

# CHAPTER 2

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## WASTE GENERATION, COMPOSITION AND MANAGEMENT DATA

[Parts shaded in grey – the unchanged text from the 2006 IPCC Guidelines]

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## 2 WASTE GENERATION, COMPOSITION AND MANAGEMENT DATA

### 2.1 INTRODUCTION

The starting point for the estimation of greenhouse gas emissions from solid waste disposal, biological treatment and incineration and open burning of solid waste is the compilation of activity data on waste generation, composition and management. General guidance on the data collection for solid waste disposal, biological treatment and incineration and open burning of waste is given in this chapter in order to ensure consistency across these waste categories. More detailed guidance on choice of activity data, emission factors and other parameters needed to make the emission estimates is given under Chapter 3, Solid Waste Disposal, Chapter 4, Biological Treatment of Solid Waste, and in Chapter 5, Incineration and Open Burning of Waste.

Solid waste generation is the common basis for activity data to estimate emissions from solid waste disposal, biological treatment, and incineration and open burning of waste. Solid waste generation rates and composition vary from country to country depending on the economic situation, industrial structure, waste management regulations and life style. The availability and quality of data on solid waste generation as well as subsequent treatment also vary significantly from country to country. Statistics on waste generation and treatment have been improved substantially in many countries during the last decade, but at present only a small number of countries have comprehensive waste data covering all waste types and treatment techniques. Historical data on waste disposal at SWDS are necessary to estimate methane (CH<sub>4</sub>) emissions from this category using the First Order Decay method (see Chapter 3 Solid Waste Disposal, Section 3.2.2). Very few countries have data on historical waste disposal going back several decades.

Solid waste is generated from households, offices, shops, markets, restaurants, public institutions, industrial installations, water works and sewage facilities, construction and demolition sites, and agricultural activities (emissions from manure management as well as on-site burning of agricultural residues are treated in the Agriculture, Forestry and Other Land Use (AFOLU) Volume). It is a *good practice* to account for all types of solid waste when estimating waste-related emissions in the greenhouse gas inventory.

Solid waste management practices include: collection, recycling, solid waste disposal on land, biological and other treatments as well as incineration and open burning of waste. Although recycling (material recovery)<sup>1</sup> activities will affect the amounts of waste entering into other management and treatment systems, the impact on emissions due to recycling (e.g., changes in emissions in production processes and transportation) is covered under other sectors and will not be addressed here in more detail.

This chapter provides updated data for the year (2010) for waste generation rates and waste composition by region according to UN classification. Waste generation rate and waste composition are key parameters used in the FOD model for estimation of CH<sub>4</sub> emissions from SWDS. These two parameters are subject to change over time depending on waste policies such as promotion of waste to energy, recycling and other treatment technologies. The refinement tables provide data which are based on references found during the period 2005 to 2010 which are assumed to be applicable for estimates of the year 2010. Data provided in *Revised 1996 IPCC Guidelines* and *2006 IPCC Guidelines* are also help countries construct proper historical time series for waste generation which varies by time. The update of waste composition by country and region based on city and country level information is provided. Waste composition provided are in line with IPCC FOD model. The refinement provides detailed information per country in the tables in the Annexes. When country values are not available in the annex, default regional values provided in Tables 2.A.1 and 2.A.2 can be used.

In addition to waste generation rate and waste composition, this refinement provides data on carbon, nitrogen and DOC contents in sludge which are also used in Chapter 6, Volume 5 (Waste) and Chapter 11, Volume 4 (AFOLU).

### 2.2 WASTE GENERATION AND MANAGEMENT DATA

No refinement

#### 2.2.1 Municipal Solid Waste (MSW)

Default data

## Second-order Draft

Updated default data of region-specific waste generation rate per capita per year are provided in updated Table 2.1. To generate data sets on waste practice at the country level for EU countries, the data were derived from Eurostat, for other countries-World bank data based on references. These data are based on weight of wet waste and can be assumed to be applicable for the year 2010. Waste generation per capita for subsequent or earlier years can be estimated using the same guidance indicated in *2006 IPCC Guidelines*. Data from *Revised 1996 IPCC Guidelines* and *2006 IPCC Guidelines* provided in Table 2.A.1 help countries construct proper historical time series for waste generation which varies by time.

The data for waste generation rate provided in the updated Tables 2.1 and 2A.1 for developing countries (in italics in the tables) should be multiplied by the urban population only since these rates assume that the waste is generated by urban population and not rural population. For other countries (not in italics in the table), the generation rates should be multiplied by the total population to estimate the total waste generated in the country.

TABLE 2.1 (UPDATED)						
MSW GENERATION AND TREATMENT DATA – REGIONAL DEFAULTS						
Region	MSW Generation Rate <sup>1,2,3</sup> (tonnes/cap/yr)	Fraction of MSW open dumped	Fraction of MSW disposed to landfills	Fraction of MSW incinerated	Fraction of MSW composted	Fraction of other MSW management, unspecified <sup>4</sup>
<b>Asia</b>						
Central Asia	0.34	–	–	–	–	–
Eastern Asia	0.48	0.00	0.23	0.24	0.00	0.52
South-Eastern Asia	0.48	–	–	–	–	–
Southern Asia	0.50	–	–	–	–	–
Western Asia	0.69	0.11	0.68	0.08	0.01	0.12
<b>Africa</b>						
Northern Africa	0.41	0.79	0.17	0.00	0.00	0.04
Eastern Africa	0.29	0.98	0.00	0.00	0.01	0.01
Middle Africa	0.19	0.95	0.00	0.00	0.00	0.05
Southern Africa	0.33	–	–	–	–	–
Western Africa	0.18	0.00	0.64	0.00	0.00	0.36
<b>Europe</b>						
Eastern Europe	0.37	0.00	0.71	0.06	0.04	0.19
Northern Europe	0.48	0.00	0.47	0.20	0.09	0.24
Southern Europe	0.47	0.00	0.76	0.04	0.03	0.17
Western Europe	0.59	0.00	0.08	0.40	0.21	0.31
<b>America</b>						
Caribbean	0.78	0.03	0.78	0.00	0.01	0.18
Central America	0.58	0.13	0.62	0.00	0.00	0.25
South America	0.43	0.43	0.40	0.00	0.00	0.18
Northern America	0.96	0.00	0.22	0.26	0.13	0.38
<b>Oceania</b>						
Australia and New Zealand	0.60	0.00	0.69	0.04	0.00	0.27
Melanesia	1.18	–	–	–	–	–
Micronesia	1.35	–	–	–	–	–
Polynesia	0.60	0.00	0.69	0.04	0.00	0.27
<sup>1</sup> Data are based on weight of wet waste.						
<sup>2</sup> To obtain the total waste generation in the country, the per-capita values should be multiplied with the population whose waste is collected. In many countries, especially developing countries, this encompasses only urban population.						
<sup>3</sup> The data are default data for the year 2010, although for some countries the year for which the data are applicable was not given in the reference, or data for the year 2010 were not available. This year for which the data are collected, where available, is given in Annex 2A.1						
<sup>4</sup> Other, unspecified, includes data on recycling for some countries.						

## UPDATING FROM 2006 IPCC GUIDELINES

Updated Table 2.1 provides updated default data on waste generation rate by region. Data by country are provided in updated Annex 2A.1. Fraction of treatments are categorized by treatment technology used in the *2006 IPCC Guidelines*.

