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Urban Solid Waste Management and Regulatory Effectiveness: The Case of the Municipality of Jaraguá (GO)

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ABSTRACT

The management of municipal solid waste is one of the main contemporary socio-environmental challenges, especially in small and medium-sized municipalities where financial and institutional constraints hinder the implementation of environmentally sound solutions. In light of the National Solid Waste Policy (PNRS – Law No. 12,305/2010), this article analyzes the historical and legal evolution of public policies for urban solid waste management in Brazil, integrating principles of Environmental Law and Environmental History, with an emphasis on the case study of the municipality of Jaraguá, Goiás. Methodologically, the research adopts a qualitative approach, of a historical-documentary and legal-normative nature, based on the analysis of legislation, official plans, technical reports, institutional data, and public communication materials. The results show that Jaraguá underwent a belated yet significant process of aligning with the PNRS guidelines, marked by the permanent closure of the open-air dump, the implementation of selective collection, the formalization of a waste pickers' cooperative, and the adoption of a licensed system for transfer and final disposal at a sanitary landfill. The study demonstrates that the intervention of the Goiás Public Prosecutor's Office, combined with the creation of municipal economic instruments and the intensification of environmental education campaigns, was decisive in overcoming structural and regulatory obstacles. It is concluded that the case of Jaraguá reveals the importance of integration between legal regulation, public policies, and social participation for the effective implementation of sustainable urban solid waste management, while also highlighting limitations to the promotion of responsible consumption and pointing to persistent challenges to the consolidation of environmentally sustainable cities.

Keywords: national solid waste policy – PNRS; SDGs; environmental history; environmental law; open-air landfill.

RESUMO

A gestão dos resíduos sólidos urbanos constitui um dos principais desafios socioambientais contemporâneos, especialmente em municípios de pequeno e médio porte onde limitações financeiras e institucionais dificultam a implementação de soluções ambientalmente adequadas. À luz da Política Nacional de Resíduos Sólidos (PNRS – Lei nº 12.305/2010), este artigo analisa a evolução histórico-jurídica das políticas públicas de manejo de resíduos sólidos urbanos no Brasil, articulando fundamentos do Direito Ambiental e da História Ambiental, com ênfase no estudo de caso do município de Jaraguá/GO. Metodologicamente, a pesquisa adota uma abordagem qualitativa, de caráter histórico-documental e jurídico-normativo, fundamentada na análise de legislação, planos oficiais, relatórios técnicos, dados institucionais e materiais de comunicação pública. Os resultados evidenciam que Jaraguá percorreu um processo tardio, porém significativo, de adequação às diretrizes da PNRS, marcado pelo encerramento definitivo do lixão a céu aberto, pela implantação da coleta seletiva, pela formalização de cooperativa de catadores e pela adoção de um sistema licenciado de transbordo e de destinação final em aterro sanitário. O estudo demonstra que a intervenção do Ministério Público de Goiás, aliada à criação de instrumentos econômicos municipais e à intensificação de campanhas de educação ambiental,



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foi decisiva para a superação de obstáculos estruturais e normativos. Conclui-se que o caso de Jaraguá revela a importância da integração entre a regulação jurídica, as políticas públicas e a participação social para a efetivação da gestão sustentável dos resíduos sólidos urbanos, ao mesmo tempo em que evidencia limites à promoção do consumo responsável, apontando desafios persistentes à consolidação de cidades ambientalmente sustentáveis.

Palavras-chave: política nacional de resíduos sólidos – PNRS; ODS; história ambiental; direito ambiental; lixo a céu aberto.

Introduction

The intensification of urbanization, industrialization, and consumption in contemporary societies has produced complex environmental impacts, among which the growing generation of municipal solid waste (MSW) stands out. The issue of waste goes beyond the technical dimension of basic sanitation and reveals itself as a historical, social, economic, and legal phenomenon, directly related to modes of production, consumption patterns, and forms of appropriation of nature.

From the perspective of Environmental History, the consolidation of inappropriate disposal practices reflects a historically constructed utilitarian view of nature, which conceives of the environment as an unlimited space for exploitation and the dumping of waste (Rossi, 2023). This logic was reinforced by the urban-industrial development model, in which economic growth and consumption came to be associated with social progress, while environmental and social impacts were silenced (Suzin & Jesus, 2023; Pereira & Lopes, 2024).

