

# SELECTIVE WASTE COLLECTION IN THE SÃO PAULO METROPOLITAN REGION: IMPACTS OF THE NATIONAL SOLID WASTE POLICY

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## Introduction

Selective collection of recyclable waste and recycling are activities that help urban sustainability and enhance environmental and human health. While urban solid waste collection is a public service in Brazil, introduced as part of managing urban solid waste, and a duty of municipalities, as established by the Federal Constitution, recycling is an industrial activity that concerns the private sector. However, both activities are interdependent and complementary and make urban sustainability possible by advocating more rational use of natural resources and inputs such as water and electricity, as well as significantly reducing the final disposal of solid waste in the ground and, consequently, emissions of greenhouse gases (ADEDIPE, 2005; IPCC, 2007).

The adoption of Brazil's National Solid Waste Policy (PNRS), Federal Law 12.305/2010 (BRAZIL 2010a), set up a legal regulatory framework for the integrated and sustainable management of solid waste nationwide and presented new challenges in terms of setting up and improving selective waste collection in Brazilian municipalities.

The preliminary version of the National Solid Waste Plan (BRAZIL, 2011), as yet unapproved, provides an estimated daily collection of 183,481.50 tons of urban solid waste nationwide. Dry waste makes up 31.9% or 58,527.40 tons/day of this total, which can be collected selectively. The Plan sets out staggered national and regional targets to reduce final disposal of solid recyclable waste in landfill sites. The national targets are for a gradual reduction of 22% (2015), 28% (2019), 34% (2023), 40% (2027) and 45% in 2031. Achieving the targets is mainly related to the success of the municipalities in

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setting up selective waste and reverse logistics systems, as instituted in the PNRS and the sectoral agreements yet to be signed.

In Brazil, the selective waste collection service is operated by the municipalities themselves through outsourcing or in partnership with waste pickers organized in working associations/cooperatives, who as yet are only involved to a small extent in terms of the total waste recovered (IPEA, 2010; BRAZIL, 2013).

Brazil's Solid Waste Policy advocates fostering and reinforcing selective waste collection with the involvement of organized waste pickers providing the service. Although management of urban solid waste is a municipal responsibility, the PNRS creates mechanisms to allow for the introduction of this selective waste collection model by making resources available to municipalities who draft their Integrated Waste Management Plans in accordance with this policy. In 2008, the National Basic Sanitation Survey showed there were 994 municipalities (18% of the country's municipalities) offering selective waste collection, the majority of them (65.7%) with organized waste pickers (IBGE, 2010).

In turn, the National Solid Waste Plan suggests a target of involving 600,000 waste pickers - 280,000 by 2015 - through the Brazil without Poverty Plan. However, it is the responsibility of the Municipal or Regional Integrated Solid Waste Management Plans to define how they will achieve this inclusion in their respective areas.

The social inclusion of waste pickers of recyclable materials in Brazil is characterized by the implementation of public policies which, through economic solidarity and self-organization, promote the establishment of waste pickers' associations/cooperatives and their involvement in municipal selective waste collection (SINGER, 2002; PACHECO and RIBEIRO, 2009).

Despite significant progress in involving waste pickers in selective waste collection in Brazil over the last 20 years, challenges still remain in terms of consolidating this as a sustainable model for solid waste management.

A number of studies and research projects, both at the academic level (BESEN et al. 2007; RIBEIRO et al., 2009; DIAS, 2009; JACOBI and BESEN, 2011; CAMPOS, 2013) and technical level (DAMASIO, 2010; IPEA, 2012), have highlighted the difficulties that municipalities and organizations of waste pickers face in providing municipalities with a selective waste collection service at a level of remuneration which is fair for the service supplied. They stress, among other issues: the prevalence of informal relationships between the public authorities and the waste picker organizations, the failure of municipalities to charge citizens for the service provided, the lack of payment to waste picker organizations for the selective waste collection services provided and, moreover, the municipalities' failure to charge manufacturers and importers of products and packaging for the reverse logistics services provided through selective waste collection (JACOBI and BESEN, 2011; ABRAMOVAY, 2013).

The Solid Waste Management Diagnostic Tool of the National Sanitation Information System (SNIS) is an annual survey which produces a snapshot and allows us to monitor the development of selective waste in Brazil. The number of participating municipalities has increased over the years and in 2011 the sample corresponded to 119 million urban inhabitants (77% of the country). Of 2,051 municipalities that responded

to the survey (38% of the country), 840 stated that they had a selective waste collection service (41%). However, they did not provide information on the coverage, so this figure might only cover collections in schools, pilot projects in some neighbourhoods or 100% of the urban area.

