

SOLID WASTE MANAGEMENT in Latin America and the Caribbean

This document is a collection of available data on solid waste management in Latin America and the Caribbean (LAC)ⁱ. The following bullet points contain a brief description of the most relevant data:

- The regional average per capita generation of Domestic Solid Waste (DSW)ⁱⁱ and Municipal Solid Waste (MSW)ⁱⁱⁱ is 0.6 kg/cap/day and 0.9 kg/cap/day, respectively. DSW represents, on average, 67% of the MSW generated in the region.
- The MSW regional average collection rate is 89.9% (as a percentage of the population). Compared with a worldwide average of 73.6%^{iv}, LAC has a high level of coverage, reflecting the priority the region gives to this service. LAC's coverage is higher than that of Africa (46%), South Asia (65%), and the Middle East and Northern Africa (approximately 85%)^v. Argentina, Chile, Colombia, Dominican Republic, Trinidad & Tobago, Uruguay and Venezuela have MSW collection rates close to 100% (universal coverage).
- About 53% of LAC's population receives 2to-5-days a week waste collection service, 45% daily service and 2% once-a-week service. Separate MSW collection, commonly known as selective collection,^{vi} is still uncommon in the region. However, there are cases like that of Brazil, where 62% of municipalities implement selective MSW collection programs^{vii}.
- Average unitary collection costs have been estimated at US\$34 per collected ton, with high cost variance between countries. For example, the cost in Argentina is US\$54, while in Paraguay is only US\$6.6 (a US\$47 difference). These variations typically reflect differences associated with the (higher-lower) quality of service.
- Adequate MSW final disposal coverage (i.e., in landfills) is approximately 55% (as a percentage of the population), which means that there is still a large amount of waste that is not disposed and/or treated adequately^{viii} (45%).
- The average final disposal cost is US\$20.4 per ton disposed^{ix}. There is a first group of countries^x where disposal costs are around US\$10 (US\$5.6 in Ecuador, US\$11.4 in Chile), a second group^{xi} where it costs around US\$20 (US\$18.8 in Costa Rica, US\$23.3 in Colombia), and then there's Brazil, where costs are, on average, considerably higher (US\$31.5).
- In several LAC countries MSW management costs are directly afforded by the municipality. The average cost recovery is 51.6%^{xii}. Municipalities typically use property taxes as the main revenue collection system. This collection mechanism represents 52.1% of the total, followed by direct billing to users^{xiii}, with 20.2%; the electricity bill (15.3%); and the water & sanitation bill (12.4%).

ⁱ Data collected between April and March 2015 using data from 2010 onwards. It should be noted that the reported variables have a low variability rate in short periods of time (5 years or less).

ⁱⁱ PAHO, AIDIS, IDB, 2010. Domestic (or Household) Solid Waste: Solid or semi-solid waste exclusively of residential origin caused by human activities within households.

ⁱⁱⁱ Ibid. Municipal (or Urban) Solid waste: Solid or semi-solid waste from urban centers in general, including those from households, commercial and service activities, institutions, markets, non-hazardous hospital waste, from industries' commercial offices, from streets and public areas' sweeping and cleaning, and from street, public garden and public square tree and plant pruning.

^{iv} ISWA, WIERT, Sweepnet, University of Leeds, SWAPI, 2013. Waste Atlas Report.

^v HOORNWEG, D.; BHADA-TATO, P., 2012. "What a waste. A global review of solid waste management". World Bank.

^{vi} Differentiated or selective waste collection is the collection and transportation of MSW that has been separated at the source (setting apart solid, dry, recyclable waste from non-recyclable solid waste). This can be done either under a door-to-door or under differentiated-containers systems.

^{vii} Abrelpe, 2013. Panorama dos Resíduos Sólidos. São Paulo, Brazil.

^{viii} Adequate final disposal is the final disposal in landfills. On the other hand, inadequate final disposal includes disposal in controlled open dumps, in open dump sites, open trash burning, dumping waste into water courses, using it as animal feed, etc.

