WS1: GENERATION OF WASTE BY TYPE AND SECTOR

H

Concept and Definition

Waste refers to materials that are not prime products (i.e. products produced for the market) for which the generator has no further use for his own purpose of production, transformation or consumption, and which he discards, or intends or is required to discard. It excludes residuals directly recycled or reused at the place of generation (i.e. establishment) and waste materials that are directly discharged into ambient water or air.

Sector Classifications:

Agriculture and Forestry comprise the activities of growing crops, raising animals, harvesting timber, and harvesting other plants and animals from a farm or their natural habitats.

Mining and quarrying include the extraction of minerals occurring naturally as solids (coal and ores), liquids (petroleum) or gases (natural gas). Extraction can be achieved by underground or surface mining or well operation.

Manufacturing comprises units engaged in the physical or chemical transformation of materials, substances, or components into new products. The materials, substances, or components transformed are raw materials that are products of agriculture, forestry, fishing, mining or quarrying, as well as products of other manufacturing activities.

Energy production includes electricity, gas, steam and hot water supply, which cover the activity of providing electric power, natural gas, and steam supply through a permanent infrastructure (network) of lines, mains and pipes.

Construction includes general construction and special trade construction for buildings and civil engineering, building installation and building completion. It includes new work, repair, additions and alterations, the erection of prefabricated buildings or structures on the site and also construction of a temporary nature.

Waste by Type and Sector:

Waste from *Agriculture and Forestry* is all waste from agricultural and forestry activities. Manure used as fertilizer should not be included; only 'surplus' (or excess) manure should be included.

Industrial waste refers to waste from mining and quarrying, manufacturing industries, energy production and construction.

- Waste from *mining and quarrying* refers to all waste from mining and quarrying activities.

- Waste from *manufacturing industries* refers to all waste from manufacturing industries.
- Waste from *energy production* refers to all waste from electricity, gas, steam and hot water supply.
- Waste from *construction* refers to all waste from construction.

Municipal waste includes household waste and similar waste. Municipal waste also includes bulky waste (e.g. white goods, old furniture, mattresses) and yard waste, leaves, grass clippings, street sweepings, the content of litter containers, and market cleansing waste, if it is managed as waste. Waste originating from households, commerce and trade, small businesses, office buildings and institutions (schools, hospitals, government buildings) is also referred to as municipal waste. On the other hand, waste from municipal sewage network and treatment and municipal construction and demolition waste are not referred to as municipal waste.

Other refers to waste generated from all other economic activities not so far specified.

(*Please refer to the United Nations Environment Statistics 2006 Questionnaire at http://unstats.un.org/unsd/environment/Questionnaires/q2006_waste_english.pdf.)*

Method of Computation

The generation of waste by type and sector was compiled from questionnaires distributed to Member States/Associate Members through a UNSD/UNEP/CARICOM collaboration according to the categories mentioned above.

Indicator Relevance

Generation of waste is intimately linked to the level of economic activity in a particular country. It is also an indication of the patterns of consumption of raw materials. A reduction in the volume of waste generated is an indication of changes in consumption patterns with respect to raw materials and of an increase in recycling and reuse. Moreover, data on waste generation over several years can indicate the level of progress the country has made toward waste reduction efforts. It can also indicate potential improvements in process efficiency and productivity.

In the case of industrial wastes, the generation of waste by type and sector provides a measure of the extent and type of industrialization in a country. The two major concerns in relation to the generation of mining waste are the large volumes that are produced as well as the potential for hazardous substances to be present in the waste stream. Large areas of land are used for depositing mining waste and this activity has the potential to cause environmental pollution if not properly controlled. Construction activity is seen as a key indicator of growth and prosperity. Due to the very large volume of construction and demolition waste produced, it can use up valuable space in landfills. In addition, if

not separated at the source it can contain small amounts of hazardous waste. However, it also has a high resource value and the technology for the separation and recovery of construction and demolition waste is well established, readily accessible and, in general, inexpensive. Most importantly, there is a reuse market for aggregates derived from construction and demolition waste in roads, drainage and other construction projects.

Data Assessment

All reporting Member States followed the internationally recommended definitions for waste and types of wastes. This indicator is, therefore, regionally and internationally conceptually harmonized.

Only nine of the reporting eighteen Member States/Associate Members of the Community provided data for this indicator and the data provided was not detailed, perhaps due to the fact that environment statistics is new to the Region.

