

Data A

Waste Amount and Composition Survey

A. Waste Amount and Composition Survey

A.1 Waste Amount

A.1.1 Household

a. High Income

No.	Inhabitant	Survey day								Include 1 st day		Exclude 1 st day	
		1	2	3	4	5	6	7	8	Total(kg)	Gen. Ratio (g/p/d)	Total (kg)	Gen. Ratio (g/p/d)
1	5	4.791	5.075	1.247	5.954	5.131	2.523	3.856	1.814	30.391	868	25.600	731
2	4	6.095	6.407	0.794	4.309	3.657	1.899	4.961	4.196	32.318	1,154	26.223	937
3	5	8.647	8.618	1.134	0.680	1.928	1.304	4.224	1.559	28.094	803	19.447	556
4	7	3.289	1.956	3.374	3.062	0.794	2.580	13.871	0.737	29.663	605	26.374	538
5	5	3.600	5.160	0.000	4.933	3.436	6.661	0.000	2.098	25.888	740	22.288	637
6	6	2.920	2.722	2.835	1.758	2.410	3.062	2.410	4.394	22.511	536	19.591	467
7	4	2.466	0.879	1.077	2.523	1.729	0.000	1.021	0.907	10.602	379	8.136	291
8	3	4.394	3.092	2.211	4.082	2.126	1.503	3.884	1.804	23.096	1,100	18.702	891
9	8	5.103	1.843	7.711	3.175	5.585	6.294	6.124	7.247	43.082	769	37.979	678
10	4	0.680	2.665	1.247	0.000	2.665	1.673	3.033	1.474	13.437	480	12.757	456
11	6	3.600	2.288	2.778	3.771	1.616	1.106	2.863	1.758	19.780	471	16.180	385
12	4	1.644	0.340	1.588	0.482	0.595	1.361	1.162	1.588	8.760	313	7.116	254
13	5	4.593	3.402	3.005	2.325	7.371	4.451	4.054	6.209	35.410	1,012	30.817	880
14	2	1.673	3.317	0.000	2.353	1.446	0.000	3.147	0.340	12.276	877	10.603	758
15	7	7.371	6.435	3.062	4.564	2.183	3.742	2.523	3.600	33.480	683	26.109	533
16	5	8.193	5.018	1.956	4.791	3.884	3.600	4.763	2.948	35.153	1,004	26.960	770
17	4	1.474	3.062	5.897	0.000	3.941	5.472	4.479	1.162	25.487	910	24.013	858
18	3	1.786	0.284	4.026	0.227	0.198	1.332	0.340	2.495	10.688	509	8.902	424
19	6	2.807	3.090	0.227	1.474	1.644	1.021	1.486	0.794	12.543	299	9.736	232
20	4	4.876	1.814	1.786	3.260	2.495	2.296	0.907	8.136	25.570	913	20.694	739
Total	97	80.002	67.467	45.955	53.723	54.834	51.880	69.108	55.260	478.229	704	398.227	586

b. Middle Income

No.	Inhabit ant	Survey day								Include 1 st day		Exclude 1 st day	
		1	2	3	4	5	6	7	8	Total	Gen. Ratio (g/p/d)	Total	Gen. Ratio (g/p/d)
1	5	4.734	6.350	3.289	6.549	5.166	5.046	2.155	5.301	38.590	1,103	33.856	967
2	5	2.948	1.134	1.021	1.474	1.049	1.389	1.332	0.936	11.283	322	8.335	238
3	4	2.552	2.155	0.879	0.794	1.701	1.616	1.446	0.765	11.908	425	9.356	334
4	4	3.884	0.680	1.588	2.268	6.889	4.196	0.680	1.577	21.762	777	17.878	639
5	5	1.531	6.294	3.175	2.013	1.191	0.964	8.080	0.170	23.418	669	21.887	625
6	4	3.459	8.647	2.155	3.062	1.701	1.191	1.814	1.588	23.617	844	20.158	720
7	4	2.835	1.134	9.515	2.013	2.920	2.155	1.559	2.466	24.597	879	21.762	777
8	5	3.430	4.451	3.742	4.224	7.116	5.897	7.428	2.807	39.095	1,117	35.665	1,019
9	8	5.670	4.338	6.407	6.909	4.734	8.675	8.703	5.528	50.964	910	45.294	809
10	7	2.948	1.871	1.304	2.240	2.438	2.410	2.665	3.402	19.278	393	16.330	333
11	3	2.211	0.255	0.255	0.454	0.936	0.454	0.680	0.170	5.415	258	3.204	153
12	6	1.304	0.170	0.567	0.397	1.418	0.907	0.794	0.595	6.152	147	4.848	116
13	5	4.678	2.693	2.183	5.557	4.139	1.616	2.495	3.941	27.302	780	22.624	646
14	12	1.729	2.041	2.807	1.556	2.013	2.722	2.381	3.062	18.311	218	16.582	197
15	6	1.871	1.559	2.892	3.062	2.807	2.438	1.843	1.474	17.946	427	16.075	383
16	3	0.397	0.482	1.049	2.041	2.350	2.722	0.680	1.021	10.742	512	10.345	493
17	5	4.253	3.204	2.466	1.786	2.240	3.771	1.905	2.211	21.836	624	17.583	502
18	3	1.559	1.644	0.964	1.814	1.134	1.956	1.304	0.595	10.970	522	9.411	448
19	4	1.191	1.899	2.410	4.224	2.438	2.268	2.920	1.474	18.824	672	17.633	630
20	5	3.997	1.559	11.425	5.557	2.807	1.559	1.049	4.423	32.376	925	28.379	811
Total	103	57.181	52.560	60.093	57.994	57.187	53.952	51.913	43.506	434.386	602	377.205	523

