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RESEARCH REPORT

No. 2005-RR1

Implementation and Financing of Solid Waste Management in the Philippines

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This report looks at the implementation and financing of solid waste management in the Philippines. It assesses how much it costs forty-one local government units (LGUs) around the country to provide solid waste management services. It also looks at how much revenue these LGUs, and other private waste contractors and operatives, get from supplying these services.

The research was carried out in response to a growing solid waste management crisis in the Philippines and legislation that requires LGUs to change their practices. Its main aim was to get information to help LGUs properly finance and implement the government's latest waste management policies and law.

The report finds that there is generally a substantial "fiscal gap" between the amount of money needed for waste management and the amount of revenue obtained by LGUs from providing waste management services. However, when the total economic benefits of providing these services were considered (these included the revenues obtained by LGUs, earnings made by other parties and savings from avoided landfill costs), it was found that some LGUs enjoyed positive net benefits. If LGUs could exploit as many potential revenue streams as possible, they could narrow their SWM fiscal gap or even go 'into the black'.

The study highlights a number of possible strategies that could be used to improve the financing of solid waste management. These included finding alternatives to expensive private contractors and looking into recycling as a revenue-generating activity.

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Library and Archives Canada Cataloguing in Publication

Sumalde, Zenaida M.

Implementation and financing of solid waste management in the Philippines

(Research report, ISSN 1608-5434, 2005-RR1)

Co-published by the International Development Research Centre.

Includes bibliographical references.

ISBN 1-55250-162-0

1. Integrated solid waste management – Economic aspects – Philippines.
2. Waste minimization – Economic aspects – Philippines.
- I. Economy and Environment Program for Southeast Asia.
- II. International Development Research Centre (Canada)
- III. Title.
- IV. Series: Research report (Economy and Environment Program for Southeast Asia); 2005-RR1.

TD789.P6S85 2005

363.72'856'09599

C2005-980094-1

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IMPLEMENTATION AND FINANCING OF SOLID WASTE MANAGEMENT IN THE PHILIPPINES

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July, 2004

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EEPSEA is supported by the International Development Research Centre (IDRC); the Swedish International Development Cooperation Agency (SIDA); and the Canadian International Development Agency (CIDA)

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ACKNOWLEDGEMENTS

The author wishes to extend her deep appreciation to the following individuals and institutions who in one way or another helped and assisted towards the completion of this study:

Dr. Benoit Laplante and Dr. Herminia A. Francisco, research advisers for the study, for their valuable comments and suggestions for the improvement of the report;

Dr. David James for his comments and suggestions during the research proposal preparation;

Mildren H. Peñales and Angeli A. Abad for research assistance;

Ms. Lizette Cardenas, SWAPP Executive Director, for assistance in contacting SWAPP-listed LGUs;

All the key people in the LGUs visited for providing the information needed for the study;

The other EEPSEA researchers for sharing their thoughts about Solid Waste Management; and

Dr. David Glover and the EEPSEA management for funding the study.

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IMPLEMENTATION AND FINANCING OF SOLID WASTE MANAGEMENT IN THE PHILIPPINES

Zenaida M. Sumalde

EXECUTIVE SUMMARY

Rapid urbanization and changing lifestyles create problems in solid waste management. In the Philippines, the Ecological Solid Waste Management Act (R.A. 9003) or program (SWMP) was enacted into law to deal with these problems. The law sets guidelines and targets for solid waste avoidance and volume reduction and mandates local government units (LGUs) to take responsibility for implementing the provisions of the Act. However, despite the authority given to the LGUs, they are still in a quandary about its implementation. Specifically, it is not clear how they can best finance the implementation of R.A. 9003.

This study was conducted to analyze the financial costs and benefits of the SWMP activities of 41 selected LGUs in the Philippines. Fifteen of these LGUs were members of the Solid Waste Management Association of the Philippines (SWAPP). The rest were made up of 10 big urbanized LGUs and 16 small rural LGUs. As expected there were wide variations in the socio-economic profile of these LGUs.

The analysis of both the financial costs of implementing the SWMP and the actual revenues obtained from solid waste management showed that an overall fiscal gap existed. This needs to be financed either through fee-based or non-fee-based mechanisms or both. However, when the total economic benefits of the SWMP were considered (these included the revenues obtained by LGUs, earnings made by other parties and savings from avoided landfill costs), it was found that there were LGUs that enjoyed positive net benefits. In general, the SWAPP-listed LGUs had relatively small fiscal gaps. Thus, the training and linkages provided by the SWAPP may be a crucial mechanism to help all LGUs finance and comply with the SWMP.

One of the potential sources of revenue to bridge the current fiscal gap is the re-channeling of garbage fees that are currently incorporated in the business permits/licenses paid by commercial establishments. The LGUs may also wish to handle SW collection and disposal themselves since this can be cheaper than contracting the services out. Despite the potential revenues that may be obtained from selling recyclables and compost, the LGUs surveyed felt that the cost of undertaking these activities outweighed the benefits. It is felt that this opinion needs to be validated through solid financial analysis.

The concerns raised by LGUs about the management and implementation of the SWMP included: a lack of skills among the staff implementing the program; inadequate financial and human resources; a lack of waste disposal sites; and, the strict requirements necessary to obtain environmental clearance certificates. Their plans to improve SWM included: intensifying the use of material recovery facilities (MRF); appropriate technical training programs; finding acceptable disposal sites that can be upgraded; and, the creation of specific SWM units.

1.0 INTRODUCTION

1.1 Background

In many countries recent rapid urbanization has led to fundamental socio-economic change, often at a high social and environmental cost. Among the consequences of such major development is the fact that, with people and business activities concentrated in specific areas, solid waste production increases dramatically and its disposal becomes a major challenge for society.

The Philippines is no exception to these global trends of urbanization and rising solid waste generation. More than 10,000 tons of solid wastes are generated in the country every day with Metro Manila accounting for more than 50% of the total produced (Bennagen, Nepomuceno and Covar, 2002). Finding dumping sites for this waste has become a continual problem for the country's governmental authorities, especially those in local government units (LGUs).

The dangers posed by rising levels of solid wastes have led to calls for legislative intervention to safeguard social interests such as public health. This has led to the passage of the Ecological Solid Waste Management Act (ESWM) or Republic Act 9003 (R.A. 9003). The law sets guidelines and targets for solid waste avoidance and volume reduction through source reduction and waste minimization measures (composting, recycling, re-use, and others). It also covers the collection, treatment and disposal of waste in accordance with ecologically sustainable development principles (EMB-DENR).

The Act provides options to LGUs for garbage management activities and supports local action planning and capacity building to handle municipality or city waste problems. It also empowers municipalities and cities to organize Ecological Waste Management Councils and also mandates every household to recycle at least 25% of its garbage and practice waste segregation at all times. It states that all segments of the society must make an effort to develop the recycling market and organize themselves to address waste disposal collectively.

1.2 Statement of the Problem

While the ESWM Act has been law since 2001, the LGUs are still in a quandary about its implementation. LGUs have the authority to collect fees and charges for the provision of solid waste management (SWM) services, however they have not been provided with guidelines on the fees or charges that should be imposed on household and businesses. The financial burden for providing SWM services therefore currently falls on the cash-strapped LGUs.