The SNIS has made data available that can be fed into important indicators to analyze and assess selective waste collection in Brazil. Nevertheless, in order to provide a more in-depth assessment, there are other indicators that the SNIS does not include, which are fundamental, such as: selective waste coverage, number of waste pickers' organizations and members, and the existence of a legal working relationship between the municipalities and the waste pickers' organizations.

Focussing on indicators and an evaluation over time, this article presents the results of research carried out in the São Paulo Metropolitan Region between 2004 and 2013, enabling an understanding of the selective waste collection situation and an analysis of the possible impacts of the National Solid Waste Policy.

## Solid waste management - conceptual framework

Global concerns about solid waste have heightened due to increased production, to the dangers associated with certain waste and to the lack of appropriate areas for final disposal thereof. The topic has emerged as a priority at the global level since the United Nations Conference on Environment and Development (RIO 92), both in developed and developing countries. From 2007, after the Intergovernmental Panel on Climate Change (IPCC) report, new factors related to solid waste management and its impacts, such as the emission of methane gas in dumps and landfills and floods, due to improper management, have broadened the agenda of governments and society (IPCC, 2007; NOBRE, 2010).

National and international literature points to the progress made over recent decades concerning the concepts of integrated solid waste management and, in particular, the number of studies that encompass the informal sector and its involvement in selective waste collection.

The concept behind integrated and sustainable waste management implies a hierarchy of objectives, which include: minimization of waste creation; reduction of the negative impacts of waste, maximizing reuse, recycling and composting; energy recovery; promotion of environmentally-safe treatment and final disposal (KLUNDERT et al., 2001; ADEDIPE et al., 2005; IPCC, 2007).

Brazil's 2010 Solid Waste Policy saw the adoption of the definition of integrated solid waste management as a series of actions orientated towards finding solutions for solid waste, encompassing political, economic, environmental, cultural and social dimensions, with social control and under the premise of sustainable development (BRAZIL, 2010a).

The term "integrated and sustainable management of solid waste" was coined as a concept in the 1990s and heralded progress by recognizing three dimensions in planning a solid waste management system: "the stakeholders involved and affected by waste management; the practical and technical elements of the systems and the sustainability-related aspects of the local context" (DIAS 2009, p.52). The author also believes that

at this point in time, the topic of informal workers and, in the case of Brazil, of waste pickers of recyclable materials has gained international visibility.

Integrated, sustainable and participative management is an interdisciplinary concept which is still being developed and can be understood in a number of ways. The interpretation of GÜNTHER and GRIMBERG (2006) focuses on three related levels: 1) the stages of the operation: creation, packaging, collection, transport, treatment, reuse of recyclable goods and biomass, and final disposal with energy recovery; 2) the public administration's search for an intersectoral approach, linking the different areas of government involved with the topic of solid waste at the various levels of government; and 3) the involvement of multiple social stakeholders in coordinated actions by public authorities in the quest for joined-up activities involving government, the private sector and society.

One of the significant changes that has taken place in the solid waste sector in Brazil and in some developing countries is greater integration among the formal and informal sectors linked to the waste chain. The collection of recyclable waste carried out in a disorganized way on city streets has been put on the agenda of governments. Municipal governments in developing countries have invested in selective waste collection systems in partnership with waste pickers' organizations, in accordance with models developed based on their different local contexts (MEDINA, 2007; RIBEIRO et al., 2009; SHEINBERG et al., 2012; VAN ZEELAND; 2013). The strategies include the legalisation of waste pickers' activities, incentivizing the formation of cooperatives, contracts for collection and recycling activities, in addition to public-private partnerships between local government and waste pickers' organizations.

The research literature on the topic of urban solid waste management has developed from two analytical focal points: the first regards reforms of the public sector, including privatization processes (RONDINELLI and IACONO, 1996; SAMSON, 2007), and the second is related to the issue of sustainability in an urban context, which also includes questions of health and human well-being (LARDINOIS and KLUNDERT, 1999; ADEDIPE et al., 2005). The first focal point stresses the role of the market, the impact of structural adjustments in reducing the size of the State, the privatization of public services and the management of services. Privatization implies a public-private arrangement where the government maintains a certain degree of power, cuts costs and political interference and favours big contracts for which the informal system is not suited (DORVIL, 2007). The second focal point highlights the relationship between sustainability and development, and represents a relevant source of arguments to analyze solid waste management systems in developing countries. This was reinforced after the Rio-92 Conference and is the result of an agenda with a predominantly urban focus (SCHUBELER, 1996; BAUD and POST, 2003). It is a conceptual framework where improvements in the natural environment are taken into consideration together with improvements to the quality of life in cities. Studies address the role of different stakeholders in improving the quality of life in the urban environment and focus on reducing waste flows through preventing waste creation, reuse and recycling (GRAFAKOS et al., 2001; BAUD and POST, 2003).