## 2.2.2 Sludge

No refinement

## 2.2.3 Industrial waste

No refinement

## 2.2.4 Other waste

No refinement

# 2.3 WASTE COMPOSITION

## 2.3.1 Municipal Solid Waste (MSW)

Waste composition is one of the main factors influencing emissions from solid waste treatment, and is influenced by factors such as cultural norms, level of economic development, climate, and energy consumption etc. In the municipal solid waste stream, waste can be classified into organic and inorganic component. Food waste, garden (yard) and park waste, and wood are classified as organic waste while paper/cardboard, textiles, nappies, and leather/rubber contain some fossil carbon. The different waste types contain different amount of degradable organic carbon (DOC) and fossil carbon. Waste compositions, as well as the classifications used to collect data on waste composition in MSW vary widely in different regions and countries.

In this Volume, default data on waste composition in MSW are provided for the following waste types:

- (1) food waste
- (2) garden (yard) and park waste
- (3) paper and cardboard
- (4) wood
- (5) textiles
- (6) nappies (disposable diapers)
- (7) rubber and leather
- (8) plastics
- (9) metal
- (10) glass (and pottery and china)
- (11) other (e.g., ash, dirt, dust, soil, electronic waste)

Waste types from (1) to (6) contain most of the DOC in MSW. Ash, dust, rubber and leather contain also certain amounts of non-fossil carbon, but this is hardly degradable. Some textiles, plastics (including plastics in disposable nappies), rubber and electronic waste contain the bulk part of fossil carbon in MSW. Paper (with coatings) and leather (synthetic) can also include small amounts of fossil carbon. It is a *good practice* to split such components into biodegradable and fossil shares by mass proportion of fossil and non-fossil carbon.

Based on data on MSW compositions collected from international literatures, the regional average components were calculated and the regional default data on waste composition in MSW are given in updated Table 2.3. These updated default data are by specific region using UN classification in accordance to the updated default data of waste generation rate.

These data are based on weight of wet waste without industrial waste. Table 2.3 updated does not provide default data for garden and park waste and nappies. In the Tier 1 default method these waste fractions can be assumed to be zero, i.e., they can be assumed to be encompassed by the other waste types.

This refinement updates waste composition by region with the average from city and country level in wet weight basis. Waste components are in line with IPCC Waste model. Detailed information on waste composition is provided in new Annex 2A.2.

<b>TABLE 2.3 (UPDATED)</b> <b>MSW COMPOSITION DATA BY PERCENTAGE-REGIONAL DEFAULTS</b>									
Region	Food Waste	Paper/ Card-board	Wood	Textiles	Rubber/ Leather	Plastic	Metal	Glass	Other
<b>Asia</b>									
Central Asia	28.0	13.0	0.0	9.8	0.0	18.5	0.9	14.5	15.3
Eastern Asia	28.5	9.4	1.9	2.8	3.4	7.0	1.2	2.2	43.7
South-Eastern Asia	41.6	12.9	3.1	2.0	1.1	10.6	3.2	2.9	22.7
Southern Asia	44.5	5.2	1.5	2.3	0.9	5.0	1.0	1.0	38.8
Western Asia	38.1	9.8	2.3	3.3	0.8	8.3	2.8	2.4	32.2
<b>Africa</b>									
Northern Africa	54.3	12.0	0.0	10.6	0.0	9.6	2.9	2.9	7.8
Eastern Africa	38.2	7.4	1.8	4.0	0.0	7.7	1.1	1.9	37.9
Middle Africa	42.2	13.4	0.0	20.9	0.0	9.2	3.4	3.0	7.9
Southern Africa	28.5	10.5	0.0	5.4	0.0	19.6	4.6	6.6	24.9
Western Africa	40.3	7.9	3.3	3.5	1.7	10.7	5.0	4.0	23.6
<b>Europe</b>									
Eastern Europe	28.9	13.9	1.3	2.6	1.6	8.8	2.3	7.3	33.4
Northern Europe	28.2	13.0	1.7	2.7	1.4	9.4	2.8	3.5	37.4
Southern Europe	31.5	15.0	1.0	4.4	0.2	11.3	2.2	3.7	30.8
Western Europe	23.5	19.8	6.4	2.6	0.3	9.1	4.1	5.3	29.1
<b>America</b>									
Caribbean	54.2	13.4	0.6	4.1	0.0	11.4	2.4	3.0	11.0
Central America	52.6	12.9	0.0	1.5	0.0	9.0	3.2	4.8	16.1
South America	55.3	16.3	0.0	0.0	0.0	16.6	2.1	3.8	5.9
Northern America	14.5	24.3	4.7	3.5	2.5	7.9	6.2	4.0	32.3
<b>Oceania</b>									
Australia and New Zealand	23.5	9.0	7.8	3.2	0.9	5.8	5.7	3.5	40.8
<p>Note 1: Data are based on weight of wet waste of MSW without industrial waste at generation around year 2010.</p> <p>Note 2: The region-specific values are calculated from national, partly incomplete composition data. The percentages given may therefore not add up to 100%. Some regions may not have data for some waste types - blanks in the table represent missing data.</p> <p>Note 3: Data of rest of Oceania and Caribbean are not refined</p> <p>Sources:</p> <p>Daniel Hoornweg and Perinaz Bhada-Tata (2012)</p> <p>Dawda Badgie et al. (2012)</p> <p>EPA (2010)</p> <p>Pennsylvania Department of Environmental Protection (2003)</p> <p>Yi Xiao et al. (2008)</p> <p>Bryan F. Staley and Morton A. Barlaz (2005)</p> <p>Tapan Narayana (2009)</p> <p>Guadalupe Gomez et al. (2009)</p> <p>Emilia den Boer et al. (2010)</p> <p>Stephen J. Burnley (2007)</p> <p>S.J. Burnley et al. (2007)</p> <p>David C. Wilson et al. (2010)</p>									



## 2.3.2 Sludge

This refinement presents guidance for estimation of emissions from sludge treatment in addition to the *2006 IPCC Guidelines*.

The DOC content in sludge will vary depending on the wastewater treatment method producing the sludge, and also be different for domestic and industrial sludge.

Sludge generated in wastewater treatment plant operation is characterized by total suspended solids (TSS) and organic fraction of sludge corresponds with volatile suspended solids (VSS).

A rough default value of 9 percent DOC (assuming the dry matter content to be 35 percent) can be used for industrial sludge, when country and/or industry-specific is not available. The default DOC value applies for total industrial sludge in a country. Sewage, food industry, textile industry and chemical industry will generate organic sludge. DOC is also found in sludge from water work and dredging. The DOC in sludge can vary much by industry type. Examples of carbon contents in some organic sludge (percentage of dry matter) in Japan are: 27 percent for pulp and paper industry, 30 percent for food industry and 52 percent for chemical industry (Yamada et al., 2003).

Amount of DOC is estimated as multiplication of share of carbon in sludge (percent of dry mass) and organic fraction of sludge (VSS). When estimating emissions, it is a *good practice* to differentiate between raw sludge and aerobically or anaerobically stabilized sludge, while in raw sludge VSS represents about 50 percent and in stabilized sludge VSS is reduced to about 30 percent.

Information of C and N content in sludge were added for estimating emissions from sludge in composting, incineration, landfilling and land application. Default values of DOC, carbon and nitrogen content as percent of dry mass of domestic sludge and sludge in selected industries are shown in the new Table 2.4A below.