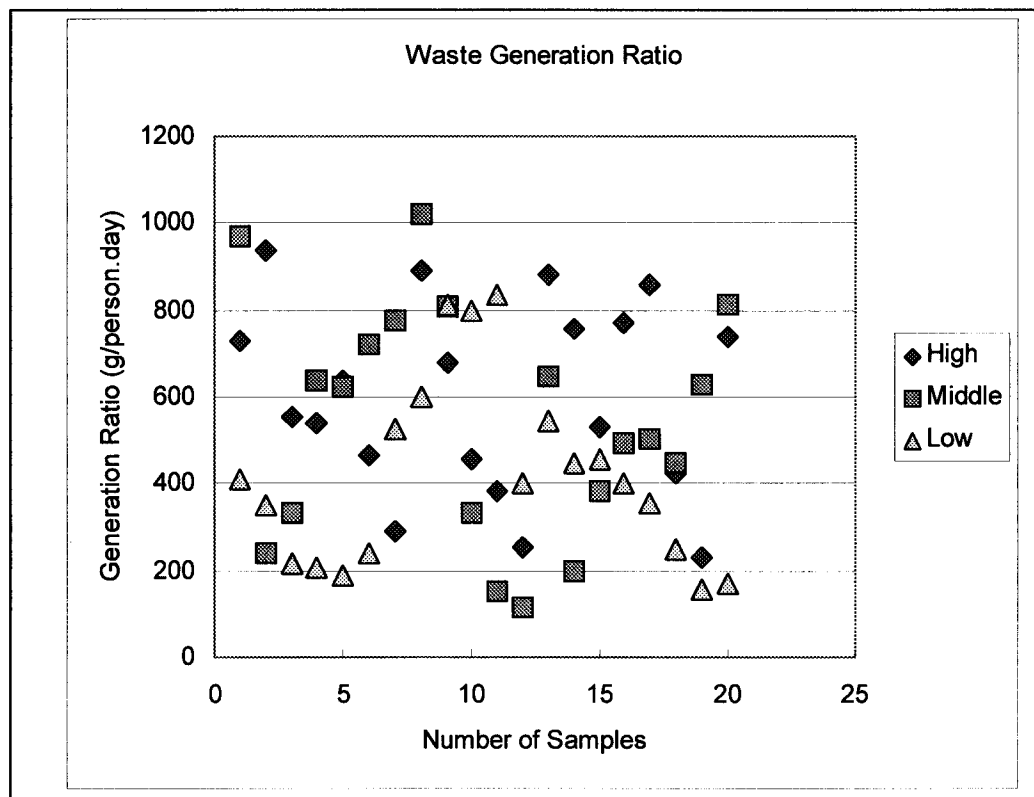
c. Low Income

No.	Inhabitant	Survey day								Include 1 st day		Exclude 1 st day	
		1	2	3	4	5	6	7	8	Total	Gen. Ratio (g/p/d)	Total	Gen. Ratio (g/p/d)
1	5	2.367	1.361	1.559	2.665	2.296	2.041	1.503	2.892	16.684	477	14.317	409
2	5	0.941	2.722	0.794	1.503	1.219	1.871	2.438	1.758	13.246	378	12.305	352
3	8	0.936	1.474	1.588	0.794	2.183	1.162	2.325	2.580	13.042	233	12.106	216
4	6	1.814	1.446	1.700	0.510	1.531	1.106	1.021	1.418	10.546	251	8.732	208
5	2	1.446	1.134	0.794	0.142	0.142	0.142	0.198	0.113	4.111	294	2.665	191
6	4	1.758	1.021	0.765	1.021	1.668	0.964	0.907	0.425	8.529	305	6.771	242
7	5	1.758	1.446	3.374	4.139	2.608	3.714	1.389	1.758	20.186	577	18.428	527
8	5	3.856	2.495	1.304	4.054	5.103	3.459	1.871	2.665	24.807	709	20.951	599
9	3	2.523	3.062	0.312	0.680	2.268	3.714	3.515	3.515	19.589	933	17.066	813
10	7	7.666	8.051	2.297	6.350	8.647	4.848	3.544	5.330	46.733	954	39.067	797
11	5	2.268	5.698	7.031	4.734	5.982	1.191	3.686	0.907	31.497	900	29.229	835
12	5	0.198	1.843	2.580	2.807	0.510	1.446	1.389	3.515	14.288	408	14.090	403
13	5	2.353	2.041	2.892	1.673	3.289	4.564	2.665	1.871	21.348	610	18.995	543
14	5	3.345	1.418	3.827	4.593	1.332	1.106	1.276	2.126	19.023	544	15.678	448
15	4	1.021	1.559	1.786	1.928	1.389	3.175	1.049	1.899	13.806	493	12.785	457
16	4	4.139	2.410	1.134	3.289	1.361	1.191	0.567	1.304	15.395	550	11.256	402
17	5	3.260	2.835	0.425	0.113	4.423	2.977	1.021	0.652	15.706	449	12.446	356
18	5	0.765	0.907	1.247	1.104	0.964	1.372	0.907	2.211	9.477	271	8.712	249
19	4	1.021	0.227	1.219	0.510	0.595	1.332	0.227	0.227	5.358	191	4.337	155
20	5	1.758	1.304	1.304	1.021	0.595	0.624	0.567	0.567	7.740	221	5.982	171
Total	97	45.193	44.454	37.932	43.630	48.105	41.999	32.065	37.733	331.111	488	285.918	421

d. Generation Ratio