In the legal sphere, the institutional response to this issue gained greater regulatory substance following the 1988 Federal Constitution, which enshrined the right to an ecologically balanced environment as a fundamental right in Article 225¹. This constitutional milestone spurred the formulation of environmental public policies, culminating, with regard to solid waste, in the enactment of Law No. 12,305/2010, which established the National Solid Waste Policy (PNRS).

The PNRS represents a significant advance by proposing an integrated and systemic approach to solid waste management, incorporating principles such as prevention, precaution, shared responsibility, and social participation. However, despite the robustness of the regulatory framework, a persistent gap remains between the legal norm and its effective implementation, especially in small and medium-sized municipalities, where environmentally unsound practices, such as open dumps, still persist.

In this context, in light of the PNRS, this article analyzes the historical-legal evolution of public policies for MSW management in Brazil, integrating principles of Environmental Law and Environmental History, with an emphasis on the case study of Jaraguá, Goiás. The aforementioned municipality exemplifies the structural difficulties faced by local authorities in complying with the PNRS guidelines, highlighting the persistence of socio-environmental inequalities and the need to reorient public waste management policies.

Despite advances in Brazil's environmental legal framework, particularly with the establishment of the PNRS, environmentally inappropriate practices for the collection and final disposal of MSW persist in numerous Brazilian municipalities. Thus, this study analyzed how historical, institutional, socioeconomic, and legal factors contribute to the ineffectiveness of the PNRS, based on the case of the municipality of Jaraguá, Goiás, and prevent Brazil from achieving the goals of the United Nations (UN) 2030 Agenda, specifically Sustainable Development Goal (SDG) 11 "Sustainable cities and communities"².

The research adopts a qualitative approach, of an exploratory and analytical nature, analyzing documents, laws, and regulations from the perspective of History and Environmental Law. Thus, the study seeks to examine the issue of MSW beyond technical data, considering its historical, institutional, and regulatory

¹ Available at: https://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm. Accessed in July 2025.

² More information on the UN SDGs is available at: <https://brasil.un.org/pt-br/sdgs>. Accessed in March 2025.



determinants. Environmental History can be understood as the field of study dedicated to analyzing the interactions between human societies and nature over time, considering the economic, political, social, and cultural determinants that shape these relationships (Pereira; Lopes, 2024). Environmental Law, in turn, constitutes the legal branch focused on protecting an ecologically balanced environment through the regulation of conduct, the definition of responsibilities, and the application of sanctions (Carvalho, 2025).

From a historical-documentary perspective, legal documents, institutional reports, and official data were analyzed to contextualize the development of public policies for solid waste management in Brazil and the State of Goiás. This approach allowed for the identification of continuities and discontinuities in waste treatment methods, as well as the persistence of environmentally inappropriate practices.

In the legal-regulatory sphere, the study examined relevant environmental legislation, with an emphasis on the 1988 Federal Constitution, the National Solid Waste Policy (PNRS), established by Law No. 12,305/2010, the state legislation of Goiás, and related regulatory acts. The analysis focused on the principles, instruments, and guidelines related to integrated solid waste management, as well as on provisions regarding environmental risks and damages.

Following these assessments, the article focuses on the municipality of Jaraguá/GO, given its relevance in illustrating the challenges faced by medium-sized municipalities in implementing the PNRS. To this end, data were used from the Brazilian Institute of Geography and Statistics (IBGE), the Goiás State Secretariat for the Environment and Sustainable Development (SEMAD), and official environmental monitoring reports.

Data analysis was conducted through critical interpretation, integrating theoretical contributions from Environmental Law and Environmental History, with the aim of understanding the structural causes of the ineffectiveness of public solid waste policies and their socio-environmental impacts between 2010—the year the PNRS was enacted—and 2024, the year in which municipalities with up to 50,000 inhabitants, such as Jaraguá, had a deadline for the decommissioning of their open dumps, in accordance with Article 54, item IV of Law No. 13,026, of July 15, 2020³, which updated the legal framework for basic sanitation in Brazil.

