



# Decent work for whom? What the socioeconomic conditions of waste pickers reveal about the implementation of SDG 8

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## Abstract

**Objective:** To analyze the social, economic, and labor conditions of recyclable and reusable materials waste pickers working in Southern Maranhão, with emphasis on the relationship between their daily reality and SDG 8.

**Methodology:** This is a qualitative study, based on primary data collected through semi-structured questionnaires applied to 42 waste pickers, in addition to field observations.

**Relevance:** The study fills a gap in the literature by exploring the reality of waste pickers in Southern Maranhão, a group often rendered invisible by public policies, contributing to the debate on decent work and productive inclusion.

**Results:** The findings reveal that 78.57% of waste pickers are men, 54.76% have incomplete primary education, and 23.81% are between 38 and 47 years old. Most work from 1 to 12 hours per day and earn less than one minimum wage per month. Despite the existence of public policies, respondents remain in a situation of social and economic vulnerability.

**Conclusion:** Although waste pickers play an essential role in the recycling chain, their labor conditions fall short of the recommendations for decent work, as outlined in SDG 8.

**Contributions:** The research highlights the urgency of implementing inclusive public policies that promote training, formalization, and recognition of waste pickers, in accordance with SDG 8.

**Keywords:** waste pickers, circular economy, SDG 8, decent work

## Authors' notes

The authors have no conflicts of interest to declare.

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## Resumo

### Trabalho decente para quem? O que revela as condições socioeconômicas dos catadores sobre a implementação do ODS 8

**Objetivo:** Analisar as condições sociais, econômicas e laborais dos catadores de materiais recicláveis e reutilizáveis que atuam no Sul do Maranhão, com ênfase na relação entre sua realidade cotidiana e o ODS 8.

**Metodologia:** A pesquisa é de natureza qualitativa, com levantamento de dados primários por meio da aplicação de questionários semiestruturados a 42 catadores, além de observações de campo.

**Relevância:** O estudo preenche uma lacuna na literatura ao explorar a realidade de catadores no Sul do Maranhão, frequentemente invisibilizados pelas políticas públicas, contribuindo para o debate sobre trabalho decente e inclusão produtiva.

**Resultados:** Os resultados revelam que 78,57% dos catadores são homens, 54,76% têm ensino fundamental incompleto e 23,81% estão na faixa etária entre 38 e 47 anos. A maioria trabalha de 1 a 12 horas por dia, recebendo menos de um salário mínimo mensal. Apesar da existência de políticas públicas, os participantes seguem em situação de vulnerabilidade social e econômica.

**Conclusão:** Embora os catadores desempenhem um papel essencial à cadeia de reciclagem, suas condições laborais estão aquém das recomendações para o trabalho decente, conforme mencionado ODS 8.

**Contribuições:** A pesquisa evidencia a urgência da implementação de políticas públicas inclusivas que promovam capacitação, formalização e valorização dos catadores, conforme preconiza o ODS 8.

*Palavras-chave:* catadores, economia circular, ODS 8, trabalho decente

## Resumen

### ¿Trabajo decente para quién? Lo que revelan las condiciones socioeconómicas de los recicladores sobre la implementación del ODS 8

**Objetivo:** Analizar las condiciones sociales, económicas y laborales de los recicladores de materiales reciclables y reutilizables que actúan en el sur de Maranhão, con énfasis en la relación entre su realidad cotidiana y el ODS 8.

**Metodología:** La investigación es de naturaleza cualitativa, con recolección de datos primarios mediante la aplicación de cuestionarios semiestruturados a 42 recicladores, además de observaciones de campo.

**Relevancia:** El estudio llena un vacío en la literatura al explorar la realidad de recicladores en el sur de Maranhão, un grupo frecuentemente invisibilizado por las políticas públicas, y contribuye al debate sobre trabajo decente e inclusión productiva.

**Resultados:** Los resultados revelan que el 78,57% de los recicladores son hombres, el 54,76% tiene educación primaria incompleta y el 23,81% se encuentra en el rango de edad entre 38 y 47 años. La mayoría trabaja entre 1 y 12 horas por día, recibiendo menos de un salario mínimo mensual. A pesar de la existencia de políticas públicas, los participantes continúan en situación de vulnerabilidad social y económica.

**Conclusión:** Aunque los recicladores desempeñan un papel esencial en la cadena de reciclaje, sus condiciones laborales están por debajo de las recomendaciones para el trabajo decente, según lo establece el ODS 8.





**Contribuciones:** La investigación evidencia la urgencia de implementar políticas públicas inclusivas que promuevan la capacitación, formalización y valorización de los recicladores, conforme lo propone el ODS 8.

*Palabras clave:* recicladores, economía circular, ODS 8, trabajo decente

## Introduction

The work of recyclable material pickers is essential to sanitary safety, the guarantee of citizens' well-being and, consequently, sustainability (Fidelis et al., 2017). Through the collection and sorting of recyclable and reusable materials, these workers contribute to the reduction of Urban Solid Waste (USW), encourage recycling, promote the strengthening of a circular economy, and help minimize environmental impacts (Cruz & Garcia, 2024) by reducing the amount of USW disposed of in sanitary landfills (Fidelis & Colmenero, 2018), controlled landfills, or open dumps.

According to Cook et al. (2024), there are approximately 10 to 20 million people involved in the collection of materials with recyclable and reusable potential worldwide. In South America, there are approximately 4 million waste pickers, with an estimate of 700,000 autonomous pickers in Brazil (ABREMA, 2024). According to the Brazilian Association of Waste and Environment Companies, waste pickers were responsible for collecting approximately 4.5 million tons of solid waste in 2023 (ABREMA, 2024).

This significant management is directly related to the daily work of pickers, involving not only the collection of materials in various locations but also the careful sorting of these wastes. By separating and classifying materials according to their type and economic value, these workers ensure that a large amount of raw material is returned to industries (MNCR, 2008; ABREMA, 2024). This represents a concrete practice of sustainability by strengthening the logic of the circular economy and promoting a more rational and efficient use of resources.

Although there is some recognition of the contribution of waste pickers (Barford & Ahmad, 2021; Santos & Castro, 2024), we observed that literature often prioritizes the work developed in cooperatives or associations located in large urban centers (Giglio et al., 2020; Ospina et al., 2025). Despite their relevancy, such approaches represent more consolidated realities of the recycling chain, leaving in the background less structured contexts marked by greater socioeconomic vulnerabilities, which highlight an important scientific gap.

Immersed in this scenario, the 2030 Agenda for Sustainable Development presents itself as a fundamental analytical framework, by explicating central challenges related to the promotion of inclusive and sustainable economic growth, as well as the guarantee of full, productive



employment and decent work for all, as provided for in Sustainable Development Goal 8 (SDG 8) (UN, 2015).