Data Sources

In accordance with the decision that the UNSD would provide data on waste, water, land, and air to the CARICOM Secretariat, data for this indicator was collected from the UNSD instead of from Member States and Associate Members.

Please refer to **Appendix 1.11.1 (a)** for the original sources of the data, as specified by the UNSD, on waste for Member States and Associate Members.

Evaluation

Generation of Waste by Type and Sector is presented below in **Table 11.1.** The data shows that in 2005, Antigua and Barbuda reported that waste generated by *other activities* was the largest source of waste generated at 38,220 tonnes or 45.5 per cent of Total waste generated by all sources followed by *Industrial activities* with 14,450 tonnes or 29.2 per cent of Total waste generated and *Municipal waste* with 21,250 tonnes (25.3 per cent) of waste generated for the year. Antigua and Barbuda also reported that *Manufacturing industries* and *Construction* contributed to 14,450 tonnes and 10,050 tonnes, respectively, of waste generated by *Industrial activities* in for the year 2005.

Data on waste generation by *Total Industrial activities* reported by Belize for the period 1995 to 2003 shows an increase in the total waste generated from 434,018 tonnes in 1995 to 530,839 tonnes in 2003. The largest amount of waste generated by *Total Industrial activities* was seen in 2002 at 533,236 tonnes for this Member State. Data was also reported for *Municipal waste* generated for the years 1997 (38,100 tonnes) and 2000 (62,100 tonnes). Total waste generated in 1995 for Guyana was reported at 42,665 tonnes and this increased by 5 per cent to 44,831 tonnes in 1996 and a further by 2.4 per cent in 1997 followed by another increase of 2.4 per cent in 1998. The most significant increase

in Total waste generated in Guyana was from 1999 to 2000 where the waste generation increased from 47,287 tonnes to 57,256 tonnes, representing an increase of 21.1 per cent.

Estimates of Jamaica's waste generated by selected *Industrial activities* were reported for the year 1995 and actual Municipal waste generated. The data shows that Mining and quarrying generated a significant amount of waste at 14,000,000 tonnes as compared to Manufacturing industries, Construction and Agriculture and forestry activities which generated 76,000 tonnes, 50 tonnes and 17 tonnes of waste respectively. Municipal waste generated for Jamaica in 1995 was reported at 597,000 tonnes.

St. Vincent and the Grenadines reported waste generation by total *Industrial activities* at 2,500 tonnes in 2002 of which *Construction activities* contributed 1,900 tonnes. *Municipal waste* for St. Vincent and the Grenadines was reported at 37,800 tonnes in 2002 and *Total waste generation* was 42,500 tonnes.

Data for Trinidad and Tobago showed a large increase in waste generation in the *Agriculture and forestry* sector from 17,514 tonnes in 1995 to 91,118 tonnes in 1996. Waste generated by the *Energy production* sector was also reported in 1997 and stood at 27,100 tonnes.

Associate Member Anguilla reported data for the period 2001 to 2005 on *Total waste generation*. *Total waste generation* for this Island declined at the beginning of the period from 5,635 tonnes in 2001 to 5,395 tonnes in 2002 and further to 5,143 tonnes in 2003 followed by an increase in 2004 to 5,963 tonnes and a greater increase by 36.4 percent to 8,131 tonnes in 2005. Data on *Municipal waste* also revealed a similar trend, declining during the period 2000 to 2003 from 4,358 tonnes to 4,244 tonnes and further to 4,051 tonnes and increasing by the end of the period 2004 (4,695 tonnes) and 2005 (5,283 tonnes). Data for Bermuda for the years 1999 to 2001 on *Total waste generation* reveals an increase from 1999 where 66,500 tonnes was generated to 68,700 tonnes in 2000 declining by 1.5 per cent to 67,500 tonnes in 2001.