Over the last decade an increase in the amount of academic research into waste pickers of recyclable materials in Brazil and other countries can be observed. Special-

lists in the area and different networks have been trying to marry empirical studies and/or activists' experiences to a theoretical framework and contribute to the field of academic study (SAMSON, 2009; DIAS, 2009; VELIS et al., 2012; SCHEINBERG et al., 2012).

Of note in Brazil are the studies that analyze the socio-economic and environmental impacts of waste pickers' work in the recycling chain and in the provision of environmental services (DAMASIO, 2010; IPEA, 2011), the working conditions of waste pickers (RIBEIRO et al., 2009; CAMPOS, 2013) and also in the development of indicators and indexes of management and sustainability, selective waste collection and management of waste pickers' organizations (BRINGUENTI et al., 2011; BESEN, 2011).

### **Selective waste collection and waste pickers of recyclable materials**

It is difficult to review the international literature on the relationship between selective waste collection and waste pickers of recyclable materials due to the range of interpretations on what constitutes the informal solid waste sector in different countries (MEDINA, 2007; SAMSON, 2009; DIAS, 2009; SCHEINBERG, 2012).

Whereas in Brazil, from the 1990s onwards, the emphasis of the informal sector in solid waste has been on integrating waste pickers of recyclable materials in selective waste collection, in Asia and Africa there are more stakeholders involved, including waste pickers and small scrap yards (DIAS, 2009; SCHEINBERG, 2012). At the international level, initiatives to include waste pickers in the solid waste management system and in particular in selective waste collection are few and far between. Brazil is the country with the highest figures, where over 1000 ventures of this nature have been conducted amongst Brazil's 5,500 municipalities (BRAZIL, 2011).

Scheinberg (2012) defined three "emerging models of inclusive recycling" in low and medium income countries. In the first, informal waste pickers are paid and are part of the solid waste management system. The second model is the commodities model, where stakeholders in the value chain collect materials, recycle them and keep the revenue. For the author, medium income countries like India and Brazil, and large Latin American cities, like Lima and Bogotá, have experimented with this model. For instance, Quezon City in the Philippines, which allows private scrap yards to act as reception points for recyclable materials, as one of their responsibilities determined by the administrative authorities. The third are "hybrid models" in which the municipality and the "collectors" share responsibilities, benefits and profits from recycling and solid waste management.

In Brazil, municipalities have been using selective waste collection since the 1990s as part of integrated solid waste management. These initiatives are put into practice by the local authorities themselves, contracted companies or waste pickers' organizations and have been the subject of a number of studies over the last 10 years, including academic studies (JACOBI, 2006; DIAS, 2009; RIBEIRO et al., 2009; JACOBI and BESEN, 2011; BRINGUENTI et al., 2011; BESEN, 2011; CAMPOS, 2013) and studies by the public sector (BRAZIL 2011; IPEA, 2010, 2013)) and non-governmental organizations (GÜNTHER and GRIMBERG, 2006; FUNDAÇÃO AVINA, 2011).

Selective waste collection with the participation of waste pickers in Brazil has been labelled in a number of ways over the years: joint-responsibility selective waste collection, socially inclusive selective waste collection and also sustainable selective waste collection. This form of selective waste collection that includes organized waste pickers breaks with the traditional logic of privatizing services, insofar as it gradually incorporates social inclusion and generates income for the most deprived sectors and those excluded from accessing formal labour markets (SINGER, 2002; RODRIGUEZ, 2005).

In Brazil, selective waste collection including organized waste pickers has become a public policy and was initially incorporated in 2007 in the National Basic Sanitation Policy (Federal Law No 11.445) and was subsequently definitively established in the National Solid Waste Policy (Federal Law No 12.305). Local authorities did not have legal instruments that allowed them to hire waste pickers' organizations to provide a selective waste collection service without tendering, and the organizations, for their part, did not meet the legal requirements of the contracting process. Once the National Basic Sanitation Policy was enacted, it provided the option of waiving the tendering process pursuant to Art. 24, XXVII, of Law No 8.666, of 21<sup>st</sup> June 1993, in order to hire cooperatives or associations of waste pickers.

This model, which has been developed over the last two decades, has become widespread and is a benchmark for other countries, particularly due to the increased levels of economic investment and the legislation adopted by the federal government from 2007 (RIBEIRO et al., 2009).