In this context, waste pickers for recyclable and reusable material assume a strategic role from both environmental and socioeconomic perspectives, as they contribute to the recycling chain and the mitigation of impacts caused by inadequate waste disposal. According to the International Labour Organization (ILO, 2019), the concept of decent work involves opportunities for work that is productive and delivers a fair income, security in the workplace, adequate work conditions and access to social protection.

Nine years after the creation of the SDGs, recyclable and reusable material waste pickers still face precarious working conditions, ranging from a lack of labor rights to exposure to various hazards that can cause diverse adverse health effects (Guerrero et al., 2013; Ziraba et al., 2016; Cavalcante et al., 2018; Marchi & Santana, 2022; Mendes et al., 2023; Castro, 2024), as well as social, psychological, biological, and environmental risks (Ziraba et al., 2016).

Ensuring compliance with the targets of SDG 8 means promoting development based on human rights and sustainability, in addition to strengthening public policies that promote the formalization of waste pickers' work, the improvement of labor conditions, and access to training opportunities. In this sense, these actions are considered fundamental to transforming the work of waste pickers into a more dignified and productive activity, offering them the social and economic protection and labor rights necessary to promote quality of life (Cruz & Garcia, 2024).

Given this context, it becomes relevant to investigate how the labor conditions of waste pickers dialogue with SDG 8 in territories marked by inequalities and socioeconomic vulnerabilities, such as the countryside regions of Brazil. From this perspective, our study seeks to answer the following question: what are the social, economic, and labor conditions of waste pickers, and how do these conditions relate to SDG 8? Thus, the objective of the study is to analyze the social, economic, and labor conditions of these workers, with an emphasis on the relationship between their daily reality and the principles established by SDG 8.

To achieve our objectives, the article is organized into five sections. Section 1 presents the Introduction. Section 2 gathers the theoretical framework on the socioeconomic conditions of waste pickers and the concept of decent work within the scope of SDG 8. Section 3 describes the adopted methodological procedures. Section 4 presents and analyzes the results regarding the social, economic, and labor conditions of the waste pickers in the studied municipalities. Finally, Section 5 provides the study's conclusions, its limitations, and indicates possibilities for future research.





## 2 Theoretical Framework

### 2.1 Socioeconomic conditions of recyclable and reusable material waste pickers

Since the beginning of large-scale industrial production in the 1950s, more than 8 billion tons of solid waste were generated up until 2015 (Geyer et al., 2017). Projections indicate that by 2025, global waste production will reach 2.2 billion tons, with management costs estimated at nearly \$375.5 billion per year (Hoornweg & Bhada-Tata, 2012).

In Latin America, USW (Urban Solid Waste) management systems are typically ineffective; in developing countries like Ecuador, challenges are related to deficient financial and administrative resources, precarious regulations, and a lack of infrastructure and adequate human resources in local governments (Visvizi et al., 2018). Brazil and Mexico, large generators of USW, still dispose of the majority of their waste in open dumps or controlled landfills (Olay-Romero et al., 2020). In Asia, India faces challenges both in collection and final disposal of wastes (Velis, 2017).

In some locations such as Africa, Asia, Latin America, and the Caribbean, the informal sector, characterized by the provision of small-scale, labor-intensive, unregulated, and unregistered services, plays a central role in USW management and recycling. This sector is responsible for collecting recyclable and reusable materials in open dumps, streets, or directly from residences and businesses.

The essential actors in the informal waste management sector are the waste pickers. They contribute daily to the improvement of environmental health indicators, sustainability, and the reduction of disposable material flows, allowing for an increase in natural resource efficiency and the closing of the loop in a circular economy through reuse and recycling processes (Scarlat & Dallemand, 2019). In this perspective, the circular economy refers to a system that keeps products and materials in use for as long as possible and minimizes waste generation through strategies such as reuse, repair, and recycling (Kirchherr et al., 2023).

These professionals are experts in identifying waste with economic value. The main activity of waste pickers consists of collecting discarded materials that can be repurposed, adding value to these items by collecting them in sufficient quantities for commercialization. In addition to collection, some pickers perform initial processing stages, such as separation, cleaning, or compaction, which facilitate transport and reuse. In this way, these workers play a crucial role in the early stages of the recycling chain, especially in the extraction of recyclable materials from mixed waste (Velis et al., 2017).

Waste pickers include diverse social groups, such as women, children, the elderly, and



immigrants (Kaza et al., 2018), highlighting the vulnerability of these workers in different socioeconomic contexts. Although informal pickers predominate in developing countries, they are also found on a smaller scale in developed countries (Medina, 2007).

Even while operating in large cities and industrial centers, the majority of waste pickers remain in a state of poverty and lack access to opportunities that could improve their living and working conditions (Gallego et al., 2023). These characteristics are common in various parts of the world. In Latin America, for example, they are observed in Argentina (Gutberlet et al., 2021), Brazil (Vasconcelos et al., 2018), Colombia (Perrazo et al., 2019), Ecuador, and Peru (Hartmann et al., 2022). In Asia, countries such as the Philippines, Indonesia (Aleluia & Ferrão, 2016), and India (Wittmer, 2020) also record significant populations of waste pickers.

Waste pickers can be divided into two main groups: organized and autonomous. Waste pickers who operate in companies, cooperatives, or associations enjoy better working conditions. In these environments, there is generally access to equipment that facilitates the selection, separation, and baling of materials, increasing the efficiency of the process. Furthermore, organizations can establish partnerships with recycling programs based on source separation, which raises productivity and income through large-scale commercialization (Medina, 2007). This collective structure offers greater social and economic protection, in addition to contributing to the professionalization of the sector and the sustainability of the activity.

On the other hand, waste pickers who work on the streets face intense physical exhaustion, covering long distances in search of recyclable materials, as disposal by citizens occurs irregularly at different times and locations. Additionally, these pickers carry bags or use carts to transport the collected materials, intensifying the physical effort required to conduct their work (Schenck et al., 2016, Yu et al., 2020).

Finally, waste pickers who work in open dumps have access to a vast quantity of solid waste irregularly disposed of, which exposes these workers to various occupational and safety risks due to direct contact with hazardous and non-hazardous waste of diverse origins (Schenck et al., 2016). This reality reflects the precariousness of the working conditions faced by this category, highlighting the need for structural and social improvements.