To help LGUs respond to the SWM challenge, the Solid Waste Management Association of the Philippines (SWAPP), a non-profit organization composed of LGUs, academics, the private sector, and individuals interested in SWM, has come up with a

sourcebook on exemplary practices in solid waste management¹. Among those LGUs in the SWAPP list are: 12 LGUs and nine private institutions from Luzon; five LGUs from the Visayas; and, eight LGUs from Mindanao. Some of these LGUs and private organizations had their SWM programs in place even before the passage of the ESWM Act. The SWM programs listed in the SWAPP Sourcebook include such activities as: segregation, composting, controlled dumpsites or landfill, establishment of Material Recovery Facilities (MRF) and information and education campaigns.

Although the LGUs listed in the SWAPP Sourcebook have had some success in the implementation of their SWM programs, the Sourcebook alone does not provide a complete answer to the SWM problems most LGUs face. In particular, the cost involved in the implementation of solid waste management activities needs to be researched. As do options for how such activities can be financed. There are also technical and administrative constraints that have to be documented. An analysis of these problems is needed if realistic and practical SWM policies are to be drawn up. For example, results of an analysis of costs and revenues could determine if SWM services can be financed from the revenues generated by the SWM programs themselves. Such results could also provide a basis for determining how much could be charged for SWM services such as garbage collection.

1.3 Objectives of the Study

In general, the study aims to analyze the financial costs and benefits of the solid waste management programs of SWAPP-listed and non-SWAPP-listed LGUs. It also aims to identify the constraints related to implementation of the ESWM Act.

Specifically, the study aims to:

- Compute the actual costs incurred by SWAPP-listed and non-SWAPP-listed LGUs in providing SWM services;
- Calculate the revenues obtained by LGUs from providing SWM services such as recycling, the re-sale of recyclables and composting;
- Measure the SWM financing gap, if any, that needs to be covered through fee-based revenues or other means;
- Identify and discuss the extent to which LGUs complied with the provisions of the ESWM and analyze the constraints they faced related to the Act; and
- Highlight policy implications relating to the improvement of the ESWM program.

¹ The sourcebook was first published in 2000 and include information only on LGUs that are members to SWAPP. No clear basis was given on how a SWM practice becomes exemplary.

1.4 Methodology

The study was based on survey data provided by the heads of SWMP in 41 LGUs. These LGUs include 15 SWAPP-listed LGUs and 26 non-SWAPP-listed.² Non-SWAPP-listed LGUs are referred to in the rest of this report as other LGUs. These other LGUs were classified into “big” and “small” depending on the total number of households they contained. Those with more than 35,000 households were classified as big LGUs (Table 1).

Table 1. Distribution of LGUs surveyed by classification and region, Philippines, 2002.

CLASSIFICATION/REGION	NUMBER
SWAPP-listed LGUs	15
National Capital Region (NCR)	2
Region 1	2
Region 3	3
Region 4	3
Region 5	1
Region 6	2
Region 7	2
Other LGUs (Big)	10
National Capital Region (NCR)	4
Region 3	2
Region 4	3
Cordillera Autonomous Region (CAR)	1
Other LGUs (Small)	16
Region 1	4
Region 3	1
Region 4	1
Region 5	4
Region 6	3
Region 7	3
Total	41

The data obtained on SWM practices included information on operating expenses and revenues and on the values of recyclables and composting activities. Information on revenues such as sanitary permits, fines and penalties for littering was obtained from the income statements of the LGUs. Savings from avoided landfill costs were estimated by multiplying the quantities of solid wastes diverted by landfill cost estimates provided by the MMDA. These estimates (per cu m of solid waste) were: Development costs - P65.00; and operating costs - P45.00.

It was hoped that the total cost of implementing SWM activities could have been estimated using the full cost accounting approach (FCA). This approach calculates Up-Front

² The SWAPP-listed LGUs were purposely chosen to enable investigation of the various practices prescribed in the ESWM. The other LGUs were chosen using the following criteria: a) proximity to a SWAPP-listed LGU with the expectation that there is a spill-over of the practices; b) recommended by SWAPP as having SWMP but are not yet SWAPP member; and c) having comparable characteristics and activities as that of SWAPP-listed LGUs.

Costs, Operating Costs and Back-end Costs. However, it was found that only one LGU had information on back-end costs (expenses that would be incurred after the life of a dumpsite or landfill), therefore these were not included in the computation. The non-inclusion of back end costs meant that the resulting estimates of the total cost of providing SWMP were undervalued.

The calculation of Up Front Costs and Operating Costs was done specifically for this study. The itemized data (except for depreciation expenses) on costs and revenues were obtained from the records of the different units/sections of the LGUs concerned. Since the data were scattered, the study consolidated them to come up with total values.

Up-Front Costs consisted of the depreciation of vehicles and equipment, the depreciation of dumpsites and the costs of securing Environmental Clearance Certificates (ECC) and doing Information and Education Campaigns (IEC). Operating costs consisted of salaries, wages and benefits, supplies, fuel and power and the maintenance of equipment and facilities, travel expenses, contractual services and rental, oversight and support services and other expenses.

Revenue from SWM activities consisted of fee-based revenue and non fee-based revenue. Non fee-based revenue included proceeds from the sales of recyclables and compost earned by the LGUs, while fee-based revenue came from garbage and other fees (such as sanitary permits, the selling of garbage bags and fines for littering) that were collected by the LGUs from households and other establishments. Values for the cost and revenue per ton of solid waste collected and per household served were determined by dividing the total cost and total revenue by the quantity of garbage collected and the number of households serviced, respectively.

The fiscal gap in providing SWM services was estimated by calculating the difference between the total cost incurred and the total revenue generated by the SWMP of each LGU. Fiscal gaps per ton and per household served were also estimated to provide the LGUs with an idea of the charges or garbage fees that could be imposed on households to help bridge the fiscal gap they face in the provision of SWM services. The fiscal gap was projected over a period of ten years taking into account projected changes in the volume of waste generation and diversion (Appendix Table 1).

The Net Present Value (NPV) of the SWMP for each LGU was calculated. The NPV is the present worth of the stream of net benefits from the program. A positive NPV implies that the benefits outweigh the costs while a negative NPV indicates otherwise. NPVs were estimated by getting the difference between the discounted benefits and the discounted costs of each program. The following calculation was used:

$$NPV = \sum_{n=1}^{10} (B - C)/(1 + r)^n$$

where: B = yearly revenues generated from the program
C = costs per year incurred for the program
r = discount rate (= 10%)
n = number of years to be considered (10 years)

NPVs were estimated using both a strict financial analysis of LGU operations and a wider economic analysis that took in other costs and benefits to society at large. The financial analysis counted the actual costs incurred and revenues that accrued to the LGUs. The economic analysis included the actual costs and revenues plus potential revenue from recyclables and compost and avoided landfill cost.

2.0 SOCIO- ECONOMIC CHARACTERISTICS AND SOLID WASTE MANAGEMENT PRACTICES OF THE LGUS

2.1 Socio-Economic Characteristics of the LGUs

A total of 41 LGUs from six regions in Luzon and two regions in the Visayas were visited and interviewed about their solid waste management programs and activities. Out of the 41 LGUs, 15 were SWAPP-listed LGUs (11 from Luzon and four from the Visayas) and 26 were classified as other LGUs (20 from Luzon and six from the Visayas). These other LGUs were further classified as either big or small LGUs. Big LGUs are those with more than 35,000 households each, while small LGUs had less than 35,000 households. The LGUs varied in terms of their land areas, number of barangays, households, populations and income (Table 2).