Environmental history and environmental law: conceptual foundations and evolution in Brazil

Throughout history, there are many examples showing that the production of solid waste has accompanied human development since the earliest settlements, making “garbage” inseparable from social, economic, and cultural practices over time. However, in recent centuries, this characteristic of societies has triggered a global ecological crisis, driven by unsustainable patterns of production and consumption, and has heightened the centrality of these issues in contemporary scientific and political debate (Gonçalves, 2021). The Industrial Revolution represents a fundamental milestone in this process, as it intensified the exploitation of natural resources, increased waste generation, and promoted profound transformations in productive and urban systems, whose impacts went beyond local scales and took on regional and global dimensions (Meira, 2019).

Prior to this period, the waste produced by societies was mostly organic and biodegradable, being rapidly reintegrated into natural cycles. With industrialization, however, complex industrial and urban waste, such as metals, glass, ceramics, and chemicals, began to predominate, increasing the risks of environmental contamination (Amaral, 2022; Moraes & Borja, 2009).

In Brazil, the development of Environmental Law reveals that, since the colonial period, there have been regulations regarding the use and exploitation of nature, although guided by economic and patrimonialist

³ Available at: https://www.planalto.gov.br/ccivil_03/_ato2019-2022/2020/lei/l14026.htm. Accessed in July 2025.



interests. The Afonsine, Manoeline, and Philippine Ordinances, as well as the Pau-Brasil Regulation of 1605, illustrate a utilitarian conservation logic, aimed at maintaining the economic exploitation of natural resources under state control (Barbosa, 2022; Mendonça, 2022).

It was only in the 20th century, especially following the intensification of environmental impacts and the occurrence of socio-environmental disasters, that a gradual paradigm shift took hold, with the recognition of nature's limits and the need for environmental protection as a prerequisite for quality of life. This process was driven by environmental movements, international conferences—such as the Stockholm Conference (1972)—and the incorporation of the principle of sustainable development into the global legal and political debate, currently expressed in the UN SDGs.

In Brazil, the 1988 Federal Constitution marked a milestone by enshrining an ecologically balanced environment as a fundamental right, imposing on the government and the public the duty to defend and preserve it for present and future generations in Article 225. This constitutional mandate laid the foundation for the construction of a robust regulatory framework, solidified in the 1990s and 2000s, which includes the National Solid Waste Policy, enacted in 2010.

The PNRS and the Historical-Legal Development of MSW Management in Brazil

As previously argued, the consolidation of large urban centers has intensified the generation of MSW, resulting in significant environmental impacts, primarily due to the accumulation and improper disposal of these materials. As highlighted by Suzin and Jesus (2023), population growth, coupled with economic development, has significantly increased the production of waste from domestic, commercial, hospital, and industrial activities, generating severe environmental consequences in the absence of effective management systems. Data from the United Nations indicate that approximately 2 billion tons of waste are produced annually on a global scale, with most consumed products being discarded in less than 6 months (UN-Brazil, 2018). Projections indicate that, by 2050, municipal solid waste generation could reach 3.8 billion tons per year, with estimated global direct and indirect costs of USD 640.3 billion (UN, 2024).

In this scenario, proper solid waste management plays a central role in environmental and urban sustainability, requiring the commitment of government, the private sector, and civil society. Under Brazilian law, solid waste is defined by the Brazilian Association of Technical Standards (ABNT NBR 10.004/2004) as materials in a solid or semisolid state resulting from industrial, domestic, hospital, commercial, agricultural, service, and street-sweeping activities, including sludge and certain liquids whose disposal in water bodies is not feasible.

The improper disposal of solid waste causes direct impacts on soil, water, and the atmosphere, as well as repercussions on public health. In Brazil, the enactment of Law No. 12,305, dated August 2, 2010, established the National Solid Waste Policy (PNRS), setting forth principles, objectives, and instruments aimed at the integrated and environmentally sound management of waste, assigning shared responsibilities to the various stakeholders involved. However, understanding the PNRS and its challenges requires a historical analysis of the development of environmental law in Brazil, since, for centuries, legal norms related to nature were guided by a utilitarian logic, focused primarily on the economic exploitation of natural resources.