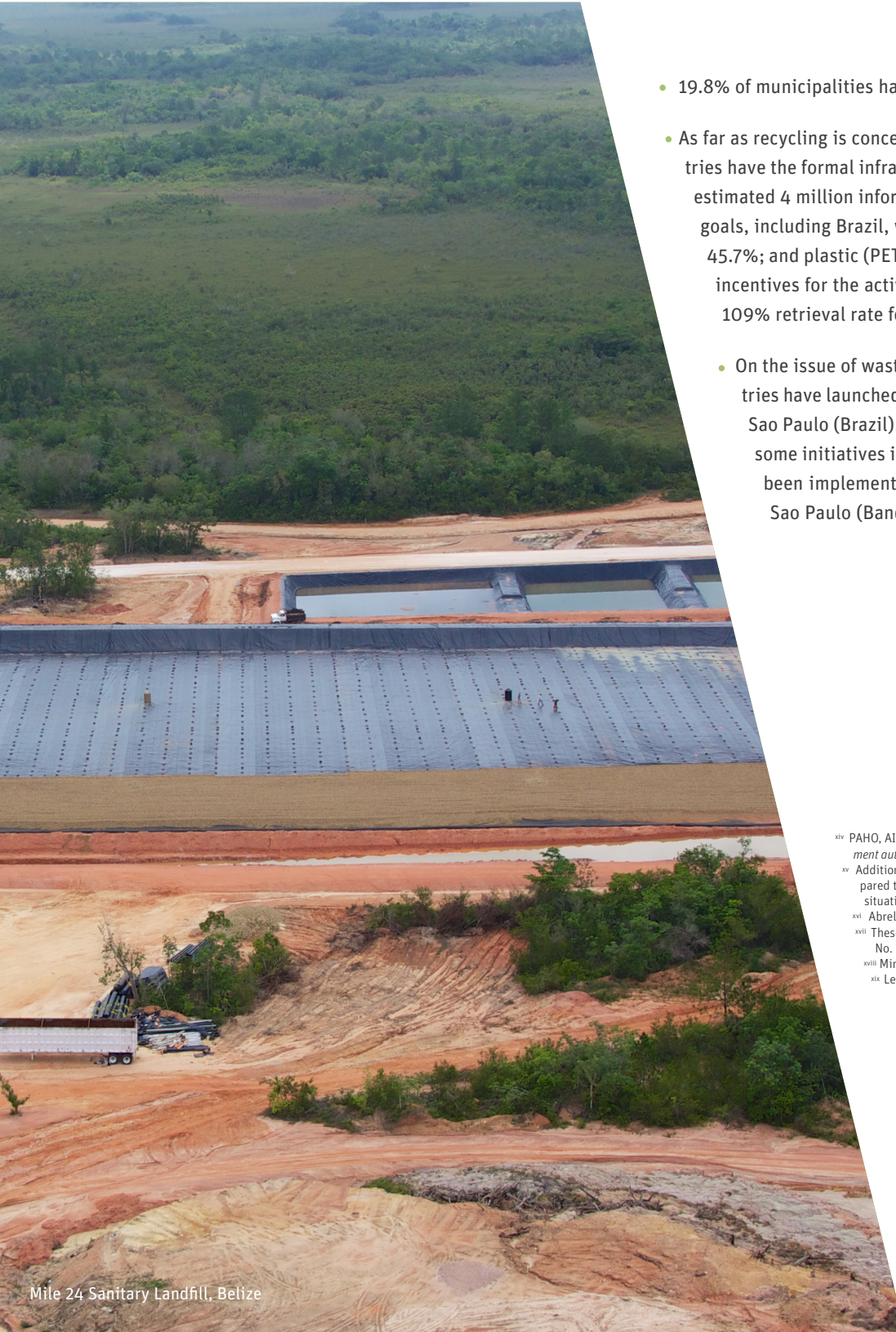
^{ix} Average cost does not take service quality into account and, depending on the country, it may include different portions of the costs of operating landfills or controlled dumping grounds.

^x This group includes Ecuador, Paraguay, Peru, Bolivia, Honduras, Uruguay, Mexico and Chile.

^{xi} This group includes Argentina, Costa Rica, El Salvador and Colombia.

^{xii} PAHO, AIDIS, IDB, 2010.

^{xiii} This refers to billing through an invoicing scheme that is separate from other public services (such as electricity or water & sanitation) and that is directly related to solid waste management.