Table 11.1 Generation of Waste by Type and Sector: 1990, 1995 - 2005

Tonnes

Country	Year	Agriculture and forestry	Industrial activities					Other activities	Municipal waste	Total waste generation
			Mining and quarrying	Manufacturing industries	Energy production	Construction	TOTAL			
AG										
	2005	0		14,450		10,050	24,500	38,220	38,220	83,970
BZ										
	1995	...	...	...	...	...	434,018	...	...	...
	1996	...	...	...	...	...	454,897	...	...	...
	1997	...	...	...	...	...	524,021	...	38,100 [A]	...
	1998	...	...	...	...	...	524,976	...	...	...
	1999	...	...	...	...	...	515,557	...	...	...
	2000	...	...	...	...	...	516,459	...	62,100	...
	2001	...	...	...	...	...	496,783	...	...	...
	2002	...	...	...	...	...	533,236	...	...	...
	2003	...	...	...	...	...	530.839	...	...	...
GY										
	1995	...	...	...	...	...	...	...	...	42,665
	1996	...	...	...	...	...	...	...	...	44,831
	1997	...	...	...	...	...	...	...	...	45,890
	1998	...	...	...	...	...	...	...	...	47,008
	1999	...	...	...	...	...	...	...	...	47,287
	2000	...	...	...	...	...	...	...	...	57,256
JM										
	1995	17,000 [A]	14,000,000 [A]	76,000 [A]	...	50,000 [A]	...	...	597,000	n/a
VC										
	2002	...	...	...	...	1,900	2,500	...	...	42,500
TT										
	1995	17,514 [1]	...	...	...	...	...	...	...	...
	1996	91,118 [1]	...	...	...	...	...	...	...	...
	1997	...	...	...	27,100 [1]	...	...	...	...	...
ASSOCIATE MEMBERS										
AI										
	2001	650	...	...	...	...	626	0	0	5,635
	2002	612	...	...	...	...	538	0	0	5,395
	2003	551	...	...	...	...	541	0	0	5,143
	2004	744	...	...	...	...	524	0	0	5,963
	2005	1,625	...	...	...	...	1,223	0	0	8,131
BM										
	1999	...	...	...	...	...	...	66,500	66,500	66,500
	2000	...	...	...	...	...	...	68,700	68,700	68,700
	2001	...	...	...	...	...	...	67,500	67,500	67,500

WA2: TREATMENT AND DISPOSAL OF MUNICIPAL AND HAZARDOUS WASTE BY TYPE OF METHOD

H

Concept and Definition

Municipal waste includes household waste and similar waste. Municipal waste also includes bulky waste (e.g. white goods, old furniture, mattresses) and yard waste, leaves, grass clippings, street sweepings, the content of litter containers, and market cleansing waste, if it is managed as waste. Waste originating from households, commerce and trade, small businesses, office buildings and institutions (schools, hospitals, government buildings) is also referred to as municipal waste. On the other hand, waste from municipal sewage network and treatment and municipal construction and demolition waste are not referred to as municipal waste.

Hazardous wastes are wastes or a combination of wastes, which because of its concentration, quantity or physical, chemical or infectious distinctiveness may *inter alia*: (a) cause or significantly contribute to an increase in mortality or increase in serious irreversible or incapacitating illness; or (b) pose a substantial present or potential threat to human health, or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

Types of Treatment and Disposal of Waste:

Recycled waste is any waste that goes through the recycling process. Recycling is defined as any reintroduction of waste material in a production process that diverts it from the waste stream, except reuse as fuel. Both reprocessing as the same type of product and for different purposes should be included. Recycling within industrial plants, that is, at the place of generation, should be excluded.

Composting is a biological process that submits biodegradable waste to anaerobic or aerobic decomposition and that results in a product that is recovered.

Incineration is the controlled combustion of waste with or without energy recovery.

Landfilled waste includes all waste going to landfills, either directly or after sorting and/or treatment, as well as residues from recovery and disposal operations going to landfills. Landfill is the final placement of waste into or onto the land in a controlled or uncontrolled way. The definition covers both landfill in internal sites (that is, where a generator of waste is carrying out its own waste disposal at the place of generation) and in external sites.

Other waste treatment/disposal refers to any other final treatment or disposal different from recycling (composting), incineration and landfill. Permanent storage of waste is included here.

Method of Computation

Data for this indicator were compiled from questionnaires distributed to Member States/Associate Members through a UNSD/UNEP/CARICOM collaboration according to the categories mentioned above.

Indicator Relevance

Although hazardous waste represents a small percentage of all waste generated in the Caribbean, it can present a potential risk to both human health and the environment. Hazardous waste is typically the subject of special legislation and requires special management arrangements to ensure that it is kept separate from and treated differently to non-hazardous waste. The main purpose of the hazardous component of this indicator, therefore, is to represent the amount of hazardous waste having special and controlled treatment. The indicator would provide a measure of the development of the hazardous waste management system, and thereby the actions taken to diminish the threats to human health and the environment.