In addition to risks related to the work environment, the profession of waste picker faces challenges that directly impact the quality of life and citizenship of these workers. The lack of social, financial, and psychological incentives contributes to the perpetuation of inadequate working conditions, while the insufficient recognition of the importance of this profession aggravates social exclusion. Despite performing an essential role in sustainable waste management and the circular economy, many waste pickers remain marginalized (Junior et al.,



2013).

Given this scenario, it is urgent to strengthen public policies that ensure better working conditions, adequate remuneration, and the valorization of these professionals. Parallel to this, it is essential to foster a cultural change that includes, recognizes, and values the contribution of waste pickers to sustainable development (Junior et al., 2013).

## 2.2 Decent work and economic growth – SDG 8

Based on the discourse of universal human rights, in September 2015, United Nations (UN) Member States adopted the 2030 Agenda for Sustainable Development, which contains 17 SDGs and 169 sub-targets, described as a model to guide the formulation of global policies until 2030 (UN, 2015).

According to the 2030 Agenda, SDG 8 aims to promote decent work and economic growth by 2030, with the International Labour Organization (ILO) playing a crucial role in defending this objective (Beltozar-Clemente, 2023). Decent work is understood as employment conducted under the principles of freedom, justice, security, and human dignity, which are essential for the well-being of individuals and serve as crucial drivers for sustainable economic growth (ILO, 2018).

Despite decades of efforts undertaken by developing countries to promote dignified and inclusive employment, vulnerable employment remains a significant obstacle to socioeconomic progress (Prони, 2013). This reflects structural challenges faced by these nations, such as a lack of adequate infrastructure, low industrialization, and limitations in social protection systems. Many workers, especially in informal sectors, face precarious conditions without formal contracts, access to labor benefits, or workplace safety guarantees (OECD/ILO, 2009; ILO, 2018).

Informality in the labor market, which characterizes a large portion of the workforce in developing countries, contributes to perpetuating the cycle of vulnerability, with precarious working conditions and a lack of social protection (World Bank, 2022, Yerrabati, 2022). These jobs, often marked by low wages, directly impact the populations' quality of life, hindering access to a stable income and opportunities for social ascension (Gammarano, 2018).

In this context, informal work refers to occupations that, in practice or by law, are not covered by labor legislation and social protection, generally lacking the rights and benefits associated with formal employment (ILO, 2023). ILO estimates indicate that more than 60% of the world's employed population earns its living in the informal economy, corresponding to about 2 billion workers, evidencing its persistence as a structural trait of labor markets, including Latin America (ILO, 2018).

The predominance of informality is also related to employment motivated by necessity



rather than choice, which distances itself from the four pillars of decent work: the creation of productive jobs that expand opportunities for all; the guarantee of fundamental rights at work, as well as the elimination of child and forced labor; the promotion of social dialogue between workers, employers, and governments; and social protection against economic vulnerabilities (Gammarano, 2018; ILO, 2018b; OECD/ILO, 2019).

Although vulnerable employment is frequently considered a survival strategy for populations in poverty, its persistence directly challenges the efforts of developing countries to achieve SDG 8. Furthermore, this type of employment has negative implications for other SDGs, such as poverty eradication (SDG 1), gender equality (SDG 5), reducing inequalities (SDG 10), and the promotion of peace and social justice (SDG 16). According to the OECD/ILO (2019), the predominance of vulnerable employment reflects a structural failure that compromises the well-being of populations and perpetuates social exclusion.

In this manner, it is observed that the formalization of waste pickers into cooperatives or associations is identified as a strategy capable of reducing social vulnerability by providing them with greater economic and social support. Formalization also represents a transformative factor for human dignity by promoting social equity and better living conditions for those who depend exclusively on waste collection (Gutberlet et al., 2013). Meanwhile, it is considered that waste pickers who operate autonomously are more susceptible to exploitation by intermediaries.

In Brazil, the social inclusion and economic empowerment of Brazilian waste pickers are legally supported by the National Solid Waste Policy - Law No. 12.305/2010 (Brazil, 2010). This law presents measures for the integration of waste pickers into shared responsibility actions throughout the product life cycle, in addition to the formalization and economic support of waste picker organizations (Brazil, 2010; Silva et al., 2019). Furthermore, in 2002, the professional category of waste pickers was recognized by the Brazilian Classification of Occupations, code 5192-05 (MTE, 2002).

Although legislation, in theory, supports and empowers the work of waste pickers as a sustainable solution for solid waste, in practice, many recyclable material pickers continue to operate under precarious conditions, without access to formal contracts, labor rights, or social protection. Despite their essential role in the recycling chain and in reducing environmental impacts, waste pickers face challenges such as low earnings, exposure to health risks, and social marginalization. These factors not only limit their opportunities for economic advancement but also hinder the implementation of public policies that promote their integration into society (Fidelis et al., 2017).

Therefore, investigating the socioeconomic and working conditions of waste pickers in