TABLE 2.4A (NEW)						
DEFAULT VALUE AND UNCERTAINTY OF CARBON CONTENT, NITROGEN CONTENT AND DOC OF DOMESTIC AND INDUSTRIAL SLUDGE (PERCENT OF DRY MATTER)						
Sludge	Carbon content		Nitrogen content		DOC	
	Carbon content (percent)	Uncertainty (percent)	Nitrogen content (percent)	Uncertainty (percent)	DOC fraction	Uncertainty (percent)
Domestic Sewage Sludge	31	+/- 27	4.2	+/- 56	0.16	+/- 61
Food Industry (fruits & vegetables)	44	+/- 33	1.1	+/- 45	0.36	+/- 69
Paper Industry (process sludge)	28	+/-49	0.5	+/-100	0.12	+/-25
Paper Industry ( WWT sludge)	31	+/- 15	0.9	+/- 60	0.12	+/- 25
Default for industrial sludge <sup>1</sup>					0.26	
Source: Derived from Phyllis2 database for biomass and waste, <a href="https://www.ecn.nl/phyllis2">https://www.ecn.nl/phyllis2</a> Energy research Centre of the Netherlands						
<sup>1</sup> Derived from <i>2006 IPCC Guidelines</i> (DOC of 9% at 35% of dry mass is equal to 26% at 100% of dry mass)						

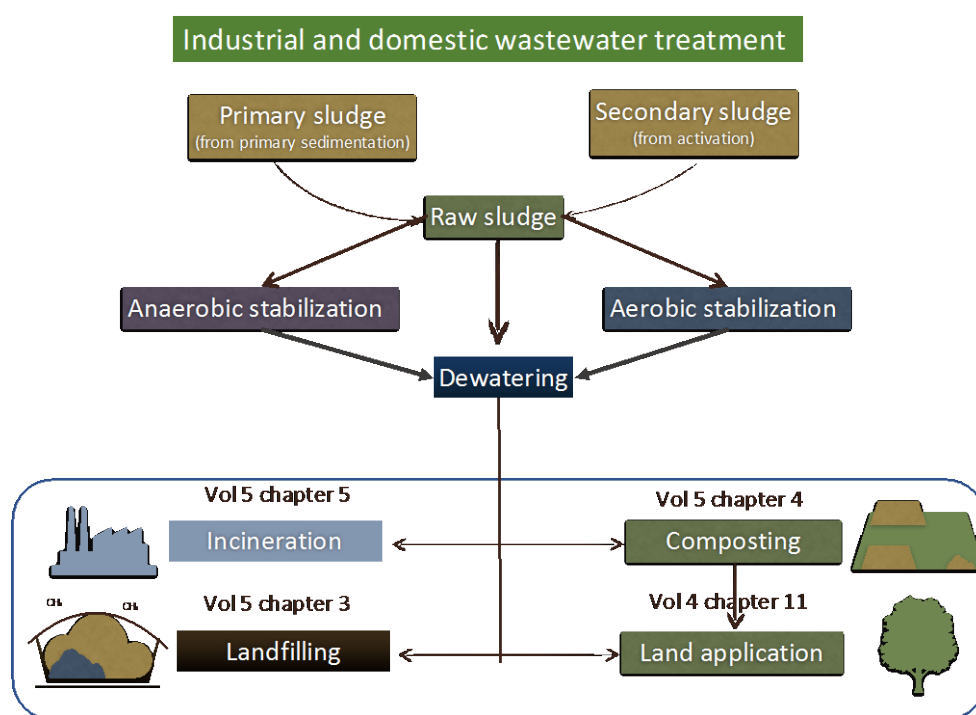
### Box 2.1A (NEW) SLUDGE PATHWAY

The 2006 IPCC Guidelines elaborate sludge as "...Sludge from domestic and industrial wastewater treatment plants is addressed as a separate waste category in this Volume. In some countries, sludge from domestic wastewater treatment is included in MSW and sludge from industrial wastewater treatment in industrial waste. Countries may also include all sludge in industrial waste. When country-specific categorization is used, it should be documented transparently...".

In this refinement definition of sludge is elaborated. Sludge is a mixture of liquid and solid components and can be produced as sewage sludge from wastewater treatment processes or as a settled suspension obtained from conventional drinking water treatment and from numerous other industrial processes. Sludge from industrial processes is usually process-specific and it is a *good practice* to obtain sludge composition data from producers.

Information C and N content in sludge were revealed further use in other treatment include wastewater and agriculture. Emission from sludge treatment is shown in figure below. In addition to emission estimate and reporting in the 2006 IPCC Guidelines Chapter 2, Section 2.2.2 estimation of CH<sub>4</sub> generated from anaerobic sludge stabilization at a wastewater treatment plant should be estimated according to methodology Chapter 4 (Volume 5) and resulting emissions should be included in Chapter 6 (Volume 5).

#### Sludge treatment pathway



## 2.3.3 Industrial waste

No refinement

## 2.3.4 Other waste

No refinement

188 **Annex 2A.1 (Updated) Waste Generation and Management Data – by country and regional averages**

TABLE 2A.1 (UPDATED)											
MSW GENERATION AND MANAGEMENT DATA– BY COUNTRY AND REGIONAL AVERAGE											
Region/country	MSW <sup>1,2</sup> Generation Rate IPCC-1996 Values <sup>4</sup> (tonnes/cap/yr)	MSW <sup>1, 2, 3</sup> Generation Rate IPCC- 2006 Values <sup>4</sup> (tonnes/cap/yr)	MSW Generation Rate Values <sup>4</sup> (tonnes/cap/yr)	Fraction of MSW disposed to SWDS IPCC-1996 Values <sup>4</sup>	Fraction of MSW disposed to SWDS IPCC-2006 Values <sup>4</sup>	Fraction of MSW disposed to SWDS		Fraction of MSW incinerated	Fraction of MSW composted	Fraction of other MSW mana- gement, unspe- cified <sup>5</sup>	Source
						Open dumped	Disposed to landfills				
Year	1990	2000	2010	1990	2000	2010	2010	2010	2010	2010	
<b>Asia</b>											
<b>Central Asia</b>	<b>0.12</b>	<b>0.21</b>	<b>0.34</b>	<b>0.60</b>	<b>0.74</b>						
<i>Tajikistan</i>			0.32								1
<i>Turkmenistan</i>			0.36								1
<b>Eastern Asia</b>	<b>0.41</b>	<b>0.37</b>	<b>0.48</b>	<b>0.38</b>	<b>0.55</b>	<b>0.00</b>	<b>0.23</b>	<b>0.24</b>	<b>0.00</b>	<b>0.52</b>	
<i>China</i>		0.27	0.37		0.97						2
Hong Kong			0.93			0.00	0.51	0.00	0.00	0.49	3
Macao			0.62			0.00	0.23	0.00	0.00	0.77	3
Japan	0.41	0.47	0.35	0.38	0.25	0.00	0.01	0.76	0.00	0.22	4
<i>Mongolia</i>			0.24								1
Republic of Korea		0.38	0.35		0.42	0.00	0.18	0.22	0.00	0.61	5
<b>South-Eastern Asia</b>		<b>0.27</b>	<b>0.48</b>		<b>0.59</b>						
<i>Brunei Darussalam</i>			0.32								1
<i>Indonesia</i>		0.28	0.19		0.80						1

Second-order Draft

**TABLE 2A.1 (UPDATED)**  
**MSW GENERATION AND MANAGEMENT DATA— BY COUNTRY AND REGIONAL AVERAGE**

Region/country	MSW <sup>1,2</sup> Generation Rate IPCC-1996 Values <sup>4</sup> (tonnes/cap/yr)	MSW <sup>1, 2, 3</sup> Generation Rate IPCC- 2006 Values <sup>4</sup> (tonnes/cap/yr)	MSW Generation Rate Values <sup>4</sup> (tonnes/cap/yr)	Fraction of MSW disposed to SWDS IPCC-1996 Values <sup>4</sup>	Fraction of MSW disposed to SWDS IPCC-2006 Values <sup>4</sup>	Fraction of MSW disposed to SWDS		Fraction of MSW incinerated	Fraction of MSW composted	Fraction of other MSW mana- gement, unspe- cified <sup>5</sup>	Source
						Open dumped	Disposed to landfills				
Year	1990	2000	2010	1990	2000	2010	2010	2010	2010	2010	
<i>Lao People's Democratic Republic</i>		0.25	0.26		0.40						1
<i>Malaysia</i>		0.30	0.55		0.70						6
<i>Myanmar</i>		0.16	0.16		0.60						1
<i>Philippines</i>		0.19	0.18		0.62						1
Singapore		0.40	1.44		0.20	0.00	0.03	0.36	0.01	0.61	3
<i>Thailand</i>		0.40	0.64		0.80						1
<i>Viet Nam</i>		0.20	0.53		0.60						1
<b>Southern Asia</b>	<b>0.12</b>	<b>0.21</b>	<b>0.50</b>	<b>0.60</b>	<b>0.74</b>						
<i>Bangladesh</i>		0.18	0.18		0.95						7
<i>Bhutan</i>			0.53								1
<i>India</i>	0.12	0.17	0.12	0.60	0.70						1
<i>Iran (Islamic Republic of)</i>			0.06								1
<i>Maldives</i>			0.91								8
<i>Nepal</i>		0.18	0.04		0.40						1
<i>Pakistan</i>			0.31								1
<i>Sri Lanka</i>		0.32			0.90						1