There was a large variation in the land area of individual LGUs across the different categories. The land area of SWAPP-listed LGUs ranged from 26.25 sq km to 276.33 sq km; big other LGUs had land areas ranging from 21.50 sq km to 425.50 sq km; while the small other LGUs had areas from 32.20 sq km to 317 sq km. With the exception of Quezon City, the LGUs in the National Capital Region (NCR) in both the SWAPP-listed and other LGU categories had smaller land areas than the rest of the LGUs. These LGUs were urbanized communities and therefore had higher populations and household numbers.

The biggest population density was recorded in Quezon City. This was due to the presence of big universities, hospitals and government institutions in the city. By virtue of their classification, the big other LGUs had the highest average population density of 8,978 persons per sq km (range from 617 to 18,964). The SWAPP-listed LGUs, being a mixed bag of big and small LGUs (only 46 percent had more than 35,000 households) had lower population densities. The small other LGUs had population densities averaging 649 persons per sq km (range from 215 to 1,452 persons per sq km) due to their larger land areas, lower number of households, smaller populations and lower number of urban barangays. Overall, the LGUs studied had a higher average population density than the national population density in 2002 of 225 persons per sq km.

In terms of income, SWAPP-listed LGUs exhibited the highest estimated average per capita income of PhP 2,073 per year. The lowest average per capita income (PhP 1,279) was found in the small other LGUs. On an individual LGU basis, Mandaluyong City, had the highest per capita income of PhP4,009 per year. LGUs in the NCR had per capita incomes that ranged from PhP857 to PhP 4,009 per year. Among the SWAPP-listed LGUs, Olongapo City had the highest per capita income of PhP 3,931 per year. This was attributed to the fact that it is the seat of a former US Naval base and has a number of commercial districts. In

Carmona and Batangas City, average per capita incomes of PhP 2,482 were recorded. These relatively high levels were considered to be due to the fact that these areas belong to the Calabarzon industrial zone area. The big other LGUs had more or less the same levels of per capita income, except for Antipolo City which had the lowest per capita income of PhP 410 per year. Among the small other LGUs, Bais City and Candon City had the highest per capita incomes of PhP 3,119 and PhP 3,240 per year, respectively. Bais City and Candon City are among the most progressive cities in Region 6 and Region 1, respectively.

In general, the big other LGUs appeared to have the highest number of households, bigger populations and population densities but ranked second next to SWAPP-listed LGUs in terms of per capita income. The higher per capita income of the SWAPP-listed LGUs may have been because of the relatively progressive nature of their municipalities and the fact their cities are at the center of commercial and industrial areas. On the other hand, the small other LGUs were characterized by bigger land areas and were less urbanized. This resulted in low population densities and lower per capita incomes.

2.2 Solid Waste Management (SWM)

This section presents information on the volumes of waste generated in each LGU and areas they served. It also provides details on the budget allocations made by the LGUs for SWM, the SWM activities undertaken and the condition and arrangement of dumpsites.

2.2.1 Volume of Waste Generated

The average amount of solid waste generated per capita for all LGUs was 0.45 kg/day. This figure was 0.45 kg/day for SWAPP-listed LGUs, 0.50 kg/day for the big other LGUs and 0.43 kg/day for the small other LGUs. In terms of average per capita waste generation, there did not seem to be significant differences between LGU groups. However there was a wide range within each group. For the SWAPP-listed LGUs, per capita waste generation ranged from 0.13 to 0.80 kg/day. In the case of the big other LGUs, the average per capita waste generated ranged from 0.28 kg to 0.71 kg/day while for the small other LGUs, the range was 0.13 kg to 1.39 kg/day (Table 3).

The reasons for this wide spread in waste generation levels were investigated and it was found that per capita waste generation increased alongside per capita income. The low income LGUs, which were mostly (9 out of 13) small other LGUs, had an average annual per capita income of PhP822 and an average daily per capita level of solid waste generation of 0.39 kg. The middle income LGUs had an annual per capita income of PhP1,475 and an average per capita level of solid waste generation of 0.46 kg/day. The high income LGUs, whose annual per capita income was PhP 2,705, had the highest level of per capita solid waste generation of 0.50 kg/day (Table 4). The middle income LGUs were a mixture of SWAPP-listed, big and small other LGUs. The high income LGUs were made up of SWAPP-listed and big other LGUs.

2.2.2 Area Serviced

In all LGUs, except Batangas City, there was no change in collection coverage before and after the implementation of SWMPs (Table 3). In Batangas City the number of barangays provided with SWM services dropped when the LGU started with its SWMP. This was because of the LGUs' desire to concentrate more on urban barangays where there were the biggest solid waste management problems. There are plans to increase the number of barangays served under the SWMP in this LGU in the future.

Table 2. Socioeconomic Characteristics of Selected LGUs, by Classification and Region, Philippines, 2002.

CLASSIFICATION/ REGION	LGU	LAND AREA (sq. km.)	POPULATION DENSITY	NUMBER OF BARANGAYS		NUMBER OF HOUSEHOLDS		POPULATION		INCOME OF LGU* (PhP Million)	LGU INCOME/ CAPITA
				Total	Urban	Total	Urban	Total	Urban		
SWAPP-listed LGUs											
NCR	Caloocan City	54.00	25,926	188	188	280,000	280,000	1,400,000	1,400,000	1,200	857
NCR	Muntinlupa City	46.70	8,122	9	9	78,016	78016	379,310	379,310	1,040	2,742
Region 1	Laoag City	127.47	741	75	30	19,751	8,195	94,466	39,437	234	2,478
Region 1	San Fernando, LU	105.25	970	59	24	20,755	15,011	102,082	72,942	215	2,103
Region 3	Marilao	26.25	4,571	16	11	24,225		120,000	157,178	75	625
Region 3	Olongapo City	185.00	1,242	17		43,107		229,839		904	3,931
Region 3	San Fernando, Pam	67.44	3,737	35	15	48,000		252,000	131,166	378	1,500
Region 4	Batangas City	276.33	958	105	41	53,685	28,664	264,658	149,652	657	2,482
Region 4	Carmona	30.92	2,195	14	14	10,930	6,989	67,866	34,945	168	2,482
Region 4	Lipa City	209.40	1,043	72	12	41,962	4,186	218,447	21,668	403	1,845
Region 5	Naga City	84.48	1,631	27	22	26,317		137,810		310	2,249
Region 6	Iloilo City	56.00	6,803	180	180	72,218	72,218	380,969	380,969	623	1,635
Region 6	Passi City	251.39	292	51	2	14,355	1,953	73,332	10,266	218	2,968
Region 7	Amlan	66.04	291	8	5	3,851	2,481	19,227	12,316	23	1,208
Region 7	Dumaguete	34.26	2,985	30	24	21,845	18,362	102,265	49,098	204	1,991
	Average	108.06	4,101	59	43	50,601	46,916	256,151	218,381	443	2,073
Big Other LGUs											
NCR	Las Piñas City	32.98	14,335	20	20	97,962	97,962	472,780	472,780	944	1,996
NCR	Mandaluyong City	26.00	10,847	27	27	61,174	61,174	282,027	282,027	1,131	4,009
NCR	Marikina City	21.50	18,964	14	14	86,539	86,539	407,730	407,730	800	1,962
NCR	Quezon City	161.11	14,219	142	142	480,624	480,624	2,290,876	2,290,876	6,483	2,830
CAR	Baguio City	57.40	7,299	128		42,000		418,972		656	1,566
Region 3	Angeles City	62.17	4,825	33	29	51,406	48,661	300,001	283,807	322	1,072
Region 3	Tarlac City	425.50	617	76	19	51,703	21,090	262,481	106,061	418	1,591
Region 4	Antipolo City	38.50	14,158	16		112,785		545,147		223	410
Region 4	Calamba City	144.80	2,161	54	34	58,466		312,981		594	1,897
Region 4	Lucena City	83.16	2,358	33	16	40,261		196,075		307	1,567
	Average	105.31	8,979	54	38	108,292	132,675	548,907	640,547	1,188	1,890

(continued..)