The profession of waste picker of recyclable materials has been recognized since 2002 by the Ministry of Labour and Employment and features in the Brazilian Classification of Occupations (CBO) under the unique code 5192. Waste pickers are defined as people who collect, sort and sell recyclable materials. These professionals are organized independently or in cooperatives/associations with their own boards and management.

In 2010, the estimated number of waste pickers of recyclable materials surpassed the 500,000 mark nationwide (BRAZIL 2011). Of this total, between 40,000 and 60,000 waste pickers belonged to more than 1,000 organizations (cooperatives and associations) operating throughout the country, which means that only 10% of all waste pickers are working as part of an organization. To make matters worse, 27% of municipalities stated that they were aware of waste pickers operating in dumps and landfill sites, picking through waste under precarious conditions (IBGE, 2010).

A study by the Institute for Applied Economic Research - IPEA (2013), based on data from the 2010 Population Census, enabled a profile to be drawn up of waste pickers in Brazil. The nationwide study indicated that 387,910 people stated they were waste pickers. Of these, 161,417 were located in the South-Eastern Region (41.6%) and 79,770 in the State of São Paulo (20% of the national total). The average age of these waste pickers was 39.4. They were predominantly male, with 68.9% men and 31.1% women. 66.1% of workers were black. The average income earned by workers in the sector was U\$ 335,00, whereas the minimum wage applicable at the time was U\$ 300,00. The illiteracy rate in Brazil at that point was 9.4% and, among waste pickers was 20.5%, which shows the need for educational and literacy programmes to support them in taking ownership of social entrepreneurship in the field of waste and selective waste collection.



Supported by affirmative policies at the federal level, the municipalities and waste pickers' organizations have received non-repayable funding from several Ministries, the Banco do Brasil, the Brazilian Economic and Social Development Bank (BNDES) and Petrobrás, as well as from international projects. The resources have been channelled into the construction of sorting centres, purchasing of equipment, training and empowerment courses, improvements in sanitary and working conditions in sorting centres and strengthening marketing networks among organizations. In return, the municipalities have made public areas available or have rented commercial spaces for sorting centres to be set up, provided collection trucks and paid water and electricity bills for the sorting centres (RIBEIRO et al., 2009; CAMPOS, 2013).

These policies also seek to support the inclusion of waste pickers who work on the streets in precarious health and safety conditions in organizations, through strengthening the National Waste Pickers' Movement (MNCR), which since 2002 has brought together organized waste pickers and freelance waste pickers in Brazil. It also takes part politically in the leadership of national and international networks of waste pickers (MEDINA, 2007; SAMSON, 2009; SAIANI et al., 2014).

At the municipal level, payment for the provision of a selective waste collection service by waste pickers' organizations is still in its infancy, both from public authorities and from industry in the reverse logistics field. The National Waste Pickers' Movement lists only six such schemes on its website (MNCR, 2013).

Although selective waste collection and recycling significantly reduce greenhouse gas emissions in comparison to the incineration and burying of waste, according to CRUZ e PAULINO (2013) no waste pickers' cooperatives receive funding in Brazil from the Clean Development Mechanism (CDM). There are initiatives such as the government of Minas Gerais which created the Recycling Exchange Programme and another by the National Waste Pickers' Movement that creates reverse logistics credits by which companies issue certificates for the packaging they place on the market and make a commitment to reverse logistics. When waste pickers' organizations sell on the materials, they issue certificates that can be purchased by the companies (ABRAMOVAY et al., 2013).

At federal level, negotiations between the government and the private sector on a sectoral agreement to govern the reverse logistics for packaging have to date not yielded a model that covers an across-the-board, wider-ranging selective waste collection service by municipalities, which includes all waste pickers (ABRAMOVAY, 2013; MNCR, 2013; SAIANI et al., 2014).

## Method

The study covered the 39 municipalities that make up the São Paulo Metropolitan Region. A comparative analysis was carried out of the selective waste collection service in all the municipalities so as to understand how it has developed and to check possible impacts after the National Solid Waste Policy, from 2010 on.

The primary data on selective waste collection service provision were obtained at three different periods, in 2004 (BRAZIL, 2010b), 2010 (BESEN, 2011) and 2013

funded by the Ministry of Health- Nacional Health Fundation (2013-2015). The same structured questionnaire was used in interviews with the public managers responsible for selective waste collection in all of the municipalities from March-April of the respective years. The following data were collected: the existence of selective waste collection and the start year, the existence of partnerships with waste pickers' organizations, modality (cooperative or association), number of members, existence of a legal partnership instrument, payment for the service, territorial coverage of the collection and the average annual amount collected.