Different disposal methods have different impacts on the environment and on human health. The breakdown of waste treatment and disposal provided by this indicator gives an indication of the possible environmental impacts by identifying the types of treatment and disposal methods most widely used in the Region. For example, there are numerous potential impacts associated with the landfilling of waste, including the production of leachate and landfill gas, odours, flies, vermin and the use of land. Data showing the amount of waste landfilled will give an indication of the probability of these negative affects occurring and the extent to which they may occur so that preventative actions can be taken.

Data Assessment

This indicator, treatment and disposal of municipal and hazardous waste by type of method, is regionally and internationally conceptually harmonized since all reporting Member States followed the internationally recommended definitions for municipal waste, hazardous waste, and methods of treatment and disposal of municipal and hazardous wastes.

Only seven Member States and two Associate Members of the usual fourteen reporting Member States and four reporting Associate Members provided data for this indicator. The data provided was not detailed, perhaps due to the fact that environment statistics is new to the Region.

Data Sources

In accordance with the decision that the UNSD would provide data on waste, water, land, and air to the CARICOM Secretariat, data for this indicator was collected from the UNSD instead of from Member States and Associate Members.

Please refer to **Appendix 1.11.2 (a)** for the original sources of the data, as specified by the UNSD, on waste of Member States and Associate Members.

Evaluation

Data on the Treatment and Disposal of *Municipal* and *Hazardous Waste* by type and method are presented for six Member States in **Table 1.2** below. The data reveals that a total of 21,250 tonnes of *Municipal waste* was disposed of in Antigua and Barbuda in the year 2005 using Landfill. Belize also reported data on *Municipal waste* and *Hazardous waste* for the years 1997 and 2000. The data reported reveals an overall increase in the amount of *Municipal waste* handled from 38,100 tonnes in 1997 to 62,100 tonnes in 2000 representing an increase of 63 per cent. The data reported on *Hazardous waste* disposed of by *Incineration* also saw an increase from 691 tonnes to 775 tonnes, an increase of 12. per cent. Dominica reported 20,906 tonnes of *Municipal waste* for the period 2001 to 2001 disposed of by Landfill and 627 tonnes of *Hazardous waste* collected in 2002 disposed of by *Landfill*. During 1995 to 2000, *Municipal waste* in Guyana increased from 60 million tonnes in 1995 to 81 million tonnes in 2000, with steady increases throughout the period and was disposed of mainly by *Landfill.* Data was also reported for Guyana in 2001 and 2002 and revealed an increase in the management of *Municipal waste* from 81,426 tonnes in 2001 to 87,765 tonnes in 2002 representing an increase of 7.8 per cent.

In 2001 Jamaica reported 718,000 tonnes of *Municipal waste* which were disposed of by *Landfill.* Jamaica also reported on 10,000 tonnes of *Hazardous waste* managed in 1998. St. Vincent and the Grenadines reported data for the year 2002 which show that 37,800 tonnes of *Municipal waste* was collected of which 32,100 tonnes or 85 per cent were disposed of by *Landfill* and 5,700 tonnes were *Recycled/ composted. Hazardous waste* generated in 2002 for St. Vincent and the Grenadines was 0.15 tonnes and this was disposed of by *Landfill.*

Data for Trinidad and Tobago in **Table 11.2** shows a gradual increase in the total *Municipal waste* collected for the years 1990, 1995 to 1997 and 1999 to 2002. The overall increase in Municipal waste collected for the reporting period was 98 per cent from 214,880 tonnes in 1990 to 424,984 tonnes in 2002. Among reporting Associate Members Anguilla and The British Virgin Islands, The British Virgin Islands collected and managed the most *Municipal waste* with an average 26,698 tonnes of waste collected and managed during the period 1995 to 2005. The data reveals a significant increase in *Municipal waste* from 1995 (11,165 tonnes) to 1999 (25,698 tonnes) by 130 per cent and from 2000 (28,560 tonnes) to 2001 (29,861 tonnes) declining in 2002 by 16 per cent and further in 2003 by 5 per cent, increasing thereafter in 2004 to 33,033 tonnes and finally to 36,697 tonnes in 2005. After 1995, more than 70 per cent of *Municipal waste* collected in The British Virgin Islands was *incinerated* and the remaining disposed of by *Landfill* up from 39 per cent in 1995. Anguilla reported data for the period 2001 to 2005 which *Municipal waste* collections declining at the beginning of the period from 4,358 tonnes in 2001 to 4,244 tonnes in 2002 and further to 4,051 tonnes in 2003 and increasing towards the end of the period from 4,695 tonnes in 2004 to 4,283 tonnes in 2005. The overall increase in *Municipal waste* collections was 21 per cent all of which were disposed of by *Landfill*.