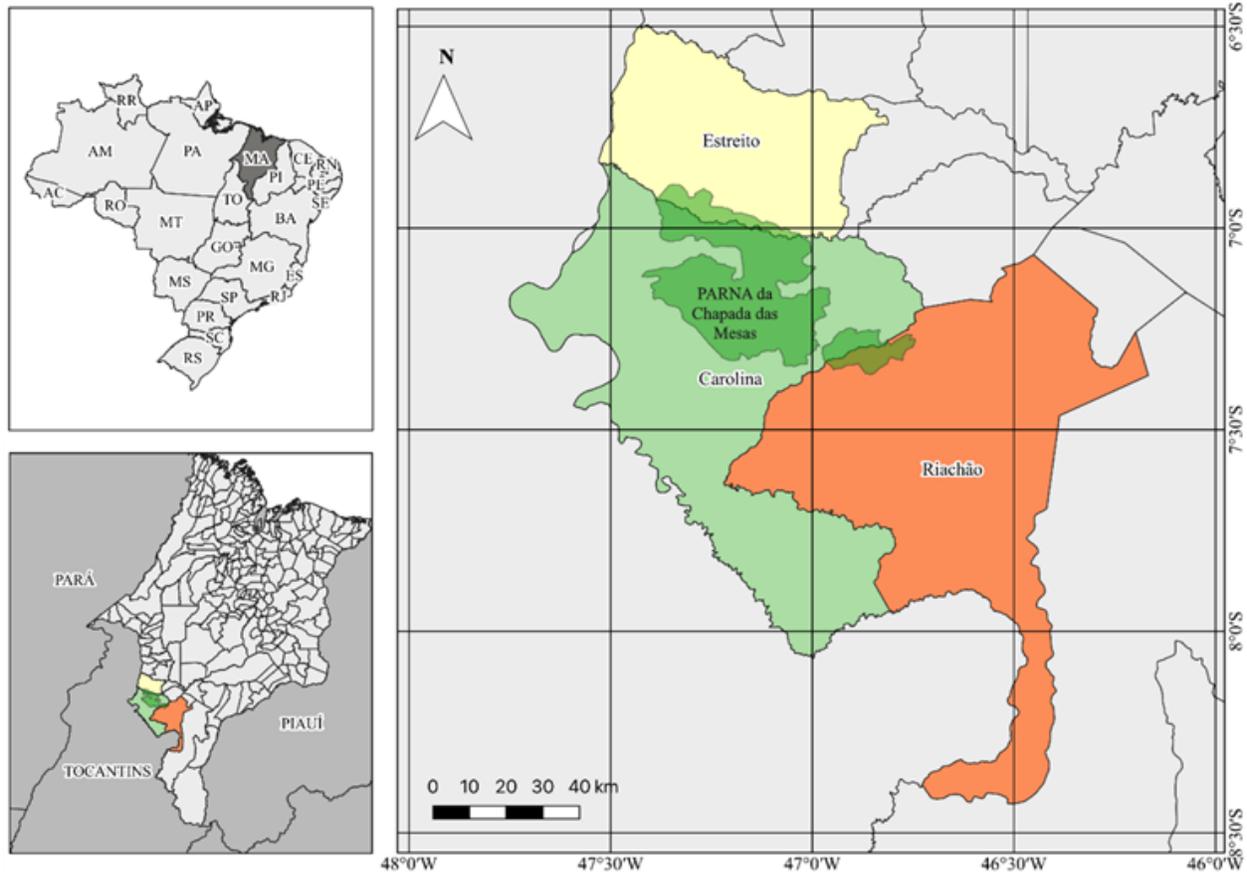
Southern Maranhão, as well as formalization initiatives and the impacts of public policies in promoting decent work, is essential to identify gaps and propose strategies that strengthen their economic and social inclusion. Simultaneously, this focus contributes to fostering sustainable practices in recycling and solid waste management, promoting environmental benefits and strengthening the dignity and rights of this category of workers.

### 3 Materials and Methods

#### 3.1 Study Area

The study was developed in three municipalities in the Southern Maranhense Mesoregion, which together occupy a territorial area of approximately  $15,390.77 \text{ km}^2$ : Estreito with 43,097 inhabitants, Carolina with 24,151 inhabitants, and Riachão with 20,288 inhabitants (IBGE, 2021).

The selection criteria for the municipalities considered populations of fewer than 50,000 inhabitants, proximity to the Chapada das Mesas National Park, and ease of access (Figure 1).

**Figure 1***Location for surveyed municipalities*

Note: Location of the municipalities of Estreito (yellow), Carolina (solid green), Riachão (orange), and the Chapada das Mesas National Park (shaded green).

### 3.2 Research Design

Exploratory and descriptive research techniques were used with a qualitative approach. Although the study was designed with a qualitative emphasis, the combination of descriptive statistics and content analysis brings the methodological design closer to a mixed-methods (quanti-qualitative) strategy, in which different types of evidence complement each other. This integration reinforces the analytical robustness of the study by mitigating limitations inherent to each technique and allowing for a more comprehensive interpretation of the investigated phenomenon (Creswell, 2014).

The literature review began with a search for data collection instruments validated in previous studies, which included open and closed questions. The questionnaires were developed based on economic and social dimensions, subdivided into two categories: 1) economic (monthly income and other sources of income); and 2) social (gender, education level, housing situation,



access to personal protective equipment, access to social benefits, weekly working hours, and length of experience in the activity). These categories were defined based on recent methodologies (Parekh et al., 2015; Cifrian et al., 2015; Hotta et al., 2016; Oliveira et al., 2015; Silva et al., 2019).

In the present study, the economic and social categories were defined based on the aforementioned references, which guided the structure of the question blocks. The questionnaire was developed from the contents and dimensions identified in the literature, with open and closed questions developed specifically for this research. There was no adaptation of previously validated instruments, nor a structured pre-test; therefore, content validation was conducted through an internal review among the researchers to ensure coherence and clarity of the questions.

The collection instrument consisted of a semi-structured questionnaire, with open and closed questions, applied in face-to-face interviews conducted by the researchers, who read the questions and recorded the participants' responses. The application took place between August 2023 and February 2024, with the objective of characterizing the social and economic conditions of waste pickers over the age of 18. Participant anonymity was preserved through coding with Arabic numerals.

Data collection also included documentary research, consulting plans, programs, projects, and public actions aimed at the work of recyclable material waste pickers, available on the websites of City Halls, Municipal and State Secretariats of the Environment, as well as the web portals of the Ministries of the Environment and Labor and Employment.

### 3.3 Sampling and Selection Criteria

The sampling criterion adopted was convenience, as the waste pickers were primarily identified at municipal open dumps and resale depots for the collected materials. The selection of participants occurred according to availability and accessibility at the time of the approach, allowing for the gathering of respondents aligned with the local reality and the exploratory and descriptive objectives of the study.

The definition of the sample, composed of 42 waste pickers, also considered the principle of theoretical saturation. Throughout the collection process, a recurrence of responses and a repetition of social, economic, and labor patterns among the participants were observed. After successive approaches at different collection points—especially open dumps and resale depots—it became evident that new interviews did not add relevant variations to the analyzed content. Thus, data saturation indicated sufficient information to meet the research objectives and support

the qualitative analyses.

The collected data were coded according to the nature of the information, namely: categorical variables (e.g., gender, education, housing situation, access to personal protective equipment, access to social benefits, or other sources of income) and continuous variables (e.g., age, monthly income, weekly working hours, and length of experience in the activity).

For quantitative treatment, the continuous variables of age, monthly income, and working hours were organized into previously defined ranges based on the waste pickers' responses, enabling their tabulation into comprehensible and comparable categories. Both the recategorized continuous variables and the categorical variables were analyzed exclusively through absolute and relative frequencies, without calculating measures of central tendency, given that the objective was solely to describe the distribution of responses. This procedure allowed for the data to be synthesized in a transparent and standardized manner, preserving the clarity of the patterns identified in the sample set.

### 3.4 Data Analysis

Descriptive analysis, through frequency distribution, was applied to categorical and continuous variables to offer a synthesized overview of the participants' socioeconomic conditions. To this end, frequency tables were prepared to describe the proportion of waste pickers in each category. Data referring to categorical variables were tabulated and organized with the aid of Microsoft Excel software (Friese, 2018).

The qualitative analysis of the information was performed using the coding method proposed by Bardin (2015) and Saldaña (2013). Bardin (2015) presents coding through the technique of thematic content analysis by frequency, while Saldaña (2013) adopts coding cycles that systematize the process and reduce subjectivity.