## Evolution of selective waste collection in the São Paulo Metropolitan Region

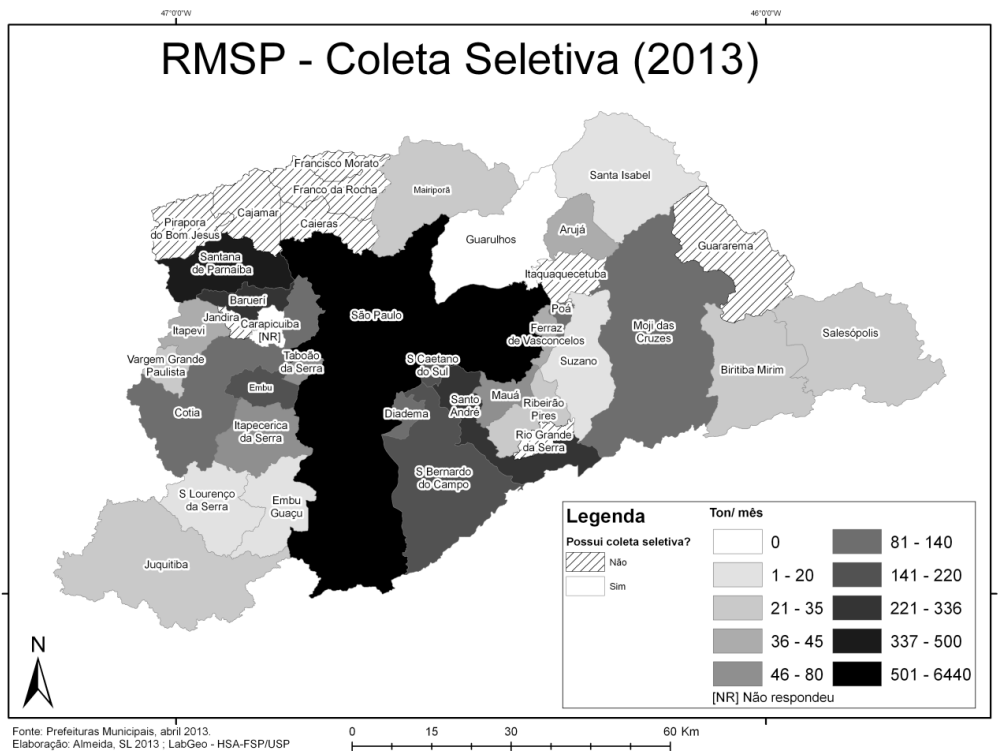
The São Paulo Metropolitan Region (RMSP), with its 39 municipalities and more than 20 million inhabitants, is the biggest urban agglomeration in Brazil and one of the biggest in the world.

According to the National Basic Sanitation Survey (PNSB), in 2008, the State of SP collected 37,839 t/day of urban solid waste, equivalent to 20.6% of the total collected in Brazil (IBGE, 2010). In 2013, it is estimated that more than 21,000 tons a day of urban solid waste were collected in the metropolitan region of São Paulo (RMSP), of which 60.9% was in the municipality of São Paulo (CETESB, 2013).

Figure 1 illustrates the selective waste collection situation in the municipalities of the São Paulo Metropolitan Region in 2013, referring to the municipalities which have set up such a service and to the bands of quantities collected. The majority of the São Paulo Metropolitan Region's 39 municipalities surveyed in 2013 provided a selective waste collection service. As a whole 30 municipalities (77.0%) provided the service and nine (23.0%) did not. Of the 30 municipalities that provided the service, 28 (93.3%) did so in partnership with waste pickers' organizations (associations and cooperatives). One of the municipalities had a selective waste collection service carried out by the local authority but intended to change the system in the first half of 2013 so as to include waste pickers. Just one municipality had a selective waste collection service and gave the recyclable materials to a cooperative located in another municipality. Of the nine municipalities that did not provide a selective waste collection service, four (44.4%) stated that they intended to set one up in partnership with waste pickers, three (33.4%) stated that they were awaiting the results of the Integrated Waste Management Plan being drafted, as this document will define the selective waste collection model to be set up, and two (22.2%) did not respond. The amount of recyclable materials collected totalled 9,473.5 tons per month, with 6,440 tons/month (68.0%) in São Paulo municipality and 3,032.5 tons/month (32.0%) in the remaining 29 municipalities of the RMSP that have a selective waste collection service. Bearing in mind the estimated quantity of 21,000 tons/day of urban solid waste collected in the RMSP in 2012 (CETESB, 2013), the formal selective waste collection programmes only manage to steer 3.8% of this figure away from disposal in landfills. In the São Paulo municipality, which generates 12,800 tons/day, only 1.7% was sent to sorting centres.