Table 11.2: Treatment and Disposal of Municipal and Hazardous Waste by type and method: 1990, 1995 - 1997, 1999 - 2005

(Tonnes)

Country	Year	Municipal waste					Hazardous waste				
		Recycled	Incinerated	Landfilled	Other	Total	Recycled	Incinerated	Landfilled	Other	Total
AG											
	2005			21,250		21,250	...	...	...	...	...
BZ											
	1997			38,100		38,100	...	...	...	...	...
	1999	...	...	...	...	...		691			691
	2000			62,100		62,100		775			775
DM											
	2001			20,906		20,906	...	...	...	...	...
	2002			20,906		20,906	...	...	502	...	627
	2003			20,906		20,906	...	...	...	...	...
	2004			20,906		20,906	...	...	...	...	...
	2005			20,906		20,906	...	...	...	...	...
GY											
	1995	368	1,320	60,418	...	...	...	...	...	...	...
	1996	372	1,152	63,500	...	...	...	...	...	...	...
	1997	429	1,200	65,000	...	...	...	...	...	...	...
	1998	483	1,272	66,514	...	...	...	...	...	...	...
	1999	504	1,338	67,051	...	...	...	...	...	...	...
	2000	536	1,285	81,100	...	...	...	...	...	...	. ..
	2001	...	...	...	...	81,426	...	...	...	...	...
	2002	...	...	...	...	87,765	...	...	...	...	...
JM											
	1998	...	...	...	...						10,000*
	2001			718,000		718,000	...	...	...	...	...
VC											
	2002	5,700	0	32,100	0	37,800	0.00	0.00	0.15	0.00	0.15

Table 11.2 Cont'd. Treatment and Disposal of Municipal and Hazardous Waste by type and method: 1990, 1995 - 1997, 1999 - 2005

Country	Year	Municipal waste					Hazardous waste				
		Recycled	Incinerated	Landfilled	Other	Total	Recycled	Incinerated	Landfilled	Other	Total
TT											
	1990	...	...	...	...	**214,880**	...	...	...	...	...
	1995	...	...	...	...	**247,170**	...	...	...	...	...
	1996	...	...	...	...	**259,000**	...	...	...	...	...
	1997	...	...	...	...	**296,000**	...	...	...	...	...
	1999	...	...	...	...	**335,984**	...	...	...	...	...
	2000	...	...	...	...	**423,742**	...	...	...	...	...
	2001	...	...	...	...	**378,784**	...	...	...	...	...
	2002	...	...	...	...	**424,984**	...	...	...	...	...
ASSOCIATE MEMBERS											
AI											
	2001			**4,358**		**4,358**	...	...	...	...	...
	2002			**4,244**		**4,244**	...	...	...	...	...
	2003			**4,051**		**4,051**	...	...	...	...	...
	2004			**4,695**		**4,695**	...	...	...	...	...
	2005			**5,283**		**5,283**	...	...	...	...	...
VG											
	1995		**4,409**		**6,756**	**11,165**	...	...	...	...	...
	1999		**18,618**		**7,080**	**25,698**	...	...	...	...	...
	2000		**21,731**		**6,829**	**28,560**	...	...	...	...	...
	2001		**22,461**		**7,400**	**29,861**	...	...	...	...	...
	2002		**20,481**		**4,455**	**24,936**	...	...	...	...	...
	2003		**18,712**		**4,918**	**23,630**	...	...	...	...	...
	2004		**26,506**		**6,527**	**33,033**	...	...	...	...	...
	2005		**29,452**		**7,245**	**36,697**	...	...	...	...	...

Addendum

Waste is still a new area of environment within the Region. As such, very little detailed quantitative data is available for dissemination and evaluation. Please see below, however, a précis of the waste data that Member States and Associate Members do have available.

Barbados:
Landfilling is the main form of solid waste disposal in Barbados. A survey in 1993 by Stanley Associates found that in any seven day period, 265 tonnes of municipal solid waste were produced at the Mangrove Pond landfill site. Another study has estimated that 130,000 tonnes of waste per capita was generated in 1996. In 1998, 316 derelict vehicles and 7,140 loads of bulky waste were collected for disposal. In addition, 1.44 million gallons of sewage were generated in 1992.