**TABLE 2A.1 (UPDATED)**  
**MSW GENERATION AND MANAGEMENT DATA— BY COUNTRY AND REGIONAL AVERAGE**

Region/country	MSW <sup>1,2</sup> Generation Rate IPCC-1996 Values <sup>4</sup> (tonnes/cap/yr)	MSW <sup>1, 2, 3</sup> Generation Rate IPCC- 2006 Values <sup>4</sup> (tonnes/cap/yr)	MSW Generation Rate Values <sup>4</sup> (tonnes/cap/yr)	Fraction of MSW disposed to SWDS IPCC-1996 Values <sup>4</sup>	Fraction of MSW disposed to SWDS IPCC-2006 Values <sup>4</sup>	Fraction of MSW disposed to SWDS		Fraction of MSW incinerated	Fraction of MSW composted	Fraction of other MSW mana- gement, unspe- cified <sup>5</sup>	Source
						Open dumped	Disposed to landfills				
Year	1990	2000	2010	1990	2000	2010	2010	2010	2010	2010	
<b>Western Asia</b>			<b>0.69</b>			<b>0.11</b>	<b>0.68</b>	<b>0.08</b>	<b>0.01</b>	<b>0.12</b>	
<i>Armenia</i>			0.25			0.00	1.00	0.00	0.00	0.00	1
<i>Bahrain</i>			0.40								1
Cyprus		0.68	0.69		1.00	0.00	0.86	0.00	0.00	0.14	9
<i>Georgia</i>			0.62								1
Israel			0.62			0.00	0.89	0.00	0.00	0.11	4
<i>Jordan</i>			0.38			0.00	0.85	0.00	0.00	0.15	1
Kuwait			3.05			0.00	0.75	0.00	0.00	0.25	3
<i>Lebanon</i>			0.43			0.37	0.46	0.00	0.08	0.09	1
<i>Oman</i>			0.26								10
Qatar			1.25								3
<i>Saudi Arabia</i>			0.47								10
State of Palestine			0.38			0.00	0.29	0.69	0.00	0.02	3
<i>Syrian Arab Republic</i>			0.50			0.60	0.23	0.00	0.04	0.13	1,10
Turkey		0.50	0.41		0.99	0.00	0.84	0.00	0.01	0.16	9
<i>United Arab Emirates</i>			0.61								1
<b>Africa</b>											
<b>Northern Africa</b>		<b>0.29</b>	<b>0.41</b>		<b>0.69</b>	<b>0.79</b>	<b>0.17</b>	<b>0.00</b>	<b>0.00</b>	<b>0.04</b>	

Second-order Draft

**TABLE 2A.1 (UPDATED)**  
**MSW GENERATION AND MANAGEMENT DATA— BY COUNTRY AND REGIONAL AVERAGE**

Region/country	MSW <sup>1,2</sup> Generation Rate IPCC-1996 Values <sup>4</sup> (tonnes/cap/yr)	MSW <sup>1, 2, 3</sup> Generation Rate IPCC- 2006 Values <sup>4</sup> (tonnes/cap/yr)	MSW Generation Rate Values <sup>4</sup> (tonnes/cap/yr)	Fraction of MSW disposed to SWDS IPCC-1996 Values <sup>4</sup>	Fraction of MSW disposed to SWDS IPCC-2006 Values <sup>4</sup>	Fraction of MSW disposed to SWDS		Fraction of MSW incinerated	Fraction of MSW composted	Fraction of other MSW mana- gement, unspe- cified <sup>5</sup>	Source
						Open dumped	Disposed to landfills				
Year	1990	2000	2010	1990	2000	2010	2010	2010	2010	2010	
<i>Algeria</i>			0.44			0.97	0.00	0.00	0.01	0.02	1
<i>Egypt</i>			0.50		0.70						1
<i>Morocco</i>			0.53			0.95	0.01	0.00	0.00	0.04	1
<i>Sudan</i>		0.29	0.29		0.82						1
<i>Tunisia</i>			0.30			0.45	0.50	0.00	0.00	0.05	1
<b>Eastern Africa</b>		<b>0.29</b>	<b>0.29</b>		<b>0.69</b>	<b>0.98</b>	<b>0.00</b>	<b>0.00</b>	<b>0.01</b>	<b>0.01</b>	
<i>Burundi</i>			0.20								1
<i>Comoros</i>			0.81								1
<i>Eritrea</i>			0.18								1
<i>Ethiopia</i>			0.11								11
<i>Kenya</i>			0.11								1
<i>Madagascar</i>			0.29			0.96	0.00	0.00	0.04	0.00	1
<i>Malawi</i>			0.18								1
<i>Mauritius</i>			0.31			0.98	0.00	0.00	0.00	0.02	1, 3
<i>Mozambique</i>			0.05								1
Réunion			0.69								3
<i>Rwanda</i>			0.19								1
<i>Seychelles</i>			1.09								1

**TABLE 2A.1 (UPDATED)**  
**MSW GENERATION AND MANAGEMENT DATA— BY COUNTRY AND REGIONAL AVERAGE**

Region/country	MSW <sup>1,2</sup> Generation Rate IPCC-1996 Values <sup>4</sup> (tonnes/cap/yr)	MSW <sup>1, 2, 3</sup> Generation Rate IPCC- 2006 Values <sup>4</sup> (tonnes/cap/yr)	MSW Generation Rate Values <sup>4</sup> (tonnes/cap/yr)	Fraction of MSW disposed to SWDS IPCC-1996 Values <sup>4</sup>	Fraction of MSW disposed to SWDS IPCC-2006 Values <sup>4</sup>	Fraction of MSW disposed to SWDS		Fraction of MSW incinerated	Fraction of MSW composted	Fraction of other MSW mana- gement, unspe- cified <sup>5</sup>	Source
						Open dumped	Disposed to landfills				
Year	1990	2000	2010	1990	2000	2010	2010	2010	2010	2010	
<i>Uganda</i>			0.12			1.00	0.00	0.00	0.00	0.00	1
<i>United Republic of Tanzania</i>			0.09								1
<i>Zambia</i>			0.08								1
<i>Zimbabwe</i>			0.19								1
<b>Middle Africa</b>		<b>0.29</b>	<b>0.19</b>		<b>0.69</b>	<b>0.95</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.05</b>	
<i>Angola</i>			0.18								1
Cameroon			0.28			0.95	0.00	0.00	0.00	0.05	1, 12
<i>Central African Republic</i>			0.18								1
<i>Chad</i>			0.18								1
<i>Congo</i>			0.18								1
<i>Democratic Republic of the Congo</i>			0.18								1
<i>Gabon</i>			0.16								1
<i>Sao Tome and Principe</i>			0.18								1
<b>Southern Africa</b>		<b>0.29</b>	<b>0.33</b>		<b>0.69</b>						
<i>Botswana</i>			0.38								1
<i>Lesotho</i>			0.18								1
<i>Namibia</i>			0.18								1