The intensification of consumption patterns in contemporary societies has produced profound transformations in the relationships between the economy, the environment, and social organization. Consumption has come to function as a symbolic marker of status and social belonging, while the inability to consume reinforces processes of invisibilization and marginalization (Moreno, 2018). This phenomenon, widely discussed in Environmental History and Social Sciences, is directly related to the exponential growth in the generation of MSW (Moreno, 2018).



The expansion of industrial and service activities, coupled with the logic of continuous production and consumption, has increased not only the quantity but also the diversity of the waste generated, originating from different production chains and posing varying levels of environmental hazard (Cunha, 2024). Although economic growth has brought about material improvements, it has also deepened social and territorial inequalities, highlighting the structural contradictions of the adopted development model (Leal, 2024).

In this context, the enactment of Law No. 12,305/2010 represents a significant regulatory milestone in the historical trajectory of Brazilian environmental governance. The PNRS consolidated principles, objectives, and instruments aimed at the integrated and environmentally sound management of solid waste, involving federal entities, the private sector, and civil society (Brazil, 2010).

From a historical-legal perspective, the PNRS signals a regulatory shift by recognizing that the waste problem is not limited to the final disposal stage but spans the entire product life cycle, from the extraction of raw materials through consumption to final disposal. This understanding broadens the scope of environmental responsibility, incorporating the principle of shared responsibility among manufacturers, importers, distributors, retailers, public authorities, and consumers (Novato; Silva, 2021).

The PNRS also aligns with the concept of sustainable development by integrating environmental, economic, and social dimensions, particularly SDG 11 “Sustainable Cities and Communities,” although the latter was only formulated in 2015 by the UN. Solid waste management is now understood not only as a technical challenge but also as a field of political and social contention, in which historical inequalities are evident, especially in the most vulnerable areas, where environmentally inappropriate practices, such as open dumps, are concentrated (Bezerra, 2024; Möller, 2024).

One of the central provisions of the PNRS is the hierarchy of waste management actions, established in Article 9, which prioritizes non-generation, reduction, reuse, recycling, and treatment, relegating environmentally sound final disposal to waste residues only. This guideline incorporates preventive and precautionary principles, which are fundamental for mitigating environmental and public health risks, reinforcing the transition from a reactive to a preventive model of environmental management (Leal, 2024).

The incorporation of the concept of risk, widely debated in contemporary literature, is essential for understanding the challenges associated with MSW. In the so-called “risk society,” environmental damage does not manifest itself only in an immediate and visible form, but takes on a systemic, cumulative, and often invisible character, requiring technical and scientific interventions for its identification and management (Melo, 2024; Souza, 2023).

The conceptual distinction between environmentally sound management and final disposal, as provided for in the PNRS, highlights the legal recognition of the risks associated with improper waste management. While waste management involves reuse and treatment practices, final disposal refers to the controlled placement of waste in sanitary landfills, in accordance with technical criteria that minimize environmental impacts and risks to public health (Brazil, 2010).

Despite the robust regulatory framework, the effectiveness of the PNRS faces structural obstacles, especially in small and medium-sized municipalities. Financial constraints, institutional weaknesses, administrative discontinuity, and the absence of consistent environmental education policies compromise the implementation of legal guidelines (Moraes; Borja, 2009; Maranhão, 2021). As a result, historically entrenched practices, such as open dumps, persist, revealing the gap between legal norms and socio-environmental reality.



The Municipality of Jaraguá (GO) and the Implementation of the National Solid Waste Policy

In the state of Goiás, regulatory developments followed the federal trend, with the establishment of the State Solid Waste Policy and specific programs aimed at eliminating open dumps. However, recent data from the State Solid Waste Plan indicate that, although there has been progress in the adoption of sanitary landfills, most municipalities have not yet achieved adequate final disposal standards, highlighting the need to review and strengthen public policies (Semad, 2024).

A historical-legal analysis of MSW management reveals that contemporary challenges are not limited to the creation of regulations but require a paradigm shift in the society–nature relationship. The implementation of the PNRS depends on the coordination of legal instruments, public policies, social participation, and recognition of the finite nature of natural resources—central elements for promoting environmental justice and sustainability.