Mile 24 Sanitary Landfill, Belize

- 19.8% of municipalities have solid waste management plans in place, which shows there is still a low level of municipal planning in this area.
- As far as recycling is concerned, it has been estimated that only 2.2% of all MSW in LAC is recycled under some sort of formal arrangement^{xiv}. Only few countries have the formal infrastructure required to classify and recycle MSW. Recyclable materials' recovery is mostly performed by the informal sector, with an estimated 4 million informal recyclers in LAC. Most countries in the region have no official data on recycling rates^{xv}. Only a few have begun to set recycling goals, including Brazil, where indices for specific materials have been implemented. Brazil reported aluminum recycling indices of 97.9% in 2012; paper, 45.7%; and plastic (PET) 58.9%^{xvi} (of industrial production). These high indices were possible due to a national and sub-national framework that provides incentives for the activity and for the inclusion of informal recyclers (or catadores) in MSW management systems^{xvii}. Meanwhile, Ecuador has reached a 109% retrieval rate for PET bottles^{xviii} due to a tax incentive known as the *impuesto redimible de botellas* PET (redeemable PET bottle tax)^{xix}.
- On the issue of waste-to-energy, municipalities throughout the region have shown interest in implementing this type of technology, and several countries have launched preliminary assessments and considered potential projects. The most advanced project is currently under construction in Barueri, Sao Paulo (Brazil). It will include MSW incineration technology and energy recovery. To date, no projects in operation have been reported, except for some initiatives in the U.K. and French territories of Bermuda and Martinique, respectively. Additionally, some landfill biogas capture projects have been implemented in cities like Buenos Aires (Complejo Ambiental Norte III), Santiago de Chile (Loma los Colorados and Santa Marta landfills), Sao Paulo (Bandeirantes landfill) and Monterrey, among others.

^{xiv} PAHO, AIDIS, IDB, 2010. Formal recycling is defined as the "recycling process carried out either by the agency in charge of the municipal sanitation service or by a company or institution authorized by waste management authorities."

^{xv} Additionally, there are lingering discrepancies over how to measure the recycling rate. Some countries produce estimates based on the proportion of waste recycled compared to total waste generation, or compared to the amount of waste received at final disposal sites; others produce a recycling rate based on the amount of materials reused by industries. Yet another method combines these previous options. This situation, coupled with the scant availability of data on recycling, makes data quantification and comparison between different countries in the region quite difficult.

^{xvi} Abrelpe, 2013. Panorama dos Resíduos Sólidos. São Paulo, Brazil.

^{xvii} These include the Política Nacional de Resíduos Sólidos (PNRS, Law No. 12305/10) setting out shared responsibility during the life cycle of products or "reverse logistics" and the Pro-Catador Program (Decree No. 7405/10), which allows government agencies to form alliances and sign contracts and agreements with recyclers' organizations in order to help hone their technical skills.

^{xviii} Ministerio del Ambiente del Ecuador, 2014. Figure on 2014 recovery estimate based on the amount of PET bottles placed in the market in 2014.

^{xix} Ley de Fomento Ambiental y Optimización de los Ingresos del Estado, 2011.

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Collected Data on the Status of Solid Waste Management in LAC

