials through the socio-productive inclusion of waste pickers, aiming to improve solid waste management based on the criteria of economies of scale, logistical efficiency, and regional integration.

**Figure 05 – Regionalization of Shared Solid Waste Management in Rio Grande do Norte**



**Source:** Prepared by the authors, adapted from Rio Grande do Norte (2024).

Although the plan was well designed by SEMARH-RN, as of May 2025, the actions initially planned had not been implemented. It should be emphasized that since the Seridó Regional Public Solid Waste Consortium was established in 2009, the first at the state level, such a consortium exists legally but does not operate effectively (Silva, 2022).

The initially planned landfills were not built, and the state currently relies on existing infrastructure, such as the Ceará-Mirim Metropolitan Landfill, inaugurated in July 2004, the Mossoró Municipal Landfill, inaugurated in 2008, the Potiguar Waste Treatment Center, which began operating in June 2021, and the Oeste Ambiental Landfill, inaugurated in 2024 (Silva, 2022; Silva *et al.*, 2025).

Analyzing the technical reports produced by SEMARH-RN, in 2010, the state was divided into seven regions, each of which was to be structured with a landfill and transfer stations for reusable and recyclable materials, with a view to implementing a territorial policy based on economic considerations (economies of scale), traffic flow for waste transport, and, to a certain extent, regional identity – the historical and geographical character of a given municipality in a given region (Rio Grande do Norte, 2012).

It is important to note that the regional design proposed by SEMARH-RN is a direct intervention in the organization of the territory, establishing, based on the regionalization of shared solid waste management, centralities, redefinition of material flows (waste transport), and coordination of municipalities, constituting intermunicipal cooperation networks. From a geographical perspective, by promoting a territorial arrangement while seeking economic and environmental efficiency, the analysis of the arrangement highlights regional asymmetries and institutional coordination challenges that are characteristic of territory management processes in the Brazilian context, especially when it comes to environmental policies.

More recently, according to a lecture given by a SEMARH-RN technician to the managers of the Seridó Consortium (Rio Grande do Norte, 2024), only two private initiatives have moved forward: the Waste Treatment Center in Vera Cruz, which serves municipalities in the metropolitan regions of Natal, as well as municipalities in the Agreste, Vale do Açu, Trairi, and Mato Grande Consortium; and the Oeste Potiguar Sanitary Landfill, located in the municipality of Rodolfo Fernandes, which began operating in 2024. The latter, however, conflicts with the proposal of the Alto Oeste Potiguar Consortium, which plans to build a public landfill in the same region, in the hub municipality of Pau dos Ferros, which is currently in the licensing phase.

Regarding the institutional problem, Silveira and Figueiredo (2021) mention that shared management, combined with integrated management, represents one of the major challenges imposed by the PNRs, since, in addition to the various public entities and their



respective providers of public urban cleaning and solid waste management services, the scenario demands that planning and management efforts be carried out in their entirety.

According to Silva (2015), among the proposals for regional consortium, the Seridó Regional Public Solid Waste Consortium stands out, whose implementation is more advanced through the completion of its landfill, which will serve the 26 municipalities in the region, with a population of over 320,000 inhabitants. However, most of the municipalities have populations of less than 20,000 inhabitants.

In this sense, it is clear that the problem of structuring consortium in the state of Rio Grande do Norte involves several aspects, among which we highlight the difficulties faced by municipalities with small populations and their consequent reduced waste generation, making proper waste management unfeasible. Added to this is the low technical capacity of these municipal governments to understand their realities to establish adequate territorial management. Finally, the lack of charging for urban cleaning services, as recommended by Federal Law No. 11,445 - National Basic Sanitation Policy (Brasil, 2007), compromises the financial revenue of city halls, a fact that could contribute to the contracting of solid waste disposal services in accordance with existing sanitary landfills in the state.

## 5 FINAL CONSIDERATIONS

The research conducted identified elements for understanding the challenges involved in implementing a comprehensive territorial policy for solid waste management in Brazilian municipalities. The analysis highlighted the structural and operational obstacles that hinder the implementation of the guidelines established by the PNRS, especially in the context of public consortium in Rio Grande do Norte.

The bibliographic and documentary research identified important obstacles in the implementation of territorial policies related to solid waste management in Brazil, especially in Rio Grande do Norte, based on the legal framework of the PNRS. Therefore, its execution offers relevant contributions to the understanding of the obstacles and the formulation of more effective strategies to face the challenges associated with integrated and sustainable waste management.

The results indicate that the implementation of public consortium in Rio Grande do Norte has been marked by discontinuity in actions and a lack of effective coordination between federal entities and between small municipalities. This fragmentation hinders the



consolidation of technical and operational arrangements that could lead to more efficient and environmentally friendly solid waste management.

In addition, it was found that the advances observed, such as the creation of private waste treatment units, often occur in a manner disconnected from the territorial planning proposed by the regional consortium planned by the public administration, which weakens the objective of an integrated and participatory policy and the consequent compliance with the PNRS in Rio Grande do Norte.

Another relevant aspect to mention is the impact of economies of scale on the municipal public budget, which was identified as one of the main potential benefits of public consortium. However, the study revealed that the lack of investment in the construction of regional landfills and transfer stations remains a significant obstacle. The landfills that existed prior to the regionalization process are in operation, but it is the private units that are beginning to emerge during this process that are affecting the implementation of the planned strategies, as they are interested in obtaining financial resources through the management of municipal solid waste.

With the deadline for closing landfills already expired (August 2024), it is urgent that the PNRS be placed on the public agenda for political debate. Raising public awareness of the importance of proper waste management should be a priority, promoting active participation in decision-making and monitoring of public policies and management. At the same time, it is essential to strengthen governance instruments, expanding financial and technical resources for the public consortium and ensuring compliance with the goals set by the PNRS.

Finally, the effective implementation of the PNRS depends not only on resources and technical planning, but also on a strategic vision of integrated management that considers the territorial and socioeconomic specificities of each region. The lack of basic infrastructure, such as landfills, and the lack of coordination between municipalities hinder the implementation of robust territorial policies. It should be noted that without territorial coordination, the possibility of establishing a regional cooperation network that reduces inequality in access to landfills and the integration of common sustainability strategies among municipalities is lost. Thus, the study reinforces the need to expand efforts to integrate planning, execution, and oversight to transform public consortium into effective instruments for the sustainable management of solid waste.

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