The thematic content analysis by frequency was divided into three stages. On the first stage, an exploratory reading was conducted to understand the reports collected during the application of the questionnaires. On the second stage, we made excerpts to establish analysis categories. In the phase of data treatment and interpretation, we defined a main analytical category: the benefits of work in associations or recycling cooperatives.

On a qualitative level, categories were defined a posteriori in an inductive manner, based on an exhaustive reading of the corpus. The coding cycles combined grammatical procedures, with coding by positive and negative attributes, and literary procedures, with coding for social and economic motives. This process allowed for the identification of emergent categories related to the waste pickers' working conditions, such as: (1) socioeconomic vulnerability; (2) occupational



risks; (3) informality and lack of formalization; and (4) perceptions of collective organization. The categories were refined throughout the coding stages, resulting in thematic subcategories that supported the interpretation of the results.

The content analysis was performed with the support of the Atlas.ti software (2023), which facilitated the coding and organization of qualitative data. The tool allowed for the identification of patterns and recurring themes, in addition to assisting in the structuring of the analysis, making the process more efficient and organized.

The research project was submitted to the Plataforma Brasil and approved by the National Research Ethics Commission (CAAE 78929323.0.0000.9448), ensuring compliance with the ethical guidelines established for conducting research involving human subjects. Furthermore, all necessary precautions were taken to ensure the confidentiality and informed consent of the participants, in accordance with the ethical and legal principles governing scientific research in Brazil.

Despite being appropriate for the exploratory objectives of the study, the methodological design presents limitations that must be recognized. Convenience sampling restricts the generalization of results, since participants were selected according to their accessibility at workplaces. Furthermore, the combination of quantitative and qualitative data, while enriching, poses analytical integration challenges that may limit the depth of inferences.

## 4 Results

In the studied areas, we identified several actors in the recycling chain as active participants in the separation and commercialization of waste with recyclable potential. Thus, 42 waste pickers of recyclable and reusable materials were interviewed, who carry out their labor activities in the municipalities of Estreito (21), Carolina (10), and Riachão (11). We consider this quantity of waste pickers to be sufficient for understanding the local reality. We should highlight that these waste pickers perform their activities autonomously.

The results obtained are presented in three main blocks. The first addresses the social and economic characteristics of the waste pickers, highlighting aspects such as gender, education, age group, type of housing, income, and working conditions. The second presents the working conditions related to the workload, average monthly earnings, work modality, and personal protective equipment. The third block presents federal, state, and municipal programs and public policies created to benefit the work of waste pickers.

### 4.1 Social and economic characteristics of the waste pickers

Among the participants, it is summarized that 78.57% were men, 54.76% have incomplete primary education, and only one responded having completed higher education; 47.62% belong to the age group of 28 to 47 years. Regarding housing conditions, it was identified that 83.33% of the participants resided in their own home and 4.76% were homeless (Table 1).

**Table 1**

*Socioeconomic Characterization of Waste Pickers*

Variables		N	%
<b>Gender</b>	Female	9	21,43
	Male	33	78,57
<b>Education Level</b>	Illiterate	9	21,43
	Incomplete Primary Education	23	54,76
	Complete Primary Education	3	7,14
	Incomplete Secondary Education	3	7,14
	Complete Secondary Education	3	7,14
	Complete Higher Education	0	0,00
<b>Age Group</b>	18-27	4	9,52
	28-37	10	23,81
	38-47	10	23,81
	48-57	9	21,43
	58-67	7	16,67
<b>Housing Type</b>	Own house	35	83,33
	Rented house	4	9,52
	Provided/Borrowed house	1	2,38
	Homeless	2	4,76
<b>Fontes de benefícios sociais e renda que os catadores recebem</b>	Retirement/Pension	3	7,14
	Shoeshining	1	2,38
	Handicrafts	1	2,38
	Snack sales	1	2,38
	Rural work (farming)	10	23,81
	Recycling	26	61,90
<b>Total</b>			100

*Note:* Socioeconomic characterization of recyclable material waste pickers.



#### 4.2 Working Conditions of the Waste Pickers

The waste pickers work between 01 and 12 hours per day (Table 2), operating primarily in open dumps (59.52%). Regarding recovered materials, the following stand out: copper (21%), plastic (19%), aluminum (18%), iron, and cardboard (21%). From the sale of these materials, the waste pickers earn an average of R\$ 50.00 per workday.

When analyzing the use of Personal Protective Equipment (PPE), it was found that some pickers used helmets, gloves, masks, and boots found at the collection sites or donated by companies.

Regarding physical symptoms, the workers reported feeling physical and mental exhaustion, headaches, back pain, and pain in the arms and legs. Some workers reported having suffered cuts and scratches, falls from their own height, and two workers were run over by a waste compactor truck.

In the municipality of Estreito, five workers reported having developed certain diseases as a result of their activities, such as spinal problems, sciatic nerve injury, athlete's foot, loss of smell, and bacterial infection.

**Table 2***Working Conditions of the Waste Pickers*

<b>Variables</b>	<b>N</b>	<b>%</b>	
<b>Working Hours per day</b>	1 to 3	3	7.14
	4 to 6	16	38.1
	7 to 9	14	33.33
	10 to 12	9	21.43
<b>Average Monthly Income</b>	Less than one minimum wage	22	52.38
	One minimum wage	13	30.95
	Between one and two salaries	5	11.9
	More than two salaries	2	4.76
<b>Work Modality</b>	Autonomous street picker	11	26.19
	Autonomous dump site picker	25	59.52
	Autonomous picker in a company	5	11.9
	Entrepreneur	1	2.38
<b>PPEs</b>	None	2	4.76
	Gloves	27	64.29
	Ear protection	0	0
	Safety glasses	3	7.14
	Special boot/shoe	28	66.67
	Mask	3	7.14
	Helmet	6	14.29
	Cap	16	38.1
Sun hat	7	16.67	

*Note:* Working conditions of the waste pickers.

In light of labor regulatory parameters, the research findings present a set of fragilities that affect different dimensions of Decent Work within the context of SDG 8. It is observed that a portion of the waste pickers exceeds the legal workday of 8 hours, constituting long shifts that increase physical and mental exhaustion and reduce opportunities for rest and recovery. Concurrently, the estimated average monthly income, which was below the current minimum wage during the research period, reveals objective limitations regarding the dimension of adequate income, indicating precarious economic inclusion and a low capacity for social protection. Furthermore, reports of pain, accidents, and illnesses related to the activity highlight fragilities in the dimension of safety and health at work. Considered in an integrated manner, these findings allow for the identification of how the observed labor conditions distance themselves from the Decent Work parameters provided for in SDG 8 (Table 3).