Second-order Draft

TABLE 2A.1 (UPDATED)											
MSW GENERATION AND MANAGEMENT DATA— BY COUNTRY AND REGIONAL AVERAGE											
Region/country	MSW <sup>1,2</sup> Generation Rate IPCC-1996 Values <sup>4</sup> (tonnes/cap/yr)	MSW <sup>1, 2, 3</sup> Generation Rate IPCC- 2006 Values <sup>4</sup> (tonnes/cap/yr)	MSW Generation Rate Values <sup>4</sup> (tonnes/cap/yr)	Fraction of MSW disposed to SWDS IPCC-1996 Values <sup>4</sup>	Fraction of MSW disposed to SWDS IPCC-2006 Values <sup>4</sup>	Fraction of MSW disposed to SWDS		Fraction of MSW incinerated	Fraction of MSW composted	Fraction of other MSW mana- gement, unspe- cified <sup>5</sup>	Source
						Open dumped	Disposed to landfills				
Year	1990	2000	2010	1990	2000	2010	2010	2010	2010	2010	
<i>South Africa</i>			0.73	1.00	0.90						1
<i>Swaziland</i>			0.19								1
<b>Western Africa</b>		<b>0.29</b>	<b>0.18</b>		<b>0.69</b>	<b>0.00</b>	<b>0.64</b>	<b>0.00</b>	<b>0.00</b>	<b>0.36</b>	
<i>Benin</i>			0.20								1
<i>Burkina Faso</i>			0.19								1
<i>Cabo Verde</i>			0.18								1
<i>Côte d'Ivoire</i>			0.18								1
<i>Gambia</i>			0.19								1
Ghana			0.03								1
Mali			0.24								13
<i>Mauritania</i>			0.18								1
<i>Niger</i>			0.18			0.00	0.64	0.00	0.00	0.36	1
<i>Nigeria</i>			0.20		0.40						14
<i>Senegal</i>			0.19								1
<i>Sierra Leone</i>			0.16								15
<i>Togo</i>			0.19								1
<b>Europe</b>											
<b>Eastern Europe</b>		<b>0.38</b>	<b>0.37</b>		<b>0.90</b>	<b>0.00</b>	<b>0.71</b>	<b>0.06</b>	<b>0.04</b>	<b>0.19</b>	



**TABLE 2A.1 (UPDATED)**  
**MSW GENERATION AND MANAGEMENT DATA— BY COUNTRY AND REGIONAL AVERAGE**

Region/country	MSW <sup>1,2</sup> Generation Rate IPCC-1996 Values <sup>4</sup> (tonnes/cap/yr)	MSW <sup>1, 2, 3</sup> Generation Rate IPCC- 2006 Values <sup>4</sup> (tonnes/cap/yr)	MSW Generation Rate Values <sup>4</sup> (tonnes/cap/yr)	Fraction of MSW disposed to SWDS IPCC-1996 Values <sup>4</sup>	Fraction of MSW disposed to SWDS IPCC-2006 Values <sup>4</sup>	Fraction of MSW disposed to SWDS		Fraction of MSW incinerated	Fraction of MSW composted	Fraction of other MSW mana- gement, unspe- cified <sup>5</sup>	Source
						Open dumped	Disposed to landfills				
Year	1990	2000	2010	1990	2000	2010	2010	2010	2010	2010	
Belarus			0.38								3
Bulgaria		0.52	0.55		1.00	0.00	0.74	0.00	0.00	0.26	9
Czechia		0.33	0.32		0.75	0.00	0.65	0.15	0.02	0.18	9
Hungary		0.45	0.40		0.92	0.00	0.70	0.10	0.04	0.16	9
Poland		0.32	0.32		0.98	0.00	0.62	0.00	0.07	0.31	9
Romania		0.36	0.31		1.00	0.00	0.76	0.00	0.10	0.14	9
Russian Federation	0.32	0.34	0.34	0.94	0.71						1
Slovakia		0.32	0.32		1.00	0.00	0.77	0.11	0.03	0.09	9
<b>Northern Europe</b>		<b>0.64</b>	<b>0.48</b>		<b>0.47</b>	<b>0.00</b>	<b>0.47</b>	<b>0.20</b>	<b>0.09</b>	<b>0.24</b>	
Denmark	0.46	0.67	0.76	0.20	0.10	0.00	0.03	0.48	0.18	0.31	9
Estonia		0.44	0.31		0.98	0.00	0.66	0.00	0.08	0.26	9
Finland	0.62	0.50	0.47	0.77	0.61	0.00	0.45	0.22	0.13	0.20	9
Iceland		1.00	0.48		0.86	0.00	0.72	0.08	0.05	0.15	9
Ireland	0.31	0.60	0.62	1.00	0.89	0.00	0.53	0.04	0.04	0.40	9
Latvia		0.27	0.32		0.92	0.00	0.91	0.00	0.01	0.09	9
Lithuania		0.31	0.40		1.00	0.00	0.86	0.00	0.02	0.12	9
Norway	0.51	0.62	0.47	0.75	0.55	0.00	0.06	0.50	0.16	0.28	9
Sweden	0.37	0.43	0.44	0.44	0.23	0.00	0.01	0.51	0.14	0.34	9

Second-order Draft

TABLE 2A.1 (UPDATED)											
MSW GENERATION AND MANAGEMENT DATA— BY COUNTRY AND REGIONAL AVERAGE											
Region/country	MSW <sup>1,2</sup> Generation Rate IPCC-1996 Values <sup>4</sup> (tonnes/cap/yr)	MSW <sup>1,2,3</sup> Generation Rate IPCC- 2006 Values <sup>4</sup> (tonnes/cap/yr)	MSW Generation Rate Values <sup>4</sup> (tonnes/cap/yr)	Fraction of MSW disposed to SWDS IPCC-1996 Values <sup>4</sup>	Fraction of MSW disposed to SWDS IPCC-2006 Values <sup>4</sup>	Fraction of MSW disposed to SWDS		Fraction of MSW incinerated	Fraction of MSW composted	Fraction of other MSW mana- gement, unspe- cified <sup>5</sup>	Source
						Open dumped	Disposed to landfills				
Year	1990	2000	2010	1990	2000	2010	2010	2010	2010	2010	
United Kingdom and Northern Ireland	0.69	0.57	0.51	0.90	0.82	0.00	0.46	0.13	0.15	0.26	9
<b>Southern Europe</b>		<b>0.52</b>	<b>0.47</b>		<b>0.85</b>	<b>0.00</b>	<b>0.76</b>	<b>0.04</b>	<b>0.03</b>	<b>0.17</b>	
Bosnia and Herzegovina			0.33			0.00	0.82	0.00	0.00	0.18	9
Croatia			0.38		1.00	0.00	0.94	0.00	0.01	0.05	9
Greece	0.31	0.41	0.53	0.93	0.91	0.00	0.83	0.00	0.02	0.15	9
Italy	0.34	0.50	0.55	0.88	0.70	0.00	0.46	0.17	0.12	0.25	9
Malta		0.48	0.60		1.00	0.00	0.91	0.00	0.00	0.09	9
Montenegro			0.54			0.00	0.88	0.00	0.00	0.12	9
Portugal	0.33	0.47	0.52	0.86	0.69	0.00	0.62	0.19	0.07	0.11	9
Serbia			0.36			0.00	0.71	0.00	0.00	0.29	9
Slovenia		0.51	0.49		0.90	0.00	0.57	0.01	0.02	0.40	9
Spain	0.36	0.60	0.51	0.85	0.68	0.00	0.62	0.09	0.12	0.18	9
Republic of Macedonia			0.35			0.00	1.00	0.00	0.00	0.00	9
<b>Western Europe</b>	<b>0.45</b>	<b>0.56</b>	<b>0.59</b>	<b>0.57</b>	<b>0.47</b>	<b>0.00</b>	<b>0.08</b>	<b>0.40</b>	<b>0.21</b>	<b>0.31</b>	
Austria	0.34	0.58	0.56	0.40	0.30	0.00	0.03	0.35	0.32	0.30	9
Belgium	0.40	0.47	0.46	0.43	0.17	0.00	0.02	0.40	0.21	0.37	9
France	0.47	0.53	0.53	0.46	0.43	0.00	0.31	0.34	0.17	0.18	9