The case of the municipality of Jaraguá, Goiás, illustrates these contradictions. Despite the legal deadlines established by the PNRS, the municipality continued the improper disposal of MSW until 2025 in an open-air landfill located in an area near the urban zone, generating environmental impacts and health risks for the population. This situation reflects not only technical or financial difficulties but also the persistence of a culturally rooted utilitarian view of nature, which holds that natural resources are infinite and at our disposal, disregarding their characteristics and functions within each ecosystem—a view that has been questioned since the 1970s, when a global agenda on the environment and the rights of nature was established, marked by the Club of Rome in 1968 and Stockholm 1972, in search of actions and solutions to minimize human impact on the ecologically balanced environment (Ferrer; Silva, 2024). Jaraguá has also been affected by these historical processes, which still underpin environmental management practices in the local context. In this context, Figure 1 presents a map of the state of Goiás, highlighting the municipality of Jaraguá.

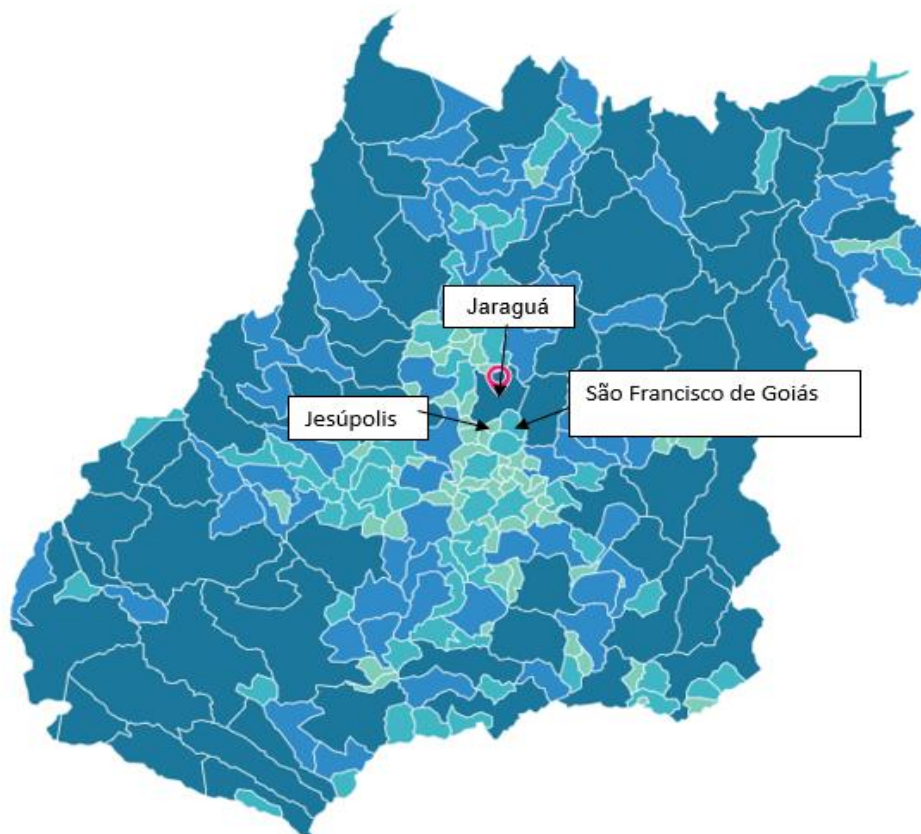


Figure1 —Map of the State of Goiás highlighting the location and territory of the municipality of Jaraguá (GO) Source: IBGE (2022).



The municipality of Jaraguá had an open-air landfill located approximately 1.5 kilometers from the urban center and 45 meters from the BR-153 highway. Consequently, the environmental risks of this situation affected both nature and the people in the city. Figure 2 shows a sketch of the location and access to the open-air landfill, which was decommissioned in 2024.