Waste generation ratio of “Exclude 1st day” data summarised below.

Sample No.	Waste generation ratio (g/person/day)		
	High income	Middle income	Low income
1	731	967	409
2	937	238	352
3	556	334	216
4	538	639	208
5	637	625	191
6	467	720	242
7	291	777	527
8	891	1,019	599
9	678	809	813
10	456	333	797
11	385	153	835
12	254	116	403
13	880	646	543
14	758	197	448
15	533	383	457
16	770	493	402
17	858	502	356
18	424	448	249
19	232	630	155
20	739	811	171



Distribution Map of Waste Generation Ratio

Waste generation ratios within 95% confidence interval were calculated by the formula below.

$$R_{95} = \bar{x} \pm z_{0.025} \left(\frac{\sigma}{\sqrt{n}} \right)$$

- where R_{95} : 95% reliable value
 \bar{x} : mean value
 σ : standard deviation
 n : number of sample

	High Income	Middle Income	Low Income
95% confidence interval (g/person/day)	± 102.8	± 124.4	± 100.2
Maximum limit (g/person/day)	703.6	666.4	518.9
Mean value (g/person/day)	600.8	542.0	418.7
Minimum limit (g/person/day)	498.0	417.6	318.5

Based on the results above, ranges of waste generation ratios are estimated as follows.

Category	Waste generation ratio (g/person/day)
High income household	500 to 700
Middle income household	420 to 670
Low income household	320 to 520

A.1.2 Commercial waste

a. Restaurant

No.	Number of Seat	Survey day								Generation ratio(g/seat/day)	
		1 (Thu.)	2 (Fri.)	3(Sat.)	4(Sun.)	5(Mon.)	6(Tue.)	7(Wed.)	8(Thu.)	Inc. 1st day	Exc. 1st day
1	60	13.70	0.00	15.50	0.00	23.00	11.20	13.30	14.90	191	185
2	80	29.55	23.40	44.40	28.50	55.80	19.90	31.70	28.00	408	414
3	58	61.50	23.30	45.30	56.30	34.10	14.30	14.80	21.60	584	517
4	0	17.15	16.60	12.40	21.00	9.50	7.50	14.60	10.70	NA	NA
5	66	3.10	300.40	447.60	134.50	259.25	273.90	200.00	247.90	3,535	4,034
Total	264	125.00	363.70	565.20	240.30	381.65	326.80	274.40	323.10	496(median)	466(median)