**TABLE 2A.1 (UPDATED)**  
**MSW GENERATION AND MANAGEMENT DATA— BY COUNTRY AND REGIONAL AVERAGE**

Region/country	MSW <sup>1,2</sup> Generation Rate IPCC-1996 Values <sup>4</sup> (tonnes/cap/yr)	MSW <sup>1, 2, 3</sup> Generation Rate IPCC- 2006 Values <sup>4</sup> (tonnes/cap/yr)	MSW Generation Rate Values <sup>4</sup> (tonnes/cap/yr)	Fraction of MSW disposed to SWDS IPCC-1996 Values <sup>4</sup>	Fraction of MSW disposed to SWDS IPCC-2006 Values <sup>4</sup>	Fraction of MSW disposed to SWDS		Fraction of MSW incinerated	Fraction of MSW composted	Fraction of other MSW mana- gement, unspe- cified <sup>5</sup>	Source
						Open dumped	Disposed to landfills				
Year	1990	2000	2010	1990	2000	2010	2010	2010	2010	2010	
Germany	0.36	0.61	0.60	0.66	0.30	0.00	0.00	0.37	0.17	0.46	9
Luxembourg	0.49	0.66	0.68	0.35	0.27	0.00	0.18	0.36	0.19	0.27	9
Netherlands	0.58	0.62	0.57	0.67	0.11	0.00	0.02	0.49	0.24	0.25	9
Switzerland	0.40	0.40	0.71	0.23	1.00	0.00	0.00	0.50	0.17	0.34	9
<b>America</b>											
<b>Caribbean</b>		<b>0.49</b>	<b>0.78</b>		<b>0.83</b>	<b>0.03</b>	<b>0.78</b>	<b>0.00</b>	<b>0.01</b>	<b>0.18</b>	
Anguilla			1.10			0.00	1.00	0.00	0.00	0.00	3
Antigua and Barbuda			1.39			0.00	1.00	0.00	0.00	0.00	3
Bahamas		0.95	1.19		0.70						1
Barbados			1.73								1
Cuba		0.21	0.30		0.90	0.00	0.84	0.00	0.11	0.04	1
Dominica			0.32			0.00	1.00	0.00	0.00	0.00	1, 3
Dominican Republic		0.25	0.43		0.90						1
Grenada			0.99			0.00	0.90	0.00	0.00	0.10	1
Guadeloupe			0.60								3
Haiti			0.37			0.24	0.00	0.00	0.00	0.76	1
Jamaica			0.07			0.00	1.00	0.00	0.00	0.00	1
Saint Kitts and Nevis			1.99			0.00	1.00	0.00	0.00	0.00	1

Second-order Draft

TABLE 2A.1 (UPDATED)											
MSW GENERATION AND MANAGEMENT DATA— BY COUNTRY AND REGIONAL AVERAGE											
Region/country	MSW <sup>1,2</sup> Generation Rate IPCC-1996 Values <sup>4</sup> (tonnes/cap/yr)	MSW <sup>1,2,3</sup> Generation Rate IPCC- 2006 Values <sup>4</sup> (tonnes/cap/yr)	MSW Generation Rate Values <sup>4</sup> (tonnes/cap/yr)	Fraction of MSW disposed to SWDS IPCC-1996 Values <sup>4</sup>	Fraction of MSW disposed to SWDS IPCC-2006 Values <sup>4</sup>	Fraction of MSW disposed to SWDS		Fraction of MSW incinerated	Fraction of MSW composted	Fraction of other MSW mana- gement, unspe- cified <sup>5</sup>	Source
						Open dumped	Disposed to landfills				
Year	1990	2000	2010	1990	2000	2010	2010	2010	2010	2010	
Saint Lucia		0.55	0.25		0.83	0.00	1.00	0.00	0.00	0.00	3
Saint Vincent and the Grenadines			0.35			0.00	0.85	0.00	0.00	0.15	3
<i>Trinidad and Tobago</i>			0.58			0.06	0.00	0.00	0.00	0.94	1
<b>Central America</b>		<b>0.21</b>	<b>0.55</b>		<b>0.50</b>	<b>0.13</b>	<b>0.62</b>	<b>0.00</b>	<b>0.00</b>	<b>0.25</b>	
<i>Belize</i>			1.05			0.00	1.00	0.00	0.00	0.00	1
<i>Costa Rica</i>		0.17	0.50			0.22	0.72	0.00	0.00	0.06	1
<i>El Salvador</i>			0.41								1
<i>Guatemala</i>		0.22	0.73		0.40	0.00	0.22	0.00	0.00	0.78	1
<i>Honduras</i>		0.15	0.53		0.40						1
Mexico		0.31	0.34			0.00	0.96	0.00	0.00	0.04	4
<i>Nicaragua</i>		0.28	0.40		0.70	0.34	0.28	0.00	0.00	0.38	1
<i>Panama</i>			0.44			0.20	0.56	0.00	0.00	0.24	1
<b>South America</b>		0.26	<b>0.43</b>		0.54	<b>0.43</b>	<b>0.40</b>	<b>0.00</b>	<b>0.00</b>	<b>0.18</b>	
Argentina		0.28	0.37		0.59						16
<i>Bolivia</i>		0.16	0.12		0.70						1
Brazil		0.18	0.31		0.80						3
Chile			0.35			0.00	1.00	0.00	0.00	0.00	4
<i>Colombia</i>		0.26	0.35		0.31	0.54	0.46	0.00	0.00	0.00	1

**TABLE 2A.1 (UPDATED)**  
**MSW GENERATION AND MANAGEMENT DATA— BY COUNTRY AND REGIONAL AVERAGE**

Region/country	MSW <sup>1,2</sup> Generation Rate IPCC-1996 Values <sup>4</sup> (tonnes/cap/yr)	MSW <sup>1, 2, 3</sup> Generation Rate IPCC- 2006 Values <sup>4</sup> (tonnes/cap/yr)	MSW Generation Rate Values <sup>4</sup> (tonnes/cap/yr)	Fraction of MSW disposed to SWDS IPCC-1996 Values <sup>4</sup>	Fraction of MSW disposed to SWDS IPCC-2006 Values <sup>4</sup>	Fraction of MSW disposed to SWDS		Fraction of MSW incinerated	Fraction of MSW composted	Fraction of other MSW mana- gement, unspe- cified <sup>5</sup>	Source
						Open dumped	Disposed to landfills				
Year	1990	2000	2010	1990	2000	2010	2010	2010	2010	2010	
<i>Ecuador</i>		0.22	0.41		0.40						1
French Guiana			0.37								3
<i>Guyana</i>			1.95			0.37	0.59	0.00	0.00	0.04	1
<i>Paraguay</i>		0.44	0.08		0.40	0.42	0.44	0.00	0.00	0.14	1
<i>Peru</i>		0.20	0.37		0.53	0.19	0.66	0.00	0.00	0.15	1
<i>Suriname</i>			0.50			1.00	0.00	0.00	0.00	0.00	1
<i>Uruguay</i>		0.26	0.04		0.72	0.32	0.03	0.00	0.00	0.66	1
<i>Venezuela</i>		0.33	0.42		0.50	0.59	0.00	0.00	0.00	0.41	1
<b>Northern America</b>	<b>0.70</b>	<b>0.65</b>	<b>0.96</b>	<b>0.69</b>	<b>0.58</b>	<b>0.00</b>	<b>0.22</b>	<b>0.26</b>	<b>0.13</b>	<b>0.38</b>	
Bermuda			1.30			0.00	0.12	0.68	0.18	0.02	3
<i>Canada</i>	0.66	0.49	0.85	0.75	0.71	0.00	0.00	0.00	0.12	0.88	1
United States of America	0.73	1.14	0.74	0.62	0.55	0.00	0.54	0.12	0.08	0.26	4
<b>Oceania</b>											
<b>Australia and New Zealand</b>	<b>0.47</b>	<b>0.69</b>	<b>0.60</b>	<b>1.00</b>	<b>0.85</b>	<b>0.00</b>	<b>0.69</b>	<b>0.04</b>	<b>0.00</b>	<b>0.27</b>	
Australia	0.46	0.69	0.61	1.00	1.00	0.00	0.52	0.08	0.00	0.40	4
New Zealand	0.49		0.58	1.00	0.70	0.00	0.85	0.00	0.00	0.15	1, 4
<b>Melanesia</b>			<b>1.18</b>								
<i>Fiji</i>			0.77								1