Figure 1: Selective waste collection in the São Paulo Metropolitan Region in 2013.



(Legend: RMSP Selective waste collection (2013) Do you have selective waste collection?  
Hatched box=no Blank=yes  
Tons/month [NR] No response)

The results of the research undertaken show that the percentage of municipalities with a selective waste collection service in the RMSP has increased from 59% in 2004 to 77% in 2013 (Table 1).

**Table 1: Variation in the municipalities with selective waste collection services, with and without partnerships with waste pickers' organizations, in the RMSP in 2004, 2010 and 2013**

<b>39 municipalities - RMSP</b>				
<b>Year</b>	<b>Selective waste collection</b>		<b>Selective waste collection with waste pickers' organizations</b>	
	<b>Municipalities</b>	<b>%</b>	<b>Municipalities</b>	<b>%</b>
<b>2004</b>	23	59.0	19	82.6
<b>2010</b>	29	74.4	28	96.5
<b>2013</b>	30	76.9	28	93.3

Source: Data provided by the municipal authorities and systematized by the authors

It can be seen in Table 1 that selective waste collection has been undertaken in most of the RMSP municipalities since 2004 in partnership with waste pickers' organizations. The 2010 data, which correspond to the period before the PNRS, show that 29 municipalities (74.4%) operated a selective waste collection service, where 28 (96.5%) do so in partnership with waste pickers' organizations. It can be seen that after the PNRS there was little significant variation (2.5%) in relation to the number of municipalities that had set up selective waste collection services. As regards those doing so in partnership with waste pickers' organizations, there was no variation.

The results show that even without a legal framework for solid waste management in Brazil over the period 2004 to 2010, many municipalities set up a selective waste collection service in the RMSP. Since 2003, the federal government has been investing resources to promote the inclusion of waste pickers, in addition to the support they receive from private initiatives and from social organizations (DIAS, 2009; BESEN, 2011; CAMPOS, 2013). Also of note is the State of São Paulo's Solid Waste Policy, State Law No 12.300/2006, regulated by State Decree No 54.645/2009, which inspired the federal legislation in its adoption of the shared responsibility model for waste management. The State policy also allows for the social inclusion of waste pickers' organizations in selective waste collection, economic instruments to extend recycling and it has contributed towards the progress of this selective waste collection modality in the RMSP. The 2007 National Sanitation Policy may also have influenced extended selective waste collection in the RMSP since its inception, due to the requirement for Municipal Sanitation Plans in which the management of urban solid waste features as one of the priority activities. Although not all Brazilian municipalities complied with the deadline to present plans and some did not include urban solid waste management in their plans, there was progress

principally in the situational stocktaking of municipalities that met the objective and in the search for environmentally appropriate end solutions. It is through this requirement for the municipal sanitation plans that many municipalities become aware of the situation regarding the management of their urban solid waste and undertook efforts to minimize and dispose of it in the most appropriate manner whilst reducing the environmental impacts and effects on the population's health.

As regards the coverage afforded by the selective waste collection service in the municipalities' urban area, there is no information in the government surveys (SNIS, 2012; PNSB, 2012) as regards coverage by this service. In this research, the criterion used to assess the coverage of the selective waste collection service in urban areas defined four categories: 1) high - more than 70.0%, 2) medium - between 51.0 to 69.9%, 3) low - between 25.0 and 49.9%, and 4) pilot project - less than 25.0%.

In 2013, we were able to analyze the coverage in the 30 municipalities with a selective waste collection service and observed that 23.3% of the municipalities had a high level of coverage; 16.7% medium; 20.0% low and 40.0% had only pilot projects. In other words, in the majority of municipalities (60%), less than 50% of the urban population is served by a selective waste collection service. When comparing variation in coverage between 2010 and 2013, by number of municipalities, a drop in municipalities with a high level of coverage and an increase in those with a medium level is observed. There is also an increase in the number of municipalities with pilot projects only.

Considering that one of the targets of the PNRS is the universal roll-out of selective waste collection, a backwards movement has occurred since it came into force as only a few municipalities are providing their citizens with a high level of coverage. There has been a reduction in the service's coverage in six municipalities; and after three years, seven are still at the level of pilot projects.