NA : not available

b. Other Commercial

No.	Number of Employee	Survey day								Generation ratio(g/employee/day)	
		1 (Thu.)	2 (Fri.)	3(Sat.)	4(Sun.)	5(Mon.)	6(Tue.)	7(Wed.)	8(Thu.)	Inc. 1st day	Exc. 1st day
1	60	21.20	22.70	11.60	8.40	9.70	13.50	10.40	19.40	244	228
2	5	12.65	2.60	5.90	0.00	10.20	14.00	7.80	8.50	1,541	1,400
3	78	40.40	44.80	0.00	21.50	44.56	41.70	37.10	51.10	451	441
4	3	1.62	0.90	0.34	0.00	0.70	0.20	0.20	0.70	194	145
5	70	11.00	21.00	4.30	8.10	24.70	11.30	6.80	20.10	192	197
Total	216	86.87	92.00	22.14	38.00	89.86	80.70	62.30	99.80	524(avg.)	482(avg.)

A.1.3 Institutional Waste

No.	Number of Employee	Survey day								Generation ratio(g/employee/day)	
		1 (Thu.)	2 (Fri.)	3(Sat.)	4(Sun.)	5(Mon.)	6(Tue.)	7(Wed.)	8(Thu.)	Inc. 1st day	Exc. 1st day
1	54	10.90	7.50	0.00	0.00	6.90	21.30	7.20	7.50	142	117
2	220	128.05	121.80	110.75	93.50	144.20	125.80	121.10	133.50	556	483
3	60	0.00	20.30	0.81	0.25	16.30	16.80	16.30	16.00	181	181
4	672	35.40	0.00	0.00	32.70	32.85	28.00	36.50	19.30	34	28
5	19	11.30	5.20	0.00	2.50	0.00	6.70	6.90	4.70	245	171
Total	1,025	185.65	154.80	111.56	128.95	200.25	198.60	188.00	181.00	232(avg.)	196(avg.)

A.1.4 Market Waste

No.	Number of stalls	Survey day								Generation ratio(g/stall/day)	
		1 (Thu.)	2 (Fri.)	3(Sat.)	4(Sun.)	5(Mon.)	6(Tue.)	7(Wed.)	8(Thu.)	Inc. 1st day	Exc. 1st day
1	700	1,096.01	380.40	1,033.00	108.70	398.55	2,463.80	1,313.40	489.13	1,301	1,263
2	1,223	2,527.20	1,105.00	2,717.00	326.10	2,563.40	4,356.10	2,780.80	2,500.00	1,929	1,910
Total	1,923	3,623.21	1,485.40	3,750.00	434.80	2,961.95	6,819.90	4,094.20	2,989.13	1,700*	1,674*

* : weighing average

A.1.5 Road Sweeping Waste

No.	1 (Mon.)	2 (Tue.)	3(Wed.)	4(Thu.)	5(Fri.)	6(Sat.)	7(Sun.)	8(Mon.)	average
Swept amount (kg/day)									
1	202.9	169.0	194.6	159.2	147.7	77.5	-	170.5	160.2
2	142.5	118.7	140	154.8	65.2	54.5	-	126.5	114.6
Total	345.4	287.7	334.6	314	212.9	132	-	297	274.8
Length of swept (m)									
1	700	600	700	700	700	600	-	800	685.7
2	600	600	900	1,000	600	600	-	600	700.0
Total	1,300	1,200	1,600	1,700	1,300	1,200	-	1,400	1,385.7
Generation ratio (g/m/day)									
1	289.9	281.7	278.0	227.4	211.0	129.2	-	213.1	233.6
2	237.5	197.8	155.6	154.8	108.7	90.8	-	210.8	163.7
Total	265.7	239.8	209.1	184.7	163.8	110.0	-	212.1	198.3