In 1996, 737 tonnes of hazardous waste moved through the Port Authority. Of the 737 tonnes, 43.4 per cent was liquid or solid compounds with the potential to generate acids, alkalis, solvents, pesticides, heavy metals, inks and dyes. The Integrated Solid Waste Management Programme manages hazardous waste in Barbados.

Barbados encounters difficulties in assessing and managing the growing volumes of waste generated by the public and the thousands of tourists that flock the island yearly. These difficulties are evident in the increasing occurrences of littering and illegal dumping. There is also a lack of an integrated approach to collection and disposal of solid and special waste and there is the need for organisational change and a cost recovery mechanism. *(Please refer to the Government of Barbados: State of the Environment Report 2000 pgs 81-85.)*

Belize:
Belize regards solid waste as waste generated by households and the commercial, industrial and construction sectors. Solid waste comprises most of the waste that is disposed of at landfills, dumpsites and incineration plants. The Belize Solid Waste Management Project conducted a study which estimated that the average waste generation rate was 2.1 pounds per person per day, with approximately 40000 tonnes of municipal solid waste being generated per annum.

In 1997, $2.6 million Belize dollars per annum (an average of $22.50 per capita) was spent on municipal waste disposal. Of the total expenditure, 48 per cent was spent on solid waste in Belize City because 51 per cent of the solid waste generated in the country originates there. However, even though Belize City generates more waste than any other city in Belize, San Pedro Town has the highest per capita expenditure on solid waste ($35.00 per capita).

Belize, like many of the other Caribbean countries, is assessing the available and economically viable means available to them to better dispose of the growing amounts of waste that are being generated. Some of these waste disposal means include composting, landfilling, recycling and incineration. Exporting solid waste, as is already done to Mexico, is also being considered since it is a useful way to get rid of waste and increase the export value in the country.

It should be noted that 60 per cent of the municipal waste generated in Belize is organic waste. As such, if it is properly disposed of, it will be taken care of by the natural processes of decomposition. (*Please refer to the Environmental Statistics for Belize 2000 pgs 53-56.*)

Grenada:
Approximately 100 tonnes of solid waste is generated daily in Grenada. The waste is collected and disposed of at Perseverance in St. George's. The waste collection system covers about 95 per cent of the island. All of the biomedical waste produced is incinerated on the compounds where they are generated or are collected for incineration at the general hospital.

There are two sewage systems on the island that serve 3 per cent of the population. These systems discharge sewage 500 feet into the ocean but the risk of coastal pollution is minimal due to ocean currents that carry outfall effluents away from the land. *(Please refer to Grenada Environmental Statistics pg. 24.)*

Jamaica:
The amount of waste generated in Jamaica is increasing with new technological advancements and consumption patterns. However, like all the Caribbean countries, managing the waste that is generated is a major problem in Jamaica. This manifests itself in the illegal dumping of waste in gullies, rivers and open lots and excessive amounts of littering. In addition, most of the waste disposal sites present in Jamaica are dumps without sanitary treatment, and sewage treatment facilities can only deal with 50 per cent of the sewage produced on the island. It should be noted, however, that the municipal waste collection and disposal system has been rationalized and the National Solid Waste Management Authority formed to reduce the occurrence of these practices.

The recycling and reuse of waste is being practiced on a small scale as means to treat and dispose of waste. These treatment and disposal methods are expected to increase over time as more waste exchange programmes are implemented.

In 1996, 597,000 tonnes of collectable waste (waste that is not burnt, deposited on empty lots or thrown into gullies) was generated. It was estimated then that each Jamaican generates 0.6-0.8 kg of solid waste per day. In 1999, waste generation increased to 945,000 tonnes. *(Please refer to the Jamaica Environment 2001: Environment Statistics and State of the Environment Report pgs 10-15.)*

Saint Lucia:
The Saint Lucia Solid Waste Management Authority is responsible for the management of solid waste in Saint Lucia. There are currently two disposal sites in Saint Lucia: the Ciceron Waste Disposal Site and the Vieux Fort Solid Waste Disposal Site. The Ciceron Site is soon to be closed and the Vieux Fort Disposal Site upgraded. A modern disposal site that complies with international standards will be built to replace the Ciceron Site.