As regards the collected quantities declared by the local authorities, which is an important indicator of selective waste collection, of the 15 municipalities that provided quantitative data on their management between 2004 and 2013, it can be seen that levels are up in practically all municipalities (Table 2). Before the implementation of the PNRS, the local authorities performed positively, with just one municipality showing a fall. After the PNRS was instituted, in the 2010 to 2013 period, however contradictory it may appear, the following can be seen as regards the quantity of recyclables from selective waste collection: 1) reduction (four municipalities); 2) the same level (one municipality); 3) increase under 100% (5 municipalities); and 4) increase of 100% or above (five municipalities).

**Table 2: Quantity of recyclables from selective waste collection and variation by period in RMSP municipalities**

Municipalities	Average monthly collected quantity * ( tons)			Variation by period (%)		
	2004	2010	2013	2004 to 2013	2004 to 2010	2010 to 2013
Barueri	100	240	300	200	140	25
Biritiba Mirim	1	24	27	2600	2300	13
Diadema	35	120	100	276	243	-17
Embu	51	110	220	331	116	100
Itapeperica da Serra	50	70	80	60	40	14
Mauá	17	40	60	264	142	50
Osasco	13	120	120	823	823	-
Poá	25	47	110	340	88	134
Ribeirão Pires	5	37	35	600	640	-4
Santana de Parnaíba	80	300	500	525	275	67
Santo André	419	630	336	-20	50	-47
São Bernardo do Campo	100	364	197	97	264	-46
São Paulo	977	3135	6440	559	221	105
Suzano	10	10	20	100	0	100
Vargem Gde. Paulista	13	2	30	140	-84	1400
<b>Total</b>	<b>1.938</b>	<b>5.249</b>	<b>8.575</b>	<b>343</b>	<b>171</b>	<b>63</b>

\* The monthly recyclable material quantities provided refer to the annual average.

Source: Data provided by the municipal authorities and systematized by the authors

As regards the waste pickers' organizations, the quantitative variation of organizations and their members, the means of organization and the type of legal link with local authorities were analyzed.

Over the 2004 to 2013 period, there was a 25.6% growth in the number of organizations (Table 3). It can be seen that the number of waste pickers' organizations opting for work cooperatives grew (38.7%) and the number of associations fell (-25.0%). The municipality of São Paulo saw the greatest growth in the number of waste pickers' organizations compared to the rest of the RMSP municipalities, standing at 33.3% and 20.8% respectively. Between 2010 and 2013, the growth in the number of waste pickers' organizations was negligible in the RMSP (2.1%); the municipality of São Paulo saw slight growth (11.1%), whereas there was a 9.4% drop in the other 38 municipalities taken together as regards the number of organizations.

In terms of the number of members of the organizations, there was a 43.6% increase in the number of members over the 2004 to 2013 period, yet in the 2004 to 2010 period the increase was greater (66.8%), with a significant fall between 2010 and 2013

(-13.9%). This pattern was visible both in the municipality of São Paulo (-10.4%) and in all the other municipalities (-17.0%). One of the arguments is that the global economic crisis in 2008 and 2009 was a factor that caused an average drop of more than 50% in the resale value of materials and hundreds of waste pickers' organizations went bankrupt (IPEA, 2010; FUNDAÇÃO AVINA, 2011).

**Table 3: Modality, quantity, number of members and growth percentage for waste pickers' organizations in 2004, 2010 and 2013**

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Total	1.938	5.249	8.575	343	171	63

Source: Data provided by the municipal authorities and systematized by the authors.

An important aspect worth stressing as regards the form of the legal working relationship between the local authorities and waste pickers' organizations is that in 2013 only two of 28 municipalities paid waste pickers' organizations for the selective waste collection service provided. The most common relationship was for an agreement without any financial benefits (64%) and 29% of the municipalities had no type of legal instrument in their dealings with waste pickers' organizations. Therefore, the income of waste pickers' organizations came solely from selling recyclable waste, which makes it difficult to invest in technological improvements to the service provided, in maintaining satisfactory working conditions and in managing undertakings.

## Final considerations

According to Brazil's National Solid Waste Policy, having a universal efficient formal selective waste collection service is key to meeting the target of only disposing of unusable refuse in landfill sites from August 2014. The PNRS also prioritizes a formal selective waste collection model that includes and pays for the service of waste pickers of recyclable materials who are organized in working associations and cooperatives.

However, since the PNRS was approved, little progress has been made in providing a universal service by spreading coverage to the majority of municipalities. Most are still at the stage of pilot projects, providing low coverage. Although there has been an increase in the quantity of waste collected selectively in the periods under study, in most municipalities the amount of waste that is being diverted from landfill is still low, and far off the target of disposing only of unusable refuse in landfill sites from August 2014.