**Table 3***Articulation between empirical findings and Decent Work dimensions (SDG 8)*

<b>Empirical finding of the study</b>	<b>Evidence in the data</b>	<b>Decent Work Dimension</b>	<b>Analytical contribution to SDG 8</b>
Predominance of income < 1 minimum wage	52.38% of waste pickers	Adequate income	Indicates precarious economic inclusion
Workdays exceeding 8h/day	54.76% of waste pickers	Working time	Evidence of intensification and overload
Frequent reports of pain, accidents, and diseases	Physical symptoms and being run over	Safety and health at work	Reveals an insecure labor environment
Partial or inadequate use of PPEs	Incomplete or improvised PPEs	Social protection	Expands exposure to risks
Absence of cooperatives or associations	100% autonomous operation	Collective organization	Limits social dialogue and rights
Inexistence of institutional support	Lack of registration and training	Formalization and productive inclusion	Distance from public policies in the territory

*Note:* Working conditions of the waste pickers.

### 4.3 Federal, state, and municipal public programs and policies

Different plans and/or programs at the federal, state, and municipal levels have been implemented over the years (Table 4). Measures such as the creation of the 2007, which waives bidding processes for contracting cooperatives, facilitated Interministerial Committee for the Social Inclusion of Waste Pickers and Law No. 11.445 of the integration of waste pickers into formal solid waste management systems.

These actions culminated in the creation of the *Pró-Catador* Program through Decree No. 7.405, of December 23, 2010. Aligned with the PNRS (National Solid Waste Policy), this federal government initiative was strategic in promoting social inclusion and strengthening waste pickers, aiming for their insertion into a formal labor market, improving their living and working conditions, and strengthening waste management in Brazil.

The aforementioned program was structured to articulate public policies and actions aimed at improving working conditions and the formalization of waste pickers, in addition to expanding selective collection throughout the country (Brazil, 2010). Currently, the program has



established partnerships between ministries and public agencies, such as the Ministry of the Environment and Climate Change, the Ministry of Cities, the Ministry of Labor and Employment, and the Ministry of Social Development, with the scope of offering technical training, support for the creation of cooperatives, and financial incentives (Table 4).





Table 4

Plans, programs, projects and/or actions that regulate, foster or incentivize the work of recyclable material waste pickers and present a direct or indirect relationship with SDG 8

<b>MINISTRY OF THE ENVIRONMENT</b>		
<b>Initiatives</b>	<b>Description</b>	<b>Involved Agency</b>
Zero Dump Program (Programa Lixão Zero)	The initiative is linked to the valorization of waste pickers' work by promoting sorting and proper disposal of solid waste, resulting in the creation of job opportunities for pickers in controlled landfills and sorting units.	Ministry of the Environment and Climate Change, 2019
Diogo de Sant'Ana Pro-Picker Program for Women and Men and Pickers for Popular Recycling	The program's central objective is to strengthen waste picker organizations, support individual pickers through access to public policies, improve working conditions, and expand selective collection while recognizing the importance of pickers in waste management.	Decree No. 11.414, signed on February 13, 2023
CATAFORTE III Program	To promote the inclusion of informal, street, and dump site recyclable material waste pickers into solidarity enterprises and access to benefits generated by solidarity networks.	Brazil, 2024
National Environment Fund	Support for cooperatives and associations of reusable and recyclable material waste pickers.	Ministry of the Environment and Climate Change, 2024
<b>MINISTRY OF THE CITIES</b>		
Support Notice	Support for the structuring and strengthening of Cooperatives of reusable and recyclable material waste pickers.	Public Call Notice No. 01/2024
<b>MINISTRY OF LABOR AND EMPLOYMENT</b>		
National Decent Work Plan	The plan's central objective is to generate Decent Work to Combat Poverty and Social Inequalities, as well as to foster training that allows pickers to improve their skills in management, waste sorting, and equipment operation.	Brazil, 2010
National Program for Access to Technical Education and Employment (Pronatec) – Pronatec Picker Modality	PRONATEC Picker: National Program for Access to Technical Education and Employment – Modality for Recyclable Material Waste Pickers.	Ministry of Labor and Employment (MTE), 2014
Strengthening of the National Employment System (SINE)	SINE was created in 1975, but in 2016, specific actions were implemented to include waste pickers in training initiatives and formal placement in the labor market.	Ministry of Labor and Employment (MTE), 2016
National Program for the Promotion of Decent Work for Waste Pickers	The Ministry of Labor and Employment, in partnership with the Ministry of the Environment and other agencies, developed programs to promote decent work for waste pickers.	Ministry of Labor and Employment (MTE), 2017
<b>STATE SECRETARIAT OF THE ENVIRONMENT OF MARANHÃO</b>		
Support to Municipalities in the Implementation of Selective Collection	This action aims to integrate waste pickers into selective collection and waste sorting activities, providing them with access to a regular source of income.	SEMA, 2017
Partnerships with the Private Sector and Reverse Logistics	The partnership aims to include waste pickers in the collection and recycling process of packaging and products, such as plastic, cardboard, and electronics, creating a more solid recycling market and offering a stable source of income for picker cooperatives.	SEMA, 2018
State Solid Waste Plan - PERS/MA	The plan provides for the inclusion of waste picker cooperatives in the recycling chain and encourages the formalization of associations, in addition to promoting training for workers involved in the collection and separation of recyclable waste.	Decree No. 38,388, of June 28, 2023
Project "Recicla, Siô"	Generating income for waste picker cooperative workers of recyclable materials, in addition to preserving the environment and transforming the "Greatest São João in the World" into a cleaner and more sustainable event.	SEMA, 2023
<b>MUNICIPAL SECRETARIATS OF THE ENVIRONMENT – ESTREITO, CAROLINA, AND RIACHÃO</b>		
Municipal Integrated Solid Waste Management Plan	Development of activities and actions that promote the inclusion and support of recyclable material waste pickers present in the municipality.	Municipal Report of Riachão, 2020
Actions focused on sustainability and waste management	The initiative was conducted with the objective of encouraging recycling and promoting decent work for the waste pickers, in line with environmental sustainability principles.	Municipal Government of Estreito (MA), 2021
Environmental Compensation	Installation of recycling infrastructure at the municipality's-controlled landfill, in addition to the delivery of a waste compactor truck to the city hall.	Municipal Government of Carolina (MA), 2021

Note: Plans, programs, projects and/or actions that regulate, foster or incentivize the work of recyclable material waste pickers.