Table 2. continued.

CLASSIFICATION/ REGION	LGU	LAND AREA (sq. km.)	POPULATION DENSITY	NUMBER OF BARANGAYS		NUMBER OF HOUSEHOLDS		POPULATION		INCOME OF LGU* (PhP Million)	LGU INCOME/ CAPITA
				Total	Urban	Total	Urban	Total	Urban		
Small Other LGUs											
Region 1	Batac	161.01	296	43	29	9,882	2,441	47,682	11,408	63	1,319
Region 1	Bauang	71.60	885	39	4	12,298	2,420	63,373	12,394	70	1,100
Region 1	Calasiao	53.39	1,443	24	5	15,020	3,093	77,039	15,141	63	824
Region 1	Candon City	103.28	505	42	38	10,257	1,736	52,197	8,334	169	3,240
Region 3	Moncada	88.75	583	37	4	10,144	1,020	51,750	5,522	44	856
Region 4	Los Baños	56.50	1,452	14	3	17,000		82,027		81	983
Region 4	Sto Tomas	103.20	879	30	4	14,621	1,557	90,745	8,430	123	1,355
Region 5	Iriga City	174.00	511	36	14	17,061		88,893		130	1,462
Region 5	Nabua	88.54	834	42	9	12,664	1,882	73,859		51	686
Region 5	Pili	126.25	554	26	20	11,012		69,895		58	830
Region 6	Leganes	32.20	729	18	6	4,533	1,669	23,475	8,442	21	880
Region 6	Pototan	97.10	653	50	4	12,735	1,709	63,400	8,632	42	658
Region 6	Zarraga	54.48	347	24	4	3,632	966	18,904	4,856	21	1,133
Region 7	Bais City	316.90	215	35	2	13,199	3,200	68,115	12,123	212	3,119
Region 7	San Jose	58.29	273	14	1	3,136	191	15,902	841	16	981
Region 7	Sibulan	163.00	230	15	8	7,871	6,538	37,523	32,690	39	1,031
	Average	109.28	649	31	10	10,942	2,239	57,799	10,944	75	1,279

Statistics for Rural Barangays, Household and Population are the differences between Total and Urban statistics.

* Income of LGUs consists of income from taxes; incomes from rent, interest and miscellaneous operation and service incomes; and other specific incomes from fees, inspection and permits and other incomes and internal revenue allotment (IRA).

Table 3. Waste Generated and Extent of Collection Coverage of SWM, by Classification and Region, 2002.

CLASSIFICATION/ REGION	LGU	PER CAPITA WASTE GENERATION (kg)	WASTE GENERATION (tons/day)	BARANGAYS COVERED (%)		COVERED POP'N (% OF TOTAL)	COVERED HH (% OF TOTAL)
				W/ SWMP (2002)	W/O SWMP		
SWAPP-listed LGUs							
NCR	Caloocan City	0.34	469	100	100	100	100
NCR	Muntinlupa City	0.48	182	100	100	100	100
Region 1	Laoag City	0.40	38	100	100	100	100
Region 1	San Fernando, LU	0.45	48	46	46	73	72
Region 3	Marilao	0.30	36	94	94	94	94
Region 3	Olongapo City	0.36	65	100	100	100	100
Region 3	San Fernando, Pam	0.63	160	100	100	100	100
Region 4	Batangas City	0.40	106	34	46	48	34
Region 4	Carmona	0.25	17	100	100	95	95
Region 4	Lipa City	0.31	69	41	41	60	41
Region 5	Naga City	0.45	62	96	96	96	96
Region 6	Iloilo City	0.80	306	98	98	98	98
Region 6	Passi City	0.91	4	6	6	6	6
Region 7	Amlan	0.13	3	63	63	64	64
Region 7	Dumaguete City	0.50	30	100	100	100	100
	Average	0.45	106	79	79	82	80
Big Other LGUs							
NCR	Las Piñas City	0.42	200	100	100	100	100
NCR	Mandaluyong City	0.71	240	100	100	100	100
NCR	Marikina City	0.61	250	100	100	100	100
NCR	Quezon City	0.66	1,512	100	100	100	100
CAR	Baguio City	0.41	233	98	98	98	98
Region 3	Angeles City	0.50	150	85	85	95	95
Region 3	Tarlac City	0.51	135	99	99	100	100
Region 4	Antipolo City	0.28	153	100	100	100	100
Region 4	Calamba City	0.35	110	56	56	64	71
Region 4	Lucena City	0.50	55	76	76	91	92
	Average	0.50	304	91	91	95	96
Small Other LGUs							
Region 1	Batac	0.48	6	33	33	24	25
Region 1	Bauang	0.22	5	23	23	35	37
Region 1	Calasiao	0.29	23	25	25	27	28
Region 1	Candon City	0.38	20	17	17	23	24
Region 3	Moncada	0.38	2	11	11	10	10
Region 4	Los Baños	0.35	30	93	93	98	93
Region 4	Sto Tomas	0.23	21	13	13	9	11
Region 5	Iriga City	0.85	25	33	33	33	33
Region 5	Nabua	0.44	7	21	21	21	15
Region 5	Pili	0.19	6	46	46	46	46
Region 6	Leganes	0.13	3	100	100	100	100
Region 6	Pototan	1.39	12	8	8	14	13
Region 6	Zarraga	0.54	1	4	4	10	9
Region 7	Bais City	0.56	43	20	20	31	31
Region 7	San Jose	0.30	2	21	21	23	25
Region 7	Sibulan	0.15	5	53	53	87	83
	Average	0.43	13	33	33	37	36

Forty seven percent of the SWAPP-listed LGUs served all their barangays prior to and after implementation of their SWMPs. At the other end of the spectrum, Passi City served only six percent of barangays, which covered only the poblacion³ barangays. As of 2002, the SWAPP-listed LGUs were providing SWM services to 79% of all their barangays, 82% of their populations and 80% of their households on the average (Table 3). The big other LGUs appeared to provide a wider coverage of SWM activities with 91%, 95% and 96% of all barangays, populations and households covered, respectively. The small other LGUs had limited coverage, averaging only 33% of their barangays, 37% of their populations and 36% of their households. The reasons given for this limited coverage were: a) rural barangays produced minimal solid waste levels and could take care of their solid wastes on their own; b) limited resources; and c) the inaccessibility of many barangays.

2.2.3 Administration and Budget for SWM

The ESWM specifically indicates that one of the functions of a city or municipal solid waste management board (SWMB) is to “adopt specific revenue-generating measures to promote the viability of the Solid Waste Management Plan” (Section 12, number 4). However, while all the LGUs surveyed claimed to have a SWMB, none had implemented adequate revenue-generating activities or measures to sustain their solid waste management plans. In fact, all the key people interviewed mentioned that income generation was never mentioned in the LGU officials’ meetings. This meant that, while the SWMB were still in the process of planning their SWMPs, their concerns were mainly focused on how to collect and dispose off solid wastes and not on how to finance this process.