A.2 Waste Composition

A.2.1 Household waste

a. High Income

Survey day \ Composition	1	2	3	4	5	6	7	8	Modified average value (%)
Kitchen waste	66.2	51.4	62.4	70.0	67.6	55.6	55.5	62.4	59.5
Papers	16.3	21.9	12.9	12.3	19.1	21.8	25.0	16.8	18.5
Textiles	0.0	3.0	0.0	1.0	0.6	0.8	1.3	0.8	1.2
Grass, wood, bamboo	5.5	11.4	1.0	0.3	0.0	0.4	0.7	2.1	2.7
Plastics	4.8	8.1	14.9	6.9	4.3	18.0	10.4	14.5	12.1
Rubber, leather	0.5	0.6	4.3	0.5	0.0	0.0	3.6	0.0	1.5
Metals	0.1	1.0	2.0	2.3	1.2	0.3	1.6	0.5	1.3
Bottles, glasses	6.2	1.0	0.7	3.7	5.6	0.5	0.0	2.1	1.3
Ceramics and soil	0.3	0.0	0.0	1.0	0.1	0.0	0.0	0.3	0.2
Others	0.1	1.6	1.8	2.0	1.5	2.6	1.9	0.5	1.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

b. Middle Income

Survey day \ Composition	1	2	3	4	5	6	7	8	Modified average value (%)
Kitchen waste	74.6	25.0	58.0	39.7	72.8	62.8	27.0	53.7	57.6
Papers	12.5	23.4	11.4	11.1	9.0	20.9	14.5	12.8	13.0
Textiles	0.0	0.0	0.3	0.3	0.1	4.2	0.7	0.6	1.1
Grass, wood, bamboo	0.8	26.1	18.6	29.5	10.9	0.9	27.7	24.3	16.8
Plastics	8.8	10.3	8.4	4.3	5.4	5.3	18.9	5.7	5.8
Rubber, leather	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.1
Metals	0.2	1.3	0.0	1.3	0.1	3.3	0.1	1.0	1.1
Bottles, glasses	0.7	10.9	0.0	12.4	0.2	0.3	3.7	0.0	2.6
Ceramics and soil	0.2	0.7	2.0	0.0	0.2	0.0	7.1	1.3	0.7
Others	2.2	2.3	1.3	1.4	1.3	1.6	0.3	0.6	1.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

c. Low Income

Survey day \ Composition	1	2	3	4	5	6	7	8	Modified average value (%)
Kitchen waste	67.9	53.0	76.8	53.3	41.8	68.4	65.8	46.8	66.0
Papers	17.8	9.1	9.1	12.9	18.8	14.3	16.2	40.1	13.1
Textiles	0.0	32.8	1.3	1.1	1.3	0.5	6.9	2.7	2.5
Grass, wood, bamboo	0.2	1.4	4.3	9.4	27.7	1.6	0.6	0.9	4.0
Plastics	12.1	0.9	5.4	12.9	6.7	6.3	6.6	1.4	7.8
Rubber, leather	0.0	0.0	0.0	0.1	0.6	0.0	0.0	0.0	0.0
Metals	0.7	0.9	0.7	2.8	1.3	1.2	0.1	0.9	1.2
Bottles, glasses	1.1	1.6	0.4	4.7	0.2	6.8	2.9	4.5	3.7
Ceramics and soil	0.0	0.0	0.5	1.7	0.0	0.0	0.0	0.0	0.6
Others	0.2	0.3	1.5	1.1	1.6	0.9	0.9	2.7	1.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

A.2.2 Commercial

a. Restaurant

Survey day \ Composition	1	2	3	4	5	6	7	8	Modified average value (%)
Kitchen waste	73.0	64.6	65.2	62.9	66.3	61.9	52.4	61.9	62.2
Papers	6.9	23.4	24.1	18.9	20.1	19.0	28.5	20.9	22.1
Textiles	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Grass, wood, bamboo	0.0	0.0	0.6	0.4	1.2	0.1	0.0	0.0	0.3
Plastics	12.0	8.8	9.7	8.1	5.0	13.4	15.0	11.1	10.2
Rubber, leather	0.0	2.1	0.0	0.1	0.0	0.0	0.0	0.0	0.3
Metals	0.0	0.3	0.0	2.1	0.2	0.3	0.1	1.8	0.7
Bottles, glasses	7.2	0.3	0.0	4.0	4.2	3.2	2.6	2.4	2.4
Ceramics and soil	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Others	0.9	0.5	0.4	3.2	3.0	2.1	1.4	1.9	1.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