By contrast, the premise behind public policies for integrating organized waste pickers in the formal selective waste collection service has been taken on board in virtually all RMSP municipalities. This shows the ability of national and state solid waste policies to stimulate the implementation of this model. However, if on the one hand this model has become widespread, on the other hand the contracting out of services to waste pickers' organizations - one of the guidelines expressed in the National Sanitation Policy, which amended the Tendering Law and enabled this contracting process to be carried out without tender and laid down the PNRS - is still a distant reality.

The research has shown that progress has been made regarding the organization of waste pickers in working cooperatives, which is the legal format that best suits the contracting out of services by local authorities, and that there has been an increase in the number of jobs for waste pickers of recyclable materials. Nevertheless, only 7% of municipalities paid for the services provided. This can represent a risk, insofar as consolidation of the suggested selective waste collection model for the country depends on waste pickers' organizations becoming sustainable social undertakings with the technical capacity to provide the contracted services.

In summary, the federal public sanitation and solid waste policies and the state solid waste policy have galvanised the spread of the selective waste collection model involving waste pickers in the RMSP. However, most of the municipalities still face technical and economic difficulties and little priority is given in the public agenda to selective waste collection.

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# SELECTIVE WASTE COLLECTION IN THE SÃO PAULO METROPOLITAN REGION: IMPACTS OF THE NATIONAL SOLID WASTE POLICY

**Abstract:** The expansion and strengthening of the provision of services of selective collection to Brazilian municipalities by cooperatives and associations of collectors of recyclable materials, comes to meet the targets set in the National Policy of Solid Waste (NPSW). It is estimated that in the Metropolitan Region of São Paulo (MRSP), was collected in 2013, through selective collection 3.8% of the 21.000 tons of municipal solid waste. The article analyzes the impacts of NPSW on selective collection in the MRSP, from the outcomes of researches carried out in the years 2004, 2010 and 2013. Questionnaires were applied in 39 municipalities with the public managers. It was found that although the selective collection, in particular the one practiced with organizations of waste pickers, has expanded in the period 2004 to 2013, no significant advances were verified in the period 2010 to 2013, after the approval of the National Policy.

**Keywords:** Urban solid waste management; Selective collection; Waste pickers organizations; National policy of solid waste; Brazil.

**Resumo:** A ampliação e o fortalecimento da prestação de serviços de coleta seletiva pelos municípios brasileiros, com integração de catadores de materiais recicláveis, organizados em cooperativas e associações de catadores, vêm ao encontro das metas estabelecidas na Política Nacional de Resíduos Sólidos (PNRS). Estima-se que na Região Metropolitana de São Paulo (RMSP), em 2013, foram desviadas dos aterros sanitários, pela coleta seletiva formal, apenas 3,8% das 21.000 toneladas diárias de resíduos sólidos urbanos coletadas. O artigo analisa os impactos da PNRS na coleta seletiva formal da RMSP, a partir de resultados de pesquisas realizadas nos anos de 2004, 2010 e 2013. Foram entrevistados gestores públicos das 39 prefeituras. Verificou-se que embora a coleta seletiva, em especial a praticada por organizações de catadores, tenha se ampliado no período entre 2004 e 2013, não se observaram avanços significativos no período de 2010 a 2013, após a aprovação da Política Nacional de Resíduos Sólidos.

**Palavras-Chave:** Gestão de resíduos sólidos urbanos; Coleta seletiva; Organizações de catadores; Política Nacional de Resíduos Sólidos, Brasil.

**Resumen:** La ampliación y el fortalecimiento de los servicios de la recolección selectiva realizada por cooperativas de recolectores en los municipios brasileños, viene a cumplir con los objetivos establecidos por la Política Nacional de Residuos Sólidos (PNRS). Se estima

que en la región metropolitana de Sao Paulo (RMSP), en 2013, se desviaron a través de la recolección selectiva apenas 3,8% de los residuos urbanos recolectados. Este artículo analiza los efectos del PNRS sobre la recolección selectiva, a partir de los resultados de investigaciones realizadas en los años 2004, 2010 y 2013. Los cuestionarios se aplicaron en 39 municipios, junto con los administradores públicos. Se constató que, si bien la recolección selectiva de las organizaciones de recicladores ha aumentado en el período de 2004 a 2013, no hubo avances significativos en el período entre 2010 y 2013, después de la aprobación de la Política Nacional de Residuos Sólidos.

**Palabras Clave:** Gestión de residuos sólidos urbanos; Recolección selectiva; Organización de recolectores; Política nacional de residuos sólidos, Brasil.

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