Second-order Draft

TABLE 2A.1 (UPDATED)											
MSW GENERATION AND MANAGEMENT DATA— BY COUNTRY AND REGIONAL AVERAGE											
Region/country	MSW <sup>1,2</sup> Generation Rate IPCC-1996 Values <sup>4</sup> (tonnes/cap/yr)	MSW <sup>1, 2, 3</sup> Generation Rate IPCC- 2006 Values <sup>4</sup> (tonnes/cap/yr)	MSW Generation Rate Values <sup>4</sup> (tonnes/cap/yr)	Fraction of MSW disposed to SWDS IPCC-1996 Values <sup>4</sup>	Fraction of MSW disposed to SWDS IPCC-2006 Values <sup>4</sup>	Fraction of MSW disposed to SWDS		Fraction of MSW incinerated	Fraction of MSW composted	Fraction of other MSW mana- gement, unspe- cified <sup>5</sup>	Source
						Open dumped	Disposed to landfills				
Year	1990	2000	2010	1990	2000	2010	2010	2010	2010	2010	
<i>Solomon Islands</i>			1.57								1
<i>Vanuatu</i>			1.20								1
<b>Polynesia</b>			<b>1.35</b>								
<i>Tonga</i>			1.35								1

**TABLE 2A.1 (UPDATED)**  
**MSW GENERATION AND MANAGEMENT DATA— BY COUNTRY AND REGIONAL AVERAGE**

Region/country	MSW <sup>1,2</sup> Generation Rate IPCC-1996 Values <sup>4</sup> (tonnes/cap/yr)	MSW <sup>1, 2, 3</sup> Generation Rate IPCC- 2006 Values <sup>4</sup> (tonnes/cap/yr)	MSW Generation Rate Values <sup>4</sup> (tonnes/cap/yr)	Fraction of MSW disposed to SWDS IPCC-1996 Values <sup>4</sup>	Fraction of MSW disposed to SWDS IPCC-2006 Values <sup>4</sup>	Fraction of MSW disposed to SWDS		Fraction of MSW incinerated	Fraction of MSW composted	Fraction of other MSW mana- gement, unspe- cified <sup>5</sup>	Source
						Open dumped	Disposed to landfills				
Year	1990	2000	2010	1990	2000	2010	2010	2010	2010	2010	

<sup>1</sup> Data are based on weight of wet waste.

<sup>2</sup> To obtain the total waste generation in the country, the per-capita values should be multiplied with the population whose waste is collected. In many countries, especially developing countries, this encompasses only urban population.

<sup>3</sup> The data are default data for the year 2000, although for some countries the year for which the data are applicable was not given in the reference, or data for the year 2000 were not available. The year for which the data are collected is given below with source of the data, where available.

<sup>4</sup> Values shown in this column are the ones included in the *Revised 1996 IPCC Guidelines*.

<sup>5</sup> Other, unspecified, includes data on recycling for some countries.

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TABLE 2A.2 (NEW) WASTE COMPOSITION – BY COUNTRIES AND REGIONAL AVERAGES										
Region/Country	Food/kitchen waste	Paper/ cardboard	Wood	Textile	Rubber/ leather	Plastic	Metal	Glass/ pottery/ china	Others	Source
<b>Central Asia</b>										
<b>Kazakhstan</b>	28.0	13.0	0.0	9.8	0.0	18.5	0.9	14.5	15.3	1
<b>Eastern Asia</b>										
<b>China</b>	33.98	4.53	0.91	4.77	3.7	5.36	0.3	1.98	44.47	2, 3, 4, 5, 6, 7, 8, 9
<b>China, Hong Kong Special Administrative Region</b>	24.0	20.7	1.6	1.9	0.0	10.9	1.9	1.9	37.1	2, 4, 6, 8, 10
<b>China, Macao Special Administrative Region</b>	33.8	5.3	1.7	2.4	0.0	6.8	0.6	1.9	47.5	2
<b>Japan</b>	27.8	38.0	0.0	0.0	0.0	13.8	5.0	6.8	8.8	8, 11, 10, 12
<b>Mongolia</b>	70.7	3.4	0.0	0.0	0.0	3.4	0.1	3.5	15.2	13
<b>Republic of Korea</b>	18.0	22.4	5.3	10.3	6.4	9.6	4.9	3.0	20.1	8, 6, 14, 10, 12, 15
<b>South-Eastern Asia</b>										
<b>Cambodia</b>	65.0	4.0	0.0	0.0	0.0	13.0	1.0	5.0	12.0	8, 10
<b>Indonesia</b>	68.4	8.6	2.1	2.0	0.5	9.3	1.4	1.5	6.3	8, 10
<b>Lao People's Democratic Republic</b>	54.3	3.3	0.0	0.0	0.0	7.8	3.8	8.5	22.4	8, 10
<b>Malaysia</b>	41.3	15.7	2.9	2.1	1.0	11.4	3.7	2.5	19.5	16, 17, 18, 19, 20, 8, 14, 10
<b>Myanmar</b>	80.0	4.0	0.0	0.0	0.0	2.0	0.0	0.0	14.0	8
<b>Philippines</b>	47.4	14.9	0.0	0.0	0.0	18.3	4.6	3.2	11.6	3, 8, 10