b. Other Commercial

Survey day \ Composition	1	2	3	4	5	6	7	8	Modified average value (%)
Kitchen waste	0.0	2.0	15.7	3.9	7.3	14.7	1.4	0.0	6.4
Papers	59.4	58.7	31.4	75.1	46.6	58.5	77.1	94.2	63.1
Textiles	14.6	13.6	3.5	2.0	11.4	1.3	4.3	0.0	5.2
Grass, wood, bamboo	14.6	11.3	25.4	5.9	24.9	8.0	6.5	0.6	11.8
Plastics	10.6	10.2	19.5	9.9	7.3	14.7	8.7	4.2	10.6
Rubber, leather	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.4
Metals	0.0	2.4	3.5	1.1	1.2	0.1	0.9	0.0	1.3
Bottles, glasses	0.0	0.0	0.6	1.3	0.0	0.0	0.0	0.0	0.3
Ceramics and soil	0.8	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Others	0.0	1.8	0.4	0.8	1.0	0.0	1.1	1.0	0.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

A.2.3 Institutional

Survey day \ Composition	1	2	3	4	5	6	7	8	Modified average value (%)
Kitchen waste	17.4	25.0	16.4	31.7	11.2	10.1	4.8	33.7	19.0
Papers	26.5	40.3	33.7	32.5	28.2	32.7	48.3	29.8	35.0
Textiles	0.0	0.0	0.0	0.0	0.0	7.5	0.0	0.2	1.1
Grass, wood, bamboo	29.6	12.1	11.2	3.5	23.8	12.6	10.3	12.5	12.3
Plastics	23.2	17.4	31.4	16.7	23.1	12.6	31.0	11.0	20.5
Rubber, leather	0.0	0.0	0.0	9.7	0.0	0.0	0.0	0.0	1.4
Metals	0.1	0.9	1.0	0.0	0.1	0.0	1.4	0.1	0.5
Bottles, glasses	1.5	2.8	2.6	0.4	8.2	14.5	0.8	3.1	4.6
Ceramics and soil	0.0	0.0	0.0	2.0	0.2	7.5	0.2	1.0	1.6
Others	1.7	1.5	3.7	3.5	5.2	2.5	3.2	8.6	4.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

A.2.4 Market

Survey day \ Composition	1	2	3	4	5	6	7	8	Modified average value (%)
Kitchen waste	14.5	74.6	74.6	78.4	75.2	80.2	82.9	80.9	78.1
Papers	10.1	5.9	9.4	10.4	14.4	5.8	9.4	11.1	9.5
Textiles	3.5	0.0	0.8	0.0	0.0	1.3	0.0	0.1	0.3
Grass, wood, bamboo	57.1	9.6	0.0	0.0	0.0	0.0	0.0	0.0	1.4
Plastics	9.2	5.5	8.9	8.0	6.0	7.1	7.3	7.3	7.2
Rubber, leather	0.0	0.0	0.2	1.5	0.6	0.1	0.0	0.0	0.3
Metals	2.8	0.0	0.0	0.0	2.9	0.0	0.0	0.1	0.4
Bottles, glasses	0.8	4.1	0.4	0.0	0.0	0.8	0.0	0.2	0.8
Ceramics and soil	0.0	0.0	0.0	0.2	0.4	4.2	0.0	0.0	0.7
Others	2.0	0.3	5.6	1.5	0.5	0.5	0.4	0.3	1.3
Total	100.0	100.0	99.9	100.0	100.0	100.0	100.0	100.0	100.0

A.2.5 Road Sweeping

Survey day \ Composition	1	2	3	4	5	6	7	8	Modified average value (%)
Kitchen waste	8.0	2.5	0.0	6.3	3.4	0.4	NA	3.1	2.6
Papers	7.8	4.0	5.1	8.1	11.5	5.2	NA	4.3	6.4
Textiles	1.1	0.0	0.8	0.0	0.3	0.8	NA	0.2	0.4
Grass, wood, bamboo	68.6	85.8	79.0	63.4	74.5	75.5	NA	73.4	75.3
Plastics	3.7	3.7	4.0	3.9	2.0	2.6	NA	5.5	3.6
Rubber, leather	0.0	0.0	0.0	0.0	0.0	0.2	NA	0.0	0.0
Metals	0.7	0.0	0.1	0.0	0.2	0.4	NA	0.0	0.1
Bottles, glasses	1.7	0.0	0.0	1.4	0.0	0.1	NA	0.1	0.3
Ceramics and soil	7.5	3.0	10.2	16.6	7.5	10.4	NA	11.3	9.8
Others	0.9	1.0	0.8	0.3	0.6	4.4	NA	2.1	1.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	NA	100.0	100.0