One of the factors that was found to affect solid waste management activity was the budget allocation of the various LGUs for SWM (Table 4). This was, in turn, found to be affected by LGU income. There were wide variations in budget allocation among the LGUs for SWM activities in both absolute terms, as a percentage of total income and in per capita terms. In general, higher absolute values were reported by the big other LGUs (Table 5). Quezon City, which had the highest household and population coverage, reported the highest absolute amount of spending for SWM activities in 2002: PhP 806.67 million. For the SWAPP-listed LGUs, the average budget for SWM was PhP 47.69 million, with Caloocan City reporting the highest value. Based on the response of key informants from Caloocan, this high level of spending was due to the inclusion of expenses for the LGUs’ Clean and Green Program (that employs many street sweepers for the city) and to changes to the city’s contract payments for the collection and disposal of solid wastes.

When SWM spending was analyzed as a proportion of total income, it was found that, on average the small other LGUs allocated the lowest amount: only two percent (ranging from 1% to 4%) of their income (Table 5). The SWAPP-listed and other big LGUs both allocated eight per cent of their income to SWM but wide variations within each group were noted. For the SWAPP-listed LGUs, budget allocation for SWM as proportion of total income ranged from 2% to 30%. The figure for the big other LGUs ranged from 1% to 22% of their incomes. The highest allocation of total LGU income (about 30%) was reported in Caloocan. Again, this may have been because the budget for SWM in this LGU covered not only collection and disposal of SW but also the city’s greening and beautification program. It can be also be noted from Table 5, that most of the LGUs that allocated a small proportion of income to SWM were those with limited or non-existent SWM activities.

³ Poblacion barangays are those within the municipality or city proper.

When SWM spending was analyzed on a per capita basis, it was found that the big other LGUs had the highest budgets for SWM. These ranged from Php6.0 per capita to Php869 per capita in 2002. For the SWAPP-listed LGUs, the average per capita budget for SWM was Php133. This spending ranged from a minimum value of Php32 in Amlan to a maximum of Php 307 in Muntinlupa City. In general, however, it was noted that the LGUs in the NCR had a higher budget for SWM both on a 'proportion of income' and 'per capita' basis. This may be because these LGUs relied on private contractors for the collection and disposal of solid wastes and also because they gave five percent of their income (exclusive of IRA) to the Metro Manila Development Authority, part of which was used for the maintenance of dumpsites.

Table 4. Waste generation and budget allocation for SWM by LGU income per capita, 2002.

LGU	CLASSIFICATION	LGU INCOME/ CAPITA (PhP/yr)	PER CAPITA WASTE GENERATION (kg/day)	BUDGET FOR SWM		CONDITION OF DISPOSAL SITE
				As % of LGU income	Per Capita (PhP/yr)	
Low Income LGUs						
Antipolo City	Big LGU	410	0.28	11	44	Controlled
Marilao	SWAPP-listed	625	0.30	10	63	Semi Controlled (private)
Pototan	Small LGU	658	1.39	2	16	Open (private)
Nabua	Small LGU	686	0.44	1	9	Open (private)
Calasiao	Small LGU	824	0.29	2	18	MRF cum controlled
Pili	Small LGU	830	0.19	3	27	Open
Moncada	Small LGU	856	0.38	2	14	Open
Caloocan City	SWAPP-listed	857	0.34	30	257	Open
Leganes	Small LGU	880	0.13	2	21	Open
San Jose	Small LGU	981	0.30	3	27	Controlled
Los Baños	Small LGU	983	0.35	1	6	Open
Sibulan	Small LGU	1,031	0.15	3	35	Open
Angeles City	Big LGU	1,072	0.50	1	6	Semi Controlled
Average		822	0.39	5.5	42	
Middle Income LGUs						
Bauang	Small LGU	1,100	0.22	4	47	Open
Zarraga	Small LGU	1,133	0.54	1	11	Open
Amlan	SWAPP-listed	1,208	0.13	3	32	Open
Batac	Small LGU	1,319	0.48	1	8	Open
Sto Tomas	Small LGU	1,355	0.23	4	55	Open
Iriga City	Small LGU	1,462	0.85	1	19	Open (private)
San Fernando, Pam	SWAPP-listed	1,500	0.63	5	71	Open
Baguio City	Big LGU	1,566	0.41	5	72	Semi Controlled
Lucena City	Big LGU	1,567	0.50	5	71	Open
Tarlac City	Big LGU	1,591	0.51	6	94	Open (private)
Iloilo City	SWAPP-listed	1,635	0.80	10	157	Open
Lipa City	SWAPP-listed	1,845	0.31	5	91	Open
Calamba City	Big LGU	1,897	0.35	3	64	Open (private)
Marikina City	Big LGU	1,962	0.61	6	115	Open
Average		1,510	0.47	4.2	65	

(continued...)

Table 4. continued.

LGU	CLASSIFICATION	LGU INCOME/ CAPITA (PhP/yr)	PER CAPITA WASTE GENERATION (kg/day)	BUDGET FOR SWM		CONDITION OF DISPOSAL SITE
				As % of LGU income	Per Capita (PhP/yr)	
High Income LGUs						
Dumaguete City	SWAPP-listed	1,991	0.50	2	35	Controlled
Las Piñas City	Big LGU	1,996	0.42	5	106	Open (private)
San Fernando, LU	SWAPP-listed	2,103	0.45	11	225	Semi Controlled (LGU)
Naga City	SWAPP-listed	2,249	0.45	5	102	Semi Controlled
Laoag City	SWAPP-listed	2,478	0.40	5	117	Controlled
Carmona	SWAPP-Listed	2,482	0.25	8	237	Controlled (private)
Batangas City	SWAPP-Listed	2,482	0.40	6	145	Controlled
Muntinlupa City	SWAPP-Listed	2,742	0.48	11	308	Open
Quezon City	Big LGU	2,830	0.66	12	352	Open
Passi City	SWAPP-Listed	2,968	0.91	2	45	Open
Bais City	Small LGU	3,119	0.56	4	138	Sanitary Landfill
Candon City	Small LGU	3,240	0.38	1	35	Open
Olongapo City	SWAPP-Listed	3,931	0.36	3	112	Semi Controlled (LGU)
Mandaluyong City	Big LGU	4,009	0.71	22	869	Open
Average		2,759	0.50	6.9	202	

Looking at Table 4, it is apparent that the budget for SWM increased as per capita LGU income increased. Therefore, it follows that the high income LGUs allocated larger amounts for SWM. However, although the small LGUs had lower per capita SWM budgets, it was found that they allocated a higher proportion of their incomes to SWM. This was due to low total income levels. In addition, the high proportion (30%) of income allocated by Caloocan to SWM pulled up the average value for the small LGUs. In fact, if the value for Caloocan was excluded, the average proportion of income budgeted for SWM by the low income LGUs was only 3.4%. It can also be noted from Table 4, that the budgets for SWM were positively linked to the quantity of SW generated. In other words, the more solid waste produced, the greater the amount that had to be spent dealing with it.

During the field visits, it was found that the LGUs had different systems of administering and allocating budgets for their SWM activities. Only two LGUs (city of Olongapo and Marikina) had separate offices that managed the budget for SWM programs. The rest had their SWM activities incorporated into the activities of different divisions such as the General Services Office (GSO), City/Municipal Planning and Development Office (CPDO/MPDO) and the City/Municipal Environment and Natural Resources Office (CENRO/MENRO) among others. For these LGUs, there were no separate records for SWM spending. Instead expenses were charged to the relevant units of the LGUs. For example, gasoline, fuel and lubricants for dump trucks, maintenance of SWM equipment and facilities were charged to GSO. Salaries of LGU personnel were under the Budget office. Supplies and consumables were taken from the supplies of each division without separate accounting for each activity. Thus, the budgets reported here were the best estimates given by the key persons in charge of SWM and the different offices.