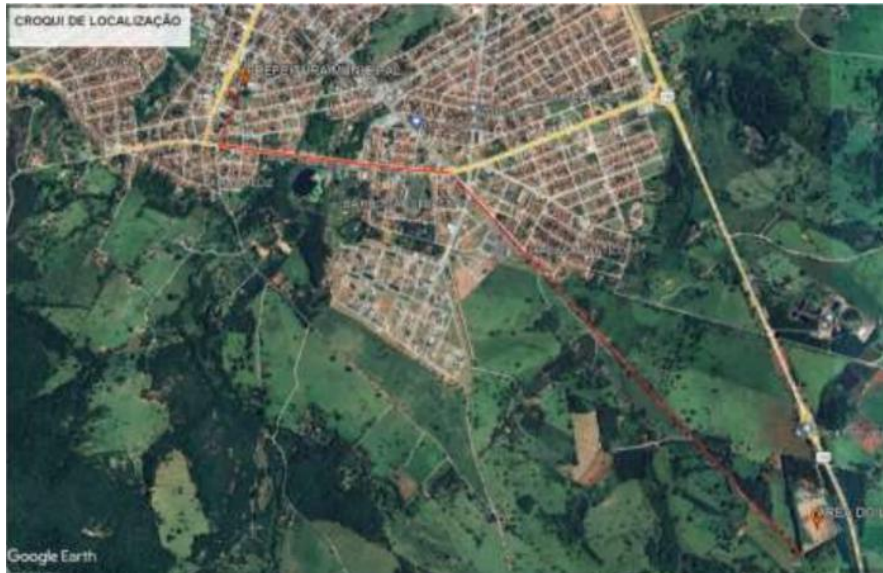


Figure2 - Sketch showing the location and access to the Jaraguá landfill. Source: Degraded Area Recovery Plan (PRAD) for the closure of the Jaraguá Municipal Landfill (2024).

Figure xml-ph-0000@deepl.internal - Satellite photo from July 2024, used in the Degraded Area Recovery Plan (PRAD) for the closure of the Jaraguá Municipal Landfill, when it was fully operational.



Figure3 - Satellite image of the open-air landfill in Jaraguá, Goiás, in July 2024. Source: Degraded Area Recovery Plan (PRAD) for the closure of the Jaraguá Municipal Landfill (2024).



Figure 3 shows areas with evidence of burning of MSW generated in Jaraguá at the former open-air landfill. This evidence, when compared to the literature, reveals the practices that occurred in Jaraguá, given its technical or financial difficulties, but also the persistence of a historically constructed utilitarian view of nature, which in many cases guides environmental management practices (Rossi, 2023).

Thus, the historical-legal analysis of MSW management reveals that contemporary challenges are not limited to the creation of regulations but require a paradigm shift in the society–nature relationship. The implementation of the PNRS depends on the coordination of legal instruments, public policies, social participation, and recognition of the finitude of natural resources—central elements for promoting environmental justice and sustainability.

The issue of MSW is intrinsically linked to contemporary consumption dynamics, which permeate all stages of social and economic life. As Moreno (2018) highlights, consumption has become part of the very social valuation of the individual, while, as Rossi (2023) points out, all human activity, regardless of its complexity, results in the generation of waste. In this context, the inadequate management of MSW constitutes one of the main environmental challenges faced by federal entities, which demands structural changes in behavior, governance, and regulation.

In light of this scenario, this section analyzes the municipality of Jaraguá, in the state of Goiás, as an empirical case study, examining the process of local adaptation to the PNRS guidelines, with an emphasis on the transition from an informal disposal model to an environmentally sound final disposal system.

Characterization of the municipality of Jaraguá and the solid waste management landscape

The municipality of Jaraguá is located in the Anápolis micro-region, in the São Patrício Valley, within the Serra de Jaraguá Ecological Park. As is the case in most municipalities in Goiás, MSW collection is carried out regularly, although with variations in frequency and available infrastructure, as indicated by the Goiás State Solid Waste Plan (PERS, 2024).

Figure 4 shows the frequency of municipal solid waste collection in the municipalities of Goiás, taken from the Goiás State Solid Waste Plan.



Figure4 —Graph showing the frequency of municipal solid waste collection in municipalities in Goiás. Source: PERS (2024, p. 05).

An analysis of the chart in question reveals that in the state of Goiás, 60% of its municipalities have daily waste collection, except on Sundays and holidays; 20% collect waste three times a week; 4% collect waste



every day of the week, without exception; Additionally, 4% of municipalities in Goiás offer collection once or twice a week; and 12% did not report how the service is provided (PERS, 2024).