The total volume of waste generated in 1998 was 202,045.5 m^3. In 1999, the total volume was 259,884 m^3; in 2000, 298,488 m^3 and in 2001, the total volume of waste generated was 275,906 m^3. Preliminary census results show that 88.4 per cent of households use the garbage trucks/skip as the main method of garbage disposal, followed by burning which is used by 5.1 per cent of households and dumping which accounts for the remaining 1.8 per cent of waste disposal. *(Please refer to the Saint Lucia Compendium of Environmental Statistics 2001 pgs 77-78.)*

Suriname:
The amount of waste generated is increasing with technological developments, new consumption patterns and increasing populations. A significant problem in Suriname is the poor waste disposal and uncontrolled disposal of waste in rivers, gullies and open spaces. The insufficient management of the waste produced is a very serious threat to human health and the environment. *(Please refer to Suriname's Environmental Statistics pgs. 30-31.)*

Appendix 1.11
Sources of Waste Data

1.11.1 (a): Sources of Data for Table 11.1 - Generation of Waste by Type and Sector: 1990, 1995 - 2005

Country	Data Source
ANTIGUA AND BARBUDA	National Solid Waste Management Authority
BELIZE	Land Information Centre
GUYANA	Bureau of Statistics
JAMAICA	Statistical Institute of Jamaica
ST VINCENT AND THE GRENADINES	Central Water and Sewerage Authority
TRINIDAD AND TOBAGO	UNDP/EMA (1998) Pollutant Inventory Study for Trinidad and Tobago
ANGUILLA	Anguilla Statistics Department
BERMUDA	Department of Statistics

1.11.1 (b): Notes for Table 11.1 - Generation of Waste by Type and Sector: 1990, 1995 - 2005

Country	Notes
ANTIGUA AND BARBUDA	Data refer to Antigua only. Manufacturing industries reflect the amalgamation of industrial, commercial and institutional waste. Construction reflects the amalgamation of construction and demolition waste. Other includes inter alia medical wastes, ship generated wastes, sewage, street sweepings, bulk wastes and tires.
BELIZE	Industrial Activities = waste generated from sugar, citrus and shrimp industries. Total waste generated is estimated using per capita from urban areas * population A - Includes waste from urban areas only (residential and commercial)
GUYANA	Generated waste does not include construction and demolition waste, etc., while disposal figures may include such waste.
JAMAICA	* means estimate.
TRINIDAD AND TOBAGO	1 For Agriculture and Forestry Waste, estimates derived from applying the waste load factor from the WHO manual

1.11.2 (a): Sources of Data for Table 11.2 - Treatment and Disposal of Municipal and Hazardous Waste by Type of Method: 1990, 1995 – 1997, 1999 - 2005

Country	Data Source
ANTIGUA & BARBUDA	National Solid Waste Management Authority
BELIZE	Land Information Centre
DOMINICA	Environmental Co-ordinating Council
GUYANA	Mayor and City Council, UNEP
JAMAICA	Statistical Institute of Jamaica
ST VINCENT AND THE GRENADINES	Central Water and Sewerage Authority
TRINIDAD AND TOBAGO	Solid Waste Management Company Limited (SWMCOL)
ANGUILLA	Anguilla Statistics Department
BRITISH VIRGIN ISLANDS	National Statistics Office

1.11.2 (b): Notes for Table 11.2 - Treatment and Disposal of Municipal and Hazardous Waste by Type of Method: 1990, 1995 – 1997, 1999 - 2005

Country	Notes
ANTIGUA AND BARBUDA	Data refer to Antigua only.
BELIZE	Hazardous waste is waste from hospitals only. Information of municipal waste managed was obtained from municipal collection agencies. 1999: SOURCE: ECLAC, REDESA Environmental Statistics & Indicators Database (BADEIMA)
DOMINICA	All information is derived from a Characterization Study carried out in 2002. No recorded data on solid waste management existed before that time. It must however be noted that even some of this information is a best estimate from projections made in a Consultant's Report in 1995. The Dominica Solid Waste Management Corporation now has a weighbridge and hopes to provide more accurate data in the coming years.
JAMAICA	A means estimate n/a Not Available
TRINIDAD AND TOBAGO	Data are from Trinidad and Tobago Solid Waste Management Company Limited (SWMCOL). The landfills managed by SWMCOL collect 85% of solid waste.
BRITISH VIRGIN ISLANDS	Incineration values refer to main island of Tortola only. Other refers to dump site.