Table 5. Budget for Solid Waste Management and SWM Practices, by Classification and Region, 2002.

CLASSIFICATION/ REGION	LGU	BUDGET FOR SWM* (‘000PhP)	AS% OF TOTAL INCOME	PER CAPITA BUDGET FOR SWM (PhP)	SOLID WASTE MANAGEMENT PRACTICES		
					Segregation	Recycling ^a	Composting
SWAPP-listed LGUs							
NCR	Caloocan City ^b	360,000	30	257	x	x	x
NCR	Muntinlupa City ^{c**}	116,719	11	308	x	x	x
Region 1	Laoag City	11,077	5	117	x	x	x
Region 1	San Fernando, LU	24,000	11	225	x	x	-
Region 3	Marilao	7,500	10	63	x	x	x
Region 3	Olongapo City	25,800	3	112	x	x	-
Region 3	San Fernando, Pam	18,000	5	71	x	-	x
Region 4	Batangas City	38,250	6	145	x	x	x
Region 4	Carmona	12,695	8	237	x	x	x
Region 4	Lipa City	19,835	5	91	x	-	-
Region 5	Naga City	14,000	5	102	x	x	x
Region 6	Iloilo City	60,000	10	157	-	-	-
Region 6	Passi City ^d	3,267	2	45	-	-	x
Region 7	Amlan	620	3	32	x	-	x
Region 7	Dumaguete City	3,626	2	35	x	x	x
	Average	47,693	8	133			
Big Other LGUs							
NCR	Las Piñas ^b	50,000	5	106	x	x	-
NCR	Mandaluyong City ^e	245,000	22	869	x	x	-
NCR	Marikina City ^b	47,000	6	115	x	x	-
NCR	Quezon City ^e	806,666	12	352	x	x	-
CAR	Baguio City	30,000	5	72	-	-	-
Region 3	Angeles City ^e	1,874	1	6	x	x	-
Region 3	Tarlac City	24,710	6	94	-	-	-
Region 4	Antipolo City ^e	24,000	11	44	x	x	x
Region 4	Calamba City ^b	20,000	3	64	-	x	-
Region 4	Lucena City	13,894	5	71	-	-	-
	Average	126,314	8	179			

Table 5. continued.

Table 5. Continued.

CLASSIFICATION / REGION	LGU	BUDGET FOR SWM (‘000PhP)	AS% OF TOTAL INCOME	PER CAPITA BUDGET FOR SWM (PhP)	SOLID WASTE MANAGEMENT PRACTICES		
					Segregation	Recycling ^a	Composting
Small Other LGUs							
Region 1	Batac	400	1	8	-	-	-
Region 1	Bauang	3,000	4	47	-	-	-
Region 1	Calasiao	1,381	2	18	x	x	x
Region 1	Candon City	1,830	1	35	x	x	x
Region 3	Moncada	700	2	14	x	x	x
Region 4	Los Baños ^c	500	1	6	x	x	x
Region 4	Sto Tomas	5,000	4	55	x	x	x
Region 5	Iriga City	1,700	1	19	-	-	-
Region 5	Nabua	700	1	9	-	-	-
Region 5	Pili	1,871	3	27	-	-	-
Region 6	Leganes ^d	500	2	21	-	-	x
Region 6	Pototan	1,000	2	16	-	-	-
Region 6	Zarraga ^d	200	1	11	-	-	x
Region 7	Bais City	9,400	4	138	-	-	-
Region 7	San Jose	425	3	27	x	x	-
Region 7	Sibulan	1,325	3	35	-	-	-
	Average	1,871	2	30			

Notes:

^a Refers to collection of recyclables for sale. Except as noted, all LGUs were observed to have the collection of recyclables done by roving waste pickers or scavengers at the disposal site.

^b Recycling is carried out by privately operated MRF.

^c Minimal segregation, recycling and composting are done in a few pilot barangays - carried out by LGU.

^d Backyard composting is practiced by HH

^e Minimal segregation, recycling and composting done in a few pilot barangays - carried out by NGOs.

*Except for Lipa City, which has records of specific expenditure items for SWM, budget refers to the budget reportedly allocated by the LGU for SWM.

** The budget was based on records of expenses of the Solid Waste Management Service Office, the activities of which include also maintenance of the Clean and Green Program.

2.2.4 SWM Activities Undertaken

Collection and disposal of solid wastes were provided as regular services by all the LGUs. Other SWM activities undertaken by the LGUs included segregation, selling of recyclables, recycling or re-use of solid wastes, and composting⁴. Among the SWAPP-listed LGUs, only Iloilo City appeared to have no SW diversion activities. This LGU was a SWAPP member because of the exemplary nature of its organized system of SW collection. For the other LGUs, it appeared that 30% of the big other LGUs and 50% of the small other LGUs had no SW diversion activities at all (Table 5). Segregation of waste (which was done either at the household or barangay level or at the dumpsite), was reportedly imposed by 87% of the SWAPP-listed LGUs, 60% of the big other LGUs

⁴ As will be discussed later, these activities are not necessarily carried out by the LGUs but other parties like organized waste pickers, households, private individual(s) or group(s) such that the income from the activities does not necessarily accrue to the LGU.

and 38% of the small other LGUs (Tables 4 and 5). Composting was practiced by 73% of the SWAPP-listed LGUs, 10% of the big other LGUs and 44% of the small other LGUs. It is worth noting that in four big other LGUs, the role of NGOs in solid waste diversion activities cannot be overemphasized.

According to reports, in 67% of the SWAPP-listed LGUs, 70% of the big other LGUs, and 38% small other LGUs, recyclables were taken and sold by households to roaming waste pickers or scavengers. Hence, the revenues from recyclables often went to these waste pickers. In those LGUs that undertook composting, the resulting product was either sold, given for free to constituents or used by the LGU nurseries.

2.2.5 Status of the Disposal Facilities or Dumpsites

None of the SWAPP-listed LGUs and big other LGUs had sanitary landfill. Only one that belonged to the small other LGU group had a sanitary landfill that conformed to the relevant government standard set out under RA 9003. However, 40% of the SWAPP-listed, 30% of the big other LGUs and 25% of the small other LGUs reported having controlled dumpsites (Table 6). LGUs in the NCR dumped their solid waste in a privately-owned open dumpsite that was managed by the MMDA in a nearby province.

Twenty percent of the SWAPP-listed LGUs, (namely Marilao, Carmona and Passi City), 30% of the big other LGUs and 25% of the small other LGUs, paid to dump residual wastes on private land. In the case of Carmona, a private garbage collector paid a tipping fee of P1,000 per truck load to a private lot owner while the LGU paid P800 pesos per truck load of garbage for soil covering. In Marilao, no disposal fee was paid but the LGU paid daily for soil covering. This amounted to P1,400 per truckload of soil and P1,400 for compacting the soil cover. The LGU did not pay a disposal fee on the condition that the lot owner was allowed to accept solid waste from other LGUs for a fee. In Bauang, the LGU paid a fixed amount of P180,000 per year (agreed for a 10 year period) to dump all its collected solid waste in a private lot. In Nabua and Iriga, collected solid wastes were disposed of in private lands for free. This was possible, because the owners wanted the low-lying idle land to be filled-up for future use. There was no contract stipulating the duration of time that the LGU could continue to use the area for free. Six SWAPP-listed LGUs, and five other LGUs had their own dumpsites that they considered to be controlled. The rest of the LGUs had either semi-controlled or open dumpsites. The LGUs under each category are shown in Table 6.