Country	Per capita generation (kg/hab/day)		Municipal-ities with solid waste manage-ment plans (%)	Collection coverage (%)	Collection service frequency in LAC (%)			Types of final disposal per number of inhabitants (%)		Unit costs (US\$/Ton)		Types of collection in LAC as a percentage of population (%)				Recycling rate
	HSW	USW			Daily	2 to 5 times a week	Once a week	Total adequate disposal	Total inadequate disposal	Collection	Final disposal	Property tax	Electricity	Drinking water & sanitation	Regular customer billing	
Argentina	0,77	1,15	74	99,8	71,9	27,9	0,2	64,7	35,3	54,02	17,63	68,2	3,9	0	27,9	-
Barbados	0	0,9 ¹⁰	-	90 ¹⁰	-	-	-	82 ¹⁰	18 ¹⁰	-	-	-	-	-	-	9 ¹⁰
Belize	0,68 ¹⁴	1,07 ^{13,14}	21,9	85,2	0	88	12	34 ⁵	66 ⁵	-	-	100	0	0	0	2 ¹³
Bolivia	0,46	0,49	9,8	83,3	5,4	94,6	0	44,8	55,2	15,27	7,89	0	95,6	0	4,4	-
Brasil	0,67	1,04 ¹¹	1,6	90,4 ¹¹	44,7	54,5	0,8	58,3 ¹¹	41,7 ¹¹	42,46	31,48	79,1	0	9,2	11,8	1 ¹⁰
Chile	0,79	1,25	53,4	97,8	22,3	77,6	0,1	82,2 ¹⁰	17,8 ¹⁰	23,34	11,43	58,6	0	0	41,4	10 ³
Colombia	0,54	0,69 ²	-	98,9	0	98,6	1,4	93,18 ⁵	6,82 ⁵	34,12	23,31	0	34,5	65,5	0	17,2 ⁹
Costa Rica	0,63 ⁷	0,88	57,1	90,4	0	68,8	31,2	67,4	32,6	22,65	18,81	31,8	0	0	68,2	0,3 ⁶
Ecuador	0,62	0,73 ¹²	-	84,2	57,3	42,7	0	30,3	69,7	30,05	5,61	7,1	75,9	16,3	0,8	-
El Salvador	0,5	0,89	41,3	78,8	20,9	79,1	0	78,9 ¹⁰	21,1 ¹⁰	30,42	21,02	0	40,9	0	59,1	-
Guatemala	0,48	0,61	28,5	77,7	1	86,5	12,5	15,5	84,5	10,84	-	0	0	0	100	-
Guyana	0	1,5 ⁶	-	89 ⁶	-	-	-	-	-	-	-	-	-	-	-	19,3 ¹²
Haiti	0	0,7 ¹⁰	-	11 ¹⁰	-	-	-	0 ¹⁰	100 ¹⁰	-	-	-	-	-	-	-
Honduras	0,61	-	26,7	64,6	5,4	75,7	19	11,3	88,7	20,81	8,16	62,6	0	10,5	26,9	-
Jamaica	0,71	-	0	73,9	0	35,3	64,7	0	100	-	-	-	-	-	-	-
Mexico	0,58	0,94	35	93,2	71,6	28,4	0,1	65,6	34,4	26,39	10,56	-	-	-	-	9,6 ⁸
Nicaragua	0,73	-	1,2	92,3	0	94,2	5,8	0	100	-	-	0	0	0	100	-
Panama	0,55	1,22	43,1	84,9	13,1	79,5	7,4	55,9 ¹⁰	44,1 ¹⁰	-	-	3	0	69,4	27,7	-
Paraguay	0,69	0,94	18,8	57	16,1	79,8	4,1	36,4	63,6	6,59	5,88	15,1	0	4,1	80,8	-
Peru	0,47	0,75	57,2	84	55,7	43,5	0,8	43,5	56,5	15,02	5,98	85,1	0	0,2	14,7	14,7 ⁴
Dom. Rep.	0,85	1,0 ⁶	5,1	97	55,2	37,1	7,7	33,9 ⁶	66,1 ⁶	-	-	0	0	8,8	91,2	-
Surinam	0	1,4 ⁶	-	80 ⁶	-	-	-	0 ¹	100 ¹	-	-	-	-	-	-	-
Trinidad & Tobago	0	1,8 ⁶	-	100 ¹⁰	-	-	-	0 ¹⁰	100 ¹⁰	-	-	-	-	-	-	8,2 ¹²
Uruguay	0,75	1,03	73,9	98	18,6	81,4	0	13,7 ¹⁰	86,3 ¹⁰	47,85	9,19	100	0	0	0	-
Venezuela	0,65	0,86	33,4	100	58,2	41	0,8	13	87	-	-	0	90,9	0	9,1	-
LAC Average	0,6	0,9	19,8	89,9	45,4	52,7	1,8	55,4	44,6	34,22	20,43	52,0	15,3	12,4	20,2	-

Sources: The data in Table 1 not associated with the references listed below was taken from the Regional Evaluation on Urban Solid Waste Management in Latin America and the Caribbean, 2010 Report, jointly published by the Pan-American Health Organization (PAHO), the Inter-American Association of Sanitary and Environmental Engineering (AIDIS), and the Inter-American Development Bank (IDB).

1 Inter-American Development Bank, 2011.

2 Sistema Único de Información (SUI), 2011.

3 Conama, 2011. Levantamiento, Análisis, Generación y Publicación de Información Nacional Sobre Residuos Sólidos de Chile.

4 United Nations Statistics Division, 2011.

5 Inter-American Development Bank, 2012.

6 HOORNWEG, D.; BHADA-TATO, P., 2012. What a waste. A global review of solid waste management. World Bank.

7 Competitiveness and Environment Program. 2012.

8 Semarnat, 2012. Diagnóstico Básico para la Gestión Integral de los Residuos. Mexico.

9 Inter-American Development Bank. 2013.

10 Waste Atlas D-WASTE, 2013. <http://www.atlas.d-waste.com/>

11 Abrelpe 2013. Panorama dos Resíduos Sólidos. São Paulo, Brazil.

12 Inter-American Development Bank, 2014.

13 Solid Waste Management Authority (Belize), 2013.

14 Hydroplan Ingenieur GmbH. 2011. “Waste Generation and Composition Study for the Western Corridor.”