Regarding waste generation in Jaraguá, data from the PRAD, prepared in 2024, indicate that the municipality has an average production of 1.16 kg/inhabitant/day, equivalent to approximately 52.46 tons of MSW per day, considering an estimated population of 45,223 inhabitants (IBGE, 2022). This rate exceeds both the national average, estimated at 0.98 kg/capita/day (Ministry of Cities, 2023), and the state average for Goiás, of 0.95 kg/capita/day (PRAD, 2024), highlighting a scenario of intensified environmental pressure. In this regard, Figure 5 stands out, showing the *per capita* mass of MSW collected in relation to the total population served by state.



Figure5 - Per capita MSW collected relative to the total population served by state (in kg/capita/day/state, in 2022). Source: Ministry of Cities (2023).

Figure 5 demonstrates that in each Brazilian state, and in the Federal District, the amount of waste collected per person daily varies. Thus, while in Piauí this figure is 1.32 kg/inhabitant, it drops to 0.77 kg/inhabitant in Rondônia, for example.

Historically, the municipality's MSW was sent to an open-air dump, where waste pickers were found working in precarious and unsanitary conditions, which constituted not only an environmental problem but also a social and health issue. This reality reflected the pattern of inadequacy still present in several Brazilian municipalities, in violation of the PNRS guidelines (Marchi, 2015).

The institutional transition in Jaraguá: selective collection and environmentally sound disposal

Starting in 2025, a significant shift in Jaraguá's municipal solid waste policy became evident. The municipality began to establish a selective collection system, initially through weekly routes communicated to the public, with subsequent expansion of educational initiatives and available infrastructure. In June 2025, the Recicla Jaraguá Cooperative began operations, responsible for sorting and marketing recyclable materials,



which resulted, between June and November of the same year, in the diversion of 26.8 tons of recyclable waste from the final disposal stream.

According to a Clarification Note to the population of Jaraguá, issued by the Cerrado Institute and published on the Folha de Jaraguá website on October 9, 2025, the Cerrado Institute is responsible for managing Jaraguá's selective collection, while the Municipal Secretariat of the Environment is the agency responsible for the supervision and control of collection activities (Folha de Jaraguá, 2025). Nevertheless, the following excerpt from the Note is noteworthy:

[...] 5. Regarding the participation of waste pickers in the Recicla Jaraguá cooperative, since the end of last year the Cerrado Institute has approached these workers at the now-defunct landfill and on the streets to invite them to learn about the selective collection program and the benefits of joining the cooperative. [...] During the term of the agreement, the Cerrado Institute will cover the costs of: i. Warehouse rent; ii. Water, electricity, and internet; iii. Rental of trucks and other vehicles used in selective collection; iv. Labor costs for the truck crew (driver and assistants); v. Administrative, financial, accounting, and legal expenses; vi. Purchase of machinery, equipment, and supplies; vii. Provision of uniforms and personal protective equipment; viii. R\$ 1,000.00 (one thousand reais) for each cooperative member, as a subsidy [...] 8. The Cerrado Institute is a private, non-profit institution and is compensated solely under the agreement established with the Municipal Secretariat of the Environment; 9. All financial proceeds from the sale of recyclable materials are directed ENTIRELY TO THE COOPERATIVE MEMBERS; neither the Cerrado Institute nor the Municipal Secretariat of the Environment receives or retains any portion of these proceeds. (Folha de Jaraguá, 2025).

As evidenced in the excerpt, the Cerrado Institute is responsible for the Jaraguá recycling cooperative⁴, providing the necessary support to the cooperative members to ensure the effectiveness of the selective collection program, subsidizing the project in various areas, such as costs for rent, water, electricity, and internet, among others. Furthermore, the Clarification Note demonstrates that the Cerrado Institute has been actively working to formalize the cooperative (Folha de Jaraguá, 2025).

At the same time, non-recyclable waste began to be collected and sent, starting in August 2025, to the transfer station of the company ECOLIFE Ambiental Transportes LTDA. All of this resulted from the signing of Agreement No. 01 of 2025 between the Jaraguá City Hall and the Cerrado Institute, which began addressing the issue in a technical and professional manner.