However, when sites were judged against the conditions set out under RA 9003, only a few of the SWAPP-listed LGUs (3 out of 15) could be classified as having controlled dumpsites. This was the case for only one of the big and one of the small other LGUs. San Fernando, La Union claimed to have a sanitary landfill but, as per RA 9003 conditions, it was actually only classified as having a semi-controlled dumpsite.

Except for Las Piñas, the SWAPP-listed LGUs in the NCR relied on the privately-owned, but LLDA-managed, dumpsite in San Mateo, Rizal where the solid waste collector/contractors paid PhP1,500 per truck as a tipping fee. This was paid at the entrance of the dumpsite to an individual assigned by the land owner. Marikina, a non-SWAPP-listed LGU in the NCR, also used the San Mateo dumpsite, but the LGU was responsible for bringing residual wastes to the dumpsite. Here, no tipping fee was paid but the LGU paid a PhP10-20 passage fee for each barangay that its garbage trucks pass through (10 in all). The passage fee was paid to the treasurer of the respective barangays. The cost of treating or bulldozing the dumped garbage was paid for by the MMDA since all the

NCR-LGUs paid 5% of their income to MMDA operations (net of the IRA). In cases where the LGU failed to give this 5% contribution, the Department of Budget and Management deducted the corresponding amount from the next release of the IRA.

It was found that, with a few exceptions within the high-income group, high LGU incomes and budgets did not necessarily mean better disposal facilities. In fact, almost all of the LGUs classified under the middle-income group had open dumpsites that were either LGU managed or privately owned (Table 4). This situation suggests the need for more sensitization among LGUs on the need for proper disposal sites. A need that has already been stipulated in the SWMA.

Table 6. Condition of Disposal Site and Arrangement by Selected LGUs, by Classification and Region. Philippines, 2002.

CLASS./ REGION	LGU	CONDITION OF THE DISPOSAL SITE		ARRANGEMENT/TREATMENT
		According to LGU Personnel Interviewed	According to RA 9003*	
SWAPP-listed LGU				
NCR	Caloocan City**	MMDA open dumpsite in Montalban	Open	Contributes 5% of its Gross Revenue to MMDA operation
	Muntinlupa City**	MMDA open dumpsite in Montalban	Open	Contributes 5% of its Gross Revenue to MMDA operation
	1 Laoag City	controlled dumpsite owned by LGU	Controlled	Waste is treated with enzymes, covered and compacted
	1 San Fernando, LU	controlled dumpsite owned by LGU	Semi-controlled	Waste is bulldozed, covered with soil and compacted
	3 Marilao	controlled dumpsite but privately owned	Semi-controlled	Pays only for inert cover and heavy equipments used
	3 Olongapo City	semi-controlled dumpsite owned by LGU	Semi-controlled	Waste is bulldozed, covered with soil and compacted
	3 San Fernando, Pam	open dumpsite owned by LGU	Open	Applies chemicals for odor and pest control
	4 Batangas City	controlled dumpsite owned by LGU	Controlled	Waste is bulldozed, cover ed with soil and compacted
	4 Carmona	controlled dumpsite but privately owned	Semi-controlled	Pays PhP1.8M tipping fee per year
	4 Lipa City	controlled dumpsite owned by LGU	Open	Waste is bulldozed and treated with chemicals
	5 Naga City	controlled dumpsite owned by LGU	Semi-controlled	Waste is treated with enzyme
	6 Iloilo City	open dumpsite owned by LGU	Open	No treatment done
	6 Passi City	open dumpsite but privately owned	Open	Pays PhP 25,000 per year for use of waste disposal site
	7 Amlan	open dumpsite owned by LGU	Open	Waste is bulldozed and covered with soil
	7 Dumaguete City	controlled dumpsite owned by LGU	Controlled	Waste is bulldozed, covered with soil and compacted
Big Other LGUs				
NCR	Las Piñas City	open dumpsite but privately owned	Open	Rents disposal site at PhP 8M per year but still contribute to MMDA
NCR	Mandaluyong City**	MMDA open dumpsite in Montalban	Open	Contributes 5% of its Gross Revenue to MMDA operation
NCR	Marikina City	MMDA open dumpsite in Montalban	Open	Contributes 5% of its Gross Revenue to MMDA operation
NCR	Quezon City**	MMDA open dumpsite in Montalban	Open	Contributes 5% of its Gross Revenue to MMDA operation
CAR	Baguio City	controlled dumpsite owned by LGU	Semi-controlled	Waste is treated with lime & rice hull, covered and compacted
3	Angeles City	controlled dumpsite owned by LGU	Semi-controlled	Waste is bulldozed and covered with soil
3	Tarlac City	open dumpsite but privately owned	Open	LGU pays PhP 3.6M per year for use of the lot
4	Antipolo City	controlled dumpsite owned by LGU	Controlled	Waste is treated with enzyme, bulldozed, covered and compacted
4	Calamba City	open dumpsite but privately owned	Open	Pays PhP 1.2M per month for use of the disposal site
4	Lucena City	open dumpsite owned by LGU	Open	No treatment done

(continued...)

Table 6 continued.

CLASS./ REGION	LGU	CONDITION OF THE DISPOSAL SITE		ARRANGEMENT/TREATMENT
		According to LGU Personnel Interviewed	According to RA 9003*	
Small Other LGUs				
1	Batac	open dumpsite owned by LGU	Open	Waste is treated with chemicals
1	Bauang	open dumpsite which is privately owned	Open	LGU pays PhP180,000 per year for use of the lot
1	Calasiao	MRF cum controlled dumpsite		MRF is fully operational; residuals are placed in sacks and stored for possible alternative use
1	Candon City	open dumpsite owned by LGU	Open	Pest and odor control chemicals are sprayed on waste
3	Moncada	controlled dumpsite owned by LGU	Open	Dig and dump system in available vacant government-owned lots
4	Los Baños	controlled dumpsite in area owned by gov’t	Open	No treatment done
4	Santo Tomas	semicontrolled/open dumpsite owned by LGU	Open	Waste is bulldozed after disposal
5	Iriga City	open dumpsite but privately owned	Open	LGU dumps the garbage free of charge
5	Nabua	open dumpsite but privately owned	Open	LGU dumps the garbage free of charge
5	Pili	open dumpsite owned by LGU	Open	No treatment done
6	Leganes	open dumpsite owned by LGU	Open	Waste is treated with enzyme
6	Pototan	open dumpsite but privately owned	Open	LGU pays PhP 50,000 per year for use of the lot
6	Zarraga	open dumpsite owned by LGU	Open	Burning of wastes at disposal site
7	Bais City	sanitary landfill	Sanitary Landfill	With liners, leachate collection & treatment system, gas control system, cover and closure procedure
7	San Jose	controlled dumpsite owned by LGU	Controlled	Each waste type is dumped separately & residual waste is covered with soil and compacted
7	Sibulan	open dumpsite owned by LGU	Open	No treatment done