However, according to the waste pickers, there is no association or cooperative in the municipalities of Carolina, Estreito, and Riachão. Furthermore, the pickers reported that there is no form of registration by the city halls, nor have they received training, aid, or financial support from the municipal, state, or federal governments.

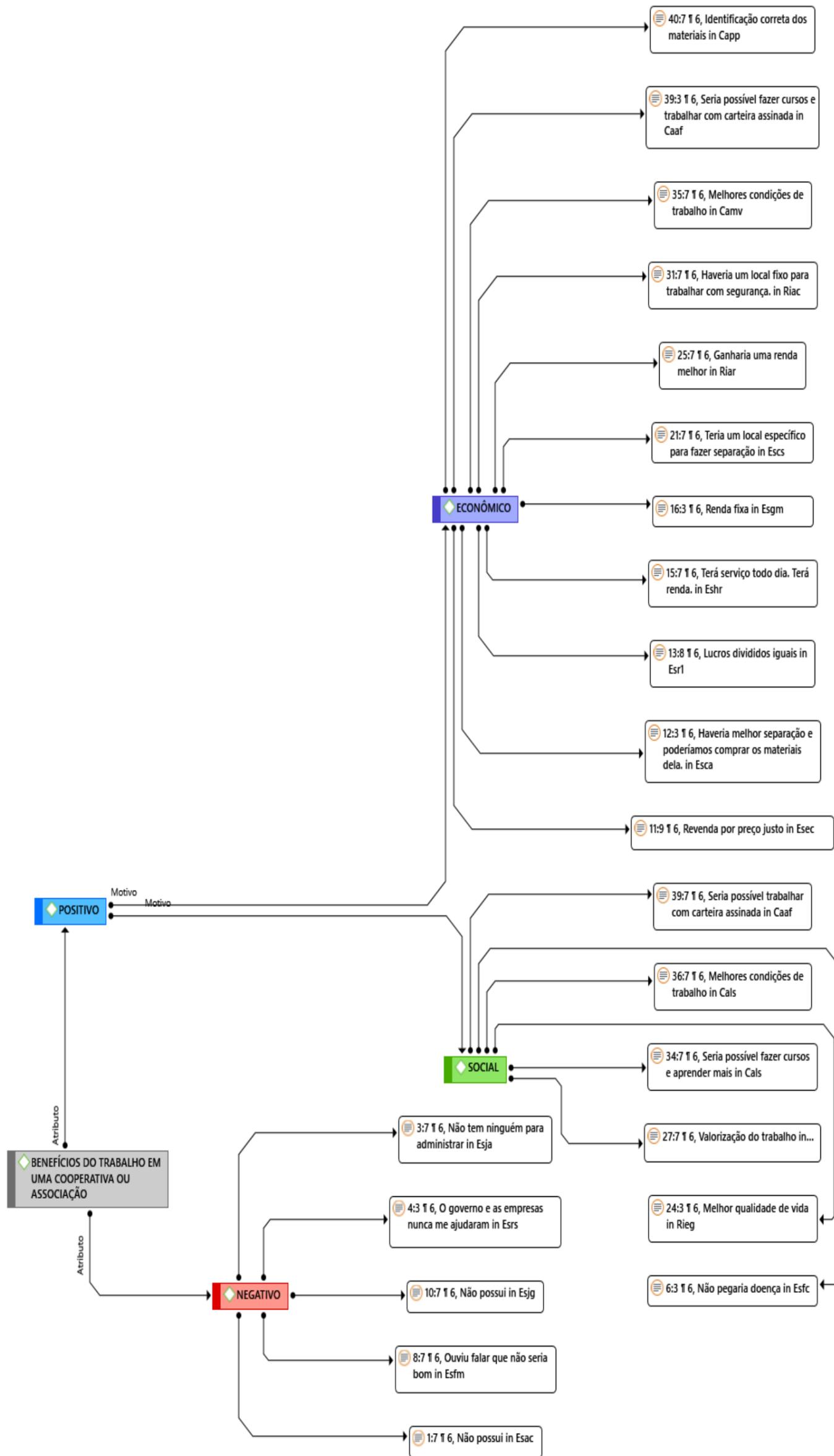
In this sense, it is considered that the non-existence of associations or cooperatives and the absence of institutional support limit the dimensions of collective organization and social dialogue—central components of Decent Work—given that the individualized performance of the waste pickers reduces their access to rights, public policies, and negotiation mechanisms, weakening their capacity for decent and sustainable insertion into the labor market, as per the principles of SDG 8.

When questioned about the benefits of working in a cooperative or association, it was possible to identify both negative and positive aspects. The positive aspects were divided into social and economic, based on the dimensions of sustainable development (Figure 2).



Figure 2

Perceptions of the Benefits of Work in a Cooperative or Association





In general, waste pickers perceive the creation of associations or cooperatives as an opportunity to improve their professional and personal conditions. They believe that, through these organizations, they would have access to training courses and programs, which would allow for the improvement of their skills and, consequently, the execution of more qualified work. Furthermore, the structuring of a fair division of profits and the offer of a fixed income would represent greater financial security, reducing the economic uncertainties that characterize their performance.

## 5 Discussion

Despite the existence of public policies aimed at the inclusion and valuation of recyclable and reusable material waste pickers, these initiatives reveal an attempt—albeit an unequal one—to institutionalize their role in solid waste management. At the federal level, programs such as Pró-Catador, the Zero Dump Program (Programa Lixão Zero), and CATAFORTE III, in addition to legal instruments like the National Solid Waste Policy (PNRS) and the National Decent Work Plan, demonstrate efforts to integrate waste pickers into formal collection and sorting systems, promoting training, infrastructure, and productive inclusion.

In Maranhão, the State Solid Waste Plan (PERS/MA), as well as actions by the Maranhão State Secretariat of the Environment—with the *Recicla, Siô* Project and reverse logistics partnerships—also aim to strengthen cooperatives and promote the formalization of the activity. At the municipal level, in the cities of Estreito, Carolina, and Riachão, specific actions are implemented, such as the installation of recycling infrastructure in the waste disposal area of Carolina, the delivery of compactor trucks in the municipality of Estreito, and integrated solid waste management plans in Riachão.

The results of this study dialogue with literature that understands cooperativism and the solidarity economy as central strategies for productive inclusion in the recycling sector, especially in contexts marked by informality and socioeconomic inequalities. International and Latin American evidence indicates that the collective organization of waste pickers, through cooperatives or associations, expands access to resources, infrastructure, institutional recognition, and social rights, in addition to strengthening their insertion into the formal chains of the circular economy (Zisopoulos et al., 2023; Ospina et al., 2025).