<b>Singapore</b>	31.5	24.9	4.3	1.5	0.0	11.2	7.8	3.0	15.8	8, 6, 10
<b>Thailand</b>	46.0	12.6	5.7	2.7	2.2	13.7	3.4	5.1	8.9	9, 8, 10
<b>Viet Nam</b>	45.3	8.8	0.0	1.8	0.0	10.8	1.2	4.6	27.6	10, 21
<b>Southern Asia</b>										
<b>Bangladesh</b>	62.5	10.5	0.0	4.6	1.5	9.1	0.8	0.6	10.6	3, 22
<b>India</b>	33.1	5.6	6.5	1.8	1.3	3.6	1.0	0.9	46.2	3, 23, 9, 24, 25, 26, 10, 27
<b>Nepal</b>	75.4	7.8	0.0	0.0	0.0	8.0	0.5	2.1	6.2	3, 28, 10
<b>Sri Lanka</b>	78.2	7.4	0.0	0.0	0.0	4.3	1.3	1.2	7.6	9, 29, 10, 30
<b>Western Asia</b>										
<b>Cyprus</b>	20.0	11.0	0.0	0.0	0.0	7.0	1.0	5.0	56.0	31
<b>Iraq</b>	54.8	7.0	2.6	3.5	0.5	25.2	3.0	2.9	0.4	32
<b>Jordan</b>	53.5	13.5	0.0	0.0	0.0	15.0	1.5	3.0	13.5	22
<b>Oman</b>	8.2	19.4	1.4	14.3	0.0	31.3	2.6	2.9	19.9	33
<b>Saudi Arabia</b>	40.8	25.9	1.0	0.0	0.0	7.5	11.0	3.5	10.5	34
<b>State of Palestine</b>	55.2	10.1	0.0	3.0	0.0	11.0	2.9	3.1	14.6	35, 36
<b>Syrian Arab Republic</b>	58.4	12.9	0.0	0.0	0.0	11.9	1.0	7.9	7.9	
<b>Turkey</b>	46.9	6.8	0.0	2.4	0.0	7.5	2.4	2.6	31.4	37, 14, 12
<b>United Arab Emirates</b>	35.4	24.3	1.0	3.2	1.7	24.2	2.4	3.4	4.4	38
<b>Yemen</b>	56.4	10.9	0.0	0.0	0.0	10.9	5.0	3.0	13.9	
<b>Northern Africa</b>										
<b>Egypt</b>	67.0	18.0	0.0	0.0	0.0	3.0	2.0	3.0	7.0	
<b>Libya</b>	36.3	15.3	0.0	11.5	0.0	18.6	6.7	3.5	8.0	39

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<b>Tunisia</b>	66.2	9.5	0.0	0.0	0.0	10.0	2.0	3.0	9.5	
<b>Eastern Africa</b>										
<b>Kenya</b>	61.0	7.0	0.0	0.0	0.0	12.0	1...0	2.0	19.0	3
<b>Mauritius</b>	29.4	14.1	0.0	2.4	0.0	11.7	2.0	1.2	39.1	3, 40
<b>United Republic of Tanzania</b>	57.1	10.9	2.4	6.7	0.0	9.3	1.9	3.2	8.4	3, 41
<b>Zambia</b>	39.0	3.0	0.0	0.0	0.0	7.0	1.0	2.0	48.0	3
<b>Middle Africa</b>										
<b>Cameroon</b>	43.0	11.4	0.0	21.1	0.0	7.7	3.5	3.5	9.9	42, 43
<b>Southern Africa</b>										
<b>South Africa</b>	24.0	14.5	0.0	5.5	0.0	26.5	6.5	9.0	14.0	44
<b>Western Africa</b>										
<b>Benin</b>	56.8	3.3	1.2	1.0	0.0	4.6	0.0	0.0	33.1	
<b>Mali</b>	21.0	4.0	0.0	0.0	0.0	2.0	4.0	1.0	68.0	3
<b>Nigeria</b>	41.3	9.3	3.7	3.7	1.8	12.9	5.9	4.3	17.2	45, 46, 47, 48
<b>Eastern Europe</b>										
<b>Bulgaria</b>	16.5	10.2	1.3	2.8	1.5	11.6	7.7	11.6	36.8	49
<b>Czechia</b>	35.0	16.0	13.0	8.0	0.0	0.0	0.0	0.0	28.0	50
<b>Hungary</b>	29.0	15.0	0.0	0.0	0.0	17.0	2.0	2.0	35.0	6
<b>Poland</b>	29.0	15.0	0.6	2.4	0.0	8.6	2.1	7.8	34.6	51, 52, 53, 14
<b>Romania</b>	47.5	7.4	1.0	2.6	0.0	5.4	2.0	3.6	30.5	54, 55
<b>Russian Federation</b>	30.7	27.1	0.0	0.0	0.0	12.7	2.6	7.9	19.0	56

<b>Ukraine</b>	33.1	14.6	5.5	4.0	1.7	0.0	0.0	0.0	41.1	
<b>Northern Europe</b>										
<b>Denmark</b>	40.3	17.1	0.4	2.2	0.5	10.5	2.8	2.7	23.6	57, 14
<b>Estonia</b>	26.0	20.0	3.0	2.0	0.0	9.0	4.0	6.0	30.0	58
<b>Finland</b>	26.8	18.5	3.2	3.0	0.0	12.6	4.4	1.8	29.7	59, 60, 14
<b>Iceland</b>	43.2	10.9	3.2	3.7	0.0	0.0	0.0	0.0	39.0	61
<b>Latvia</b>	0.0	6.4	2.1	0.0	0.0	8.5	2.4	20.6	60.0	62
<b>Lithuania</b>	25.5	5.7	1.2	7.2	0.0	0.0	0.0	0.0	60.4	63
<b>Sweden</b>	19.0	12.0	0.1	0.2	0.0	6.0	2.0	1.2	59.5	64, 14
<b>Southern Europe</b>										
<b>Croatia</b>	24.0	22.0	3.0	0.0	0.0	0.0	0.0	0.0	51.0	65
<b>Greece</b>	45.0	16.0	1.0	3.8	0.0	14.0	4.1	3.9	12.3	66, 67
<b>Italy</b>	20.0	29.3	0.0	0.0	0.0	18.0	2.7	5.4	24.6	14
<b>Portugal</b>	32.8	13.5	0.5	6.5	0.0	11.5	2.4	4.9	28.0	68, 69, 6
<b>Serbia</b>	44.3	13.0	0.0	4.5	0.4	13.9	1.4	4.2	18.4	70, 71
<b>Spain</b>	58.0	19.1	0.0	0.0	0.1	11.0	3.3	3.2	5.2	72, 14
<b>Western Europe</b>										
<b>United Kingdom of Great Britain and Northern Ireland</b>	23.3	21.3	7.8	2.0	0.3	7.0	4.4	5.4	28.5	14, 73, 64, 75, 76, 77
<b>Ireland</b>	17.0	19.8	0.0	23.4	0.0	0.0	0.0	0.0	39.9	78
<b>France</b>	32.0	20.0	0.0	0.0	0.0	9.0	3.0	10.0	26.0	6
<b>Germany</b>	35.4	22.7	0.0	4.6	0.0	14.9	3.6	6.9	11.9	6

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<b>Luxembourg</b>	45.5	8.9	5.0	1.0	0.0	29.7	0.0	0.0	9.9	80
<b>Netherlands</b>	30.5	26.5	0.0	0.0	0.0	18.0	3.5	6.0	15.5	3, 6
<b>Switzerland</b>	28.3	17.4	1.7	3.0	0.0	27.9	2.8	3.7	15.2	8, 6
<b>Caribbean</b>										
<b>Jamaica</b>	62.2	14.9	0.7	4.6	0.0	12.6	2.0	2.8	0.2	
<b>Australia and New Zealand</b>										
<b>Australia</b>	25.0	8.7	6.6	2.2	0.9	5.6	5.5	3.4	42.2	89
<b>New Zealand</b>	16.8	10.9	11.9	5.9	0.0	0.0	0.0	0.0	54.5	90
<b>Central America</b>										
<b>Mexico</b>	45.7	13.1	0.0	1.5	4.0	10.1	3.7	6.8	18.5	81, 82, 6
<b>Nicaragua</b>	74.8	9.1	0.0	0.0	0.0	8.1	1.0	1.0	6.1	3
<b>South America</b>										
<b>Brazil</b>	53.5	17.6	0.0	0.0	0.0	17.5	2.2	4.0	5.3	3, 84, 83
<b>Colombia</b>	83	5			1	6		2	3	
<b>Peru</b>	70.0	6.0	0.0	0.0	0.0	9.0	2.0	2.0	11.0	3
<b>Northern America</b>										
<b>Canada</b>	20.8	38.6	0.0	0.0	0.0	7.8	8.0	4.4	20.4	6, 14
<b>United States of America</b>	13.8	24.0	4.8	3.5	2.5	8.2	6.4	4.3	32.5	3, 85, 86, 7, 87, 88

Source:

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