The Conclusive Technical Report on the Disposal of Municipal Solid Waste, released in January 2026, confirms that the collected waste undergoes operational control, weighing, temporary storage, and subsequent final disposal at a licensed Class II-A sanitary landfill located in the municipality of Guapó (GO), ensuring traceability and environmental compliance (Ecolife Ambiental Transportes, 2026). Nevertheless, the

⁴ The Cooperative does not yet have a National Legal Entity Registration Number (CNPJ), as it requires at least seven members.



external audit is conducted by the MPGO (Public Prosecutor's Office of Goiás) in the district of Jaraguá, which has already closed the extrajudicial proceeding, which included Recommendation No. 2024011918018, as demonstrated by the Decision to Close Public Civil Inquiry Extrajudicial Case No. 202400331605.

The data presented in the Conclusive Technical Report on Solid Waste Disposal in Jaraguá, prepared by ECOLIFE Ambiental Transportes LTDA, indicate significant volumes of waste sent to the regular disposal system, notably the progressive increase in monthly quantities between September and December 2025, which demonstrates both the regularity of collection and the definitive replacement of the previously adopted informal disposal model. Between August 19 and 31, 2025, for example, there were 108 (one hundred and eight) entries of solid waste trucks into the transfer area, totaling 451,240 kg of net weight; in September, there were 286 entries and a total of 1,052,960 kg; in October there were 318 entries with a net total of 1,153,300 kg; in November there were 293 entries, totaling 1,186,710 kg; and in December, there were 307 entries, totaling 1,299,300 kg in net weight (ECOLIFE Ambiental Transportes, 2026).

Obstacles and institutional factors hindering compliance with the PNRS

The analysis of the Jaraguá case shows that the delay in implementing an environmentally sound solid waste disposal system was primarily associated with three main factors: (i) insufficient financial resources for the construction and operation of a municipal landfill; (ii) the absence, until then, of an organized selective collection structure and a waste pickers' cooperative; and (iii) low public awareness regarding the proper separation and disposal of waste.

In this process, the decisive role of the Goiás State Public Prosecutor's Office stands out, particularly through Recommendation No. 2024011918018, which drove the adoption of concrete regulatory and administrative measures. As a result, the Urban Solid Waste Management Fee (TMRSU) was established through Municipal Law No. 1,625/2024, creating a specific source of funding for the sector. Furthermore, the strengthening of the recycling cooperative was formalized through Memorandum of Understanding No. 01/2025, signed with the Cerrado Institute, with a focus on promoting selective collection, composting, and territorial management based on geographic information systems.

From the perspective of the SDGs, the policies adopted by the municipality align directly with SDG 8 "Decent Work and Economic Growth," by promoting dignified work and income generation for cooperative members, and with SDG 11, by advancing the construction of a more sustainable and environmentally responsible city.

Final Considerations

This study sought to demonstrate the historical and legal evolution of public policies for MSW management in Brazil, integrating principles of Environmental Law and Environmental History, with an emphasis on the case study of the municipality of Jaraguá/GO. The study engages with the case of the municipality of Jaraguá/GO, which exemplifies the structural difficulties faced by local authorities in complying with the PNRS guidelines, highlighting the persistence of socio-environmental inequalities and the need to reorient public waste management policies. Methodologically, a qualitative approach was adopted, of a historical-documentary and legal-normative nature, based on the analysis of legislation, official plans, technical reports, institutional data, and public communication materials. Thus, it was demonstrated that MSW management in Brazil results from historical, institutional, and socioeconomic constraints that continue to hinder the effectiveness of the current legal framework, even though the country has a legal framework conceptually guided by the 2030 Agenda, institutionalized by the UN in 2025.



The focus on the municipality of Jaraguá revealed that, although the PNRS establishes principles and tools aligned with international best practices for integrated waste management, its implementation may face obstacles stemming from the institutional fragility of local authorities and a lack of technical and financial resources. Factors such as these explain the continued existence or delayed decommissioning of open dumps in the country, even after successive legal extensions, creating socio-environmental risks that run counter to the objectives of the PNRS and the UN SDGs.

Drawing on critical literature, legal frameworks, and other documents used as research sources, this study argues that overcoming the ineffectiveness of MSW management requires more than isolated legal adjustments. It implies reorienting public policies from a perspective that integrates proper waste disposal, appropriate environmental education projects so that the population adopts more conscious behaviors regarding consumption and disposal, and, furthermore, the guarantee of dignity for workers. With this, it is possible to promote environmental governance and align MSW management with the UN SDGs.

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