However, the literature also emphasizes that the existence of legal frameworks or inclusion programs, in itself, does not ensure their local effectiveness, with fragmented institutional arrangements, insufficient investments, and processes of social stigmatization that hinder the consolidation of these organizations being recurrent (Velis, 2017).

In this context, although the circular economy has advanced as a normative and academic



agenda in Latin America, its implementation remains concentrated on the technical dimension of waste management, with less attention to territorial dynamics and the mechanisms for the social inclusion of waste pickers (Ospina et al., 2025). The findings of this study reinforce that the precariousness observed does not stem solely from individual informality, but from an implementation gap, in which the universalist design of solidarity economy and productive inclusion policies do not materialize equitably in the analyzed territories.

Despite the efforts identified across different government spheres, the results evidence a persistent scenario of labor precariousness among autonomous waste pickers in the studied municipalities, in contrast to the principles of SDG 8—especially target 8.3, which advocates for supporting productive activities, generating decent jobs, and encouraging formalization. Although public initiatives aimed at this category exist, the findings demonstrate that these workers remain exposed to informality, low remuneration, insufficient personal protective equipment, and the absence of continuous institutional support.

The informal recycling sector, especially in countries of the Global South, contributes effectively to waste recovery and the mitigation of the environmental impacts of the linear disposal system, although it faces structural obstacles to its full integration into the circular economy (Zisopoulos et al., 2023). Velis (2017) complements this analysis by pointing out that, in developing countries, the actions of waste pickers are the primary means of recovering dry recyclable waste, driven both by economic necessity and by the accessibility of materials and the absence of structured public policies.

In the Xique-Xique dump in Bahia, Santos and Castro (2024) identified 56 waste pickers with a socioeconomic profile marked by low education, low income, and the absence of labor protection, elements equally observed among the Maranhão waste pickers analyzed in this research. Similarly, Gallego et al. (2023), when studying the Colombian context, identified multiple profiles of waste pickers operating informally and with low remuneration, which reinforces that localized samples, such as the 42 waste pickers in the municipalities sampled in this study, are representative of a reality shared in different regions of South America.

Regarding Personal Protective Equipment (PPE), obtaining it through donations or searching at the collection sites themselves highlights the precariousness of working conditions, as well as the negligence concerning the health and safety of waste pickers. Although some workers report the use of helmets, gloves, masks, and boots, these items are not provided in a systematic manner, exposing them to various risks such as cuts, punctures, biological and chemical contamination, musculoskeletal pain, and respiratory problems (Vasconcelos et al., 2018; Santos & Castro, 2024). Velis (2017) reinforces that the absence of technical and logistical

support from the State aggravates this vulnerability, limiting the effectiveness of informal collection, even though it is crucial for urban solid waste management systems. Such elements configure an unhealthy and unsafe work environment, in disagreement with the minimum parameters established by the ILO.

The reports from waste pickers about recurring physical symptoms such as physical and mental exhaustion, headaches, back, arm, and leg pain, in addition to accidents such as cuts, scratches, falls, and being run over by compactor trucks, evidence the unsafe and unhealthy conditions in which they perform their activities. These findings are corroborated by Junior et al. (2013), who highlight the absence of adequate structure and the lack of PPE as factors that aggravate conditions of chronic fatigue, musculoskeletal pain, and vulnerability to accidents, compromising both the physical and mental health of these workers.

The long daily working hours observed in this study ranged between 1 and 12 hours, focused on collecting waste with commercial value such as copper (21%), plastic (19%), aluminum (18%), iron, and cardboard (21%). This evidences a subsistence model sustained by the commercialization of recyclable materials, without minimum guarantees of social or occupational protection. Zisopoulos et al. (2023) highlight that even though they are essential to the circular economy, waste pickers operate under precarious conditions, which limits their full contribution to urban waste management systems.

The average daily income of R\$ 50.00 reported by the waste pickers confirms the economic precariousness of the activity, placing them below the minimum wage and the average income of other workers. Despite the intense workday, this remuneration reflects a reality of extreme vulnerability. Wittmer (2020) observes a similar situation among female waste pickers in Ahmedabad, India, who balance collection with domestic tasks without institutional support in contexts of social exclusion. Mendes et al. (2023) reinforce that factors such as low schooling, advanced age, and lack of opportunities in the formal labor market perpetuate informality, keeping these workers in a cycle of poverty and social invisibility.

Thus, the implementation of SDG 8, especially regarding the promotion of decent work, does not yet effectively include recyclable material waste pickers in the analyzed municipalities. The observed socioeconomic conditions—marked by informality, low income, exhaustive workdays, and an absence of social and sanitary protection, in addition to the lack of personal protective equipment—reveal a scenario of exclusion that persists on the margins of public policies oriented toward sustainable development and dignity at work. Although there are initiatives at the federal, state, and municipal levels aimed at valuing these workers, their concrete effects are still limited and disconnected from the realities lived in the territories.



## 6 Final Considerations

This study evidenced that, although recyclable and reusable material waste pickers play a central role in the recycling chain and in promoting sustainability, their social, economic, and labor conditions in southern Maranhão remain distant from the parameters of Decent Work, as advocated by the International Labour Organization and SDG 8. The findings indicate low income, long workdays, informality and fragile bonds, limited access to social protection, and exposure to occupational risks. This body of evidence shows that the activity tends to be configured as a subsistence strategy, rather than as productive, formalized, and protected employment, contradicting Target 8.3, which calls for support for formalization and the generation of decent work.

In answering the question “Decent work for whom?”, the results suggest that, in the analyzed context, SDG 8 is not realized in a universal manner. For the autonomous waste pickers in the surveyed cities, precarities historically associated with the category persist, such as economic instability, low social valuation, and remaining on the margins of institutional protection. This reinforces the need to recognize them not only for their socio-environmental contribution but also as subjects of rights, with access to formalization, social protection, fair remuneration, and safe working conditions.

From a scientific point of view, it is recognized that the heterogeneity among Maranhão municipalities, in both socioeconomic aspects and waste management structure, may limit the generalization of the findings, recommending caution in extrapolating the results. From the perspective of practical implications, the results point to the importance of continuous and territorially adjusted public policies that strengthen the structuring of waste pickers' work. Among the priority measures, the following stand out: investment in infrastructure, such as sorting centers; regular provision of PPE; training actions and effective integration into reverse logistics arrangements; public procurement and contracting mechanisms capable of reducing dependence on middlemen and contributing to greater economic stability.

As a future research agenda, it is recommended to expand the number of investigated municipalities, including urban and rural contexts, and to adopt more comprehensive indicators of the dimensions of decent work. This would serve to deepen comparative analyses, understand regional dynamics, and subsidize more equitable policies aligned with the fulfillment of SDG 8.

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