* Minimum considerations for controlled dumpsite in RA 9003 are a) regular inert cover; b) surface water and peripheral site drainage control; c) provision for aerobic and anaerobic decomposition; d) restriction of waste deposition to small working areas; e) fence including provision for litter control; f) basic record keeping; g) provision of maintained access road; h) controlled waste picking and trading; i) post closure site cover and vegetation; and j) hydro-geological siting. For sanitary landfill, the requirements are: a) disposal site records; b) surface and ground water quality and effluent and gas emissions monitoring; c) documentations of approvals of requirements by DENR; d) signs; e) monitoring of quality of surface, ground and effluent waters and gas emissions; f) site design that discourages unauthorized access; g) roads designed to minimize generation of dust and tracking of material onto adjacent public roads; h) sanitary facilities at or near vicinity of site for personnel; i) safe and adequate drinking water supply for site personnel; j) communication facilities; k) lighting where operations are conducted during hours of darkness; l) use and wearing of appropriate safety equipment by operating and maintenance personnel; m) adequate training of personnel on subject pertinent to the site operation and maintenance, hazardous materials recognition and screening and heavy equipment operations; n) adequate supervision on dumpsite activities by site operator; o) presence of attendant for disposal sites open to the public; p) uploading of solid wastes shall be confined to a small area as possible to accommodate the number of vehicles using the area without resulting in traffic, personnel or public safety hazards; q) solid wastes shall be spread and compacted in layers with repeated passages of the landfill equipment to minimize voids within the cell and maximize compaction; r) grading of covered surfaces of the disposal area to promote lateral runoff of precipitation and to prevent ponding; s) use of cover material so as not to cause problems or interfere with unloading, spreading, compacting, access, safety, drainage, or other operations. ** These LGUs rely on contract services for collection and disposal of their SW due to have limited spaces. Key informants admitted that this arrangement relieves them of administrative burden of overseeing the activities of collection and disposal.

3.0 COST OF PROVIDING SOLID WASTE MANAGEMENT

As mentioned earlier, only the up-front costs and operating costs were included in the estimation of the total cost of providing SWM services. These costs were calculated on a per unit basis, cost per ton of solid waste and cost per household.

3.1 Total Cost

For all LGUs, the majority of the total SWM cost was attributed to operating expenses. These constituted 99%, 96% and 86% of the total cost for the big other LGUs, SWAPP-listed LGUs and small other LGUs, respectively (Appendix Table 2).

Except for Las Piñas⁵, LGUs in the NCR use a common dumpsite that was managed by the Metro Manila Development Authority (MMDA), hence they did not have foreclosure plans for the dumpsite. In fact, the whole of Metro Manila is faced with the problem of finding disposal sites for its garbage.

The LGUs in other regions were still in the process of converting open dumpsites into controlled dumpsites and finding additional or new areas for controlled dumpsites or sanitary landfills. Most LGUs needed financial and technical assistance to do the necessary feasibility studies to convert open dumpsites into controlled dumpsites or sanitary landfills. No concrete plans existed for what these LGU will do once their existing dumpsites are exhausted. In those LGUs that dump on private land for a fee, it was clear that no dumpsite foreclosure plans existed.

In Batangas City and San Fernando, La Union, the dumpsite should last for another 50 years. These LGUs were also able to rotate the use of land within their boundaries for waste disposal. In other words, they were able to dump in a certain location, cover it with topsoil, and then move on to other areas.

It should be recalled that back end costs include retirement and other benefits for employees. In all the LGUs, the SWM workers were all contractual or casual employees. Their employment was either terminated after a certain period, normally every six months, or they were re-assigned to other offices or activities. Hence, no provision for their retirements was included in the cost calculations.

3.1.1 SWAPP-listed LGUs

On average, the total cost of the SWMP to a SWAPP-listed LGU was PhP 45.519 million. This was slightly lower than the budget allocated for SWMP in year 2002 (Table 7). This discrepancy may be due to the provisions for capital outlays in the SWM budgets, linked to the fact that the study considered only the depreciation of SWM equipment.

⁵ This LGU is renting a privately owned lot as its disposal site. Las Piñas has also its own equipment and facilities for SW collection and disposal.

The SWAPP-listed LGUs in the NCR (Caloocan and Muntinlupa) registered the highest SWMP expenses of PhP 344.27 million and PhP 118.28 million. These LGUs relied on contractual services for the collection and disposal of SW rather than on their own equipment and manpower. Therefore their high expenses may have been due to the following factors: the high costs of contract services for collection and disposal; salaries and wages of casual employees for the LGUs' clean and green programs which were charged against SWM; and, the share they had to pay to the MMDA operation.⁶

However, it should be noted that the MRFs indicated in the SWAPP Sourcebook were no longer functioning in Caloocan and Muntinlupa. In Caloocan, the MRF operated by a private individual was closed in early 2003 due to complaints from residents about bad smells. In Muntinlupa, the MRF was temporarily closed in 2003 to allow for its expansion. This was made possible by a PhP 1.2 million grant from Asian Development Bank (ADB) through the DENR. The eco-center where composting was undertaken was likewise closed temporarily this year due to compost marketing problems.

SWAPP-listed LGUs outside the NCR that reported high total cost were Iloilo City (PhP 50.5 mil), Batangas City (PhP 25.4 mil) and Olongapo City (PhP 22.5 mil). Other SWAPP-listed LGUs had total costs that ranged from PhP0.78 million to PhP 22 million.

3.1.2 Other LGUs

The big other LGUs reported an average total SWM cost of PhP222.46 million in 2002, while the small other LGUs spent an average of PhP 2.90 million. The average total SWM costs for the big other LGUs was almost twice the average budget allocated for SWMPs, while the small other LGUs had an average total cost that exceeded budget allocation by 33% (Tables 5 and 7).

The high total cost of the big other LGUs was partly due to the share that most had to contribute to finance the operation of the MMDA. It could also have been partly due to the fact that the budget allocation referred to the actual expenses for the current year and excluded the up front costs of SWMP. Among the big other LGUs, Quezon City reported the highest total expenses of PhP1.653 billion. This was due to the contractual services that the LGU bought in and other expenses (Appendix Table 2).

The total expenses of the small other LGUs were far less than those of the big other and SWAPP-listed LGUs. This may be because of the limited coverage of these LGUs (Table 3). The highest total expenses for this group of LGUs (PhPP8.468 mil) was reported by Bais City while the lowest (PhP 0.515 mil) was in Sibulan (Table 7).

⁶ All NCR LGUs are charged by MMDA five percent of their gross revenue net of IRA for the latter's operation. In case where the LGU cannot remit the contribution on time, the corresponding amount will be automatically deducted from the succeeding release of the IRA. Approximately 60% of the amount is used by the MMDA to pay for the operation and maintenance of the Metro Manila dumpsite in San Mateo, Rizal and Payatas.

Table 7. Total and Per Unit Cost of Solid Waste Management, by Classification and Region, Philippines, 2002 (PhP).

CLASSIFICATION/ REGION	LGU	COSTS*		
		Total ('000)	Per Ton	Per HH Served
SWAPP-listed LGUs				
NCR	Caloocan City	344,273	2,010	1,230
NCR	Muntinlupa City	118,281	1,780	1,516
Region 1	Laoag City	13,156	961	666
Region 1	San Fernando, LU	15,216	867	1,014
Region 3	Marilao	8,774	662	385
Region 3	Olongapo City*	22,500	948	522
Region 3	San Fernando, Pam	21,291	365	444
Region 4	Batangas City	25,367	656	1,390
Region 4	Carmona	10,360	1,720	998
Region 4	Lipa City	18,596	744	1,081
Region 5	Naga City	21,981	971	870
Region 6	Iloilo City	50,508	452	714
Region 6	Passi City	6,381	4,371	2,323
Region 7	Amlan	782	833	315
Region 7	Dumaguete City	5,324	486	244
	Average	45,519	1,188	914
Big Other LGUs				
NCR	Las Piñas City	97,485	1,335	995
NCR	Mandaluyong City	214,335	2,447	3,504
NCR	Marikina City	97,883	1,073	1,131
NCR	Quezon City	1,653,331	2,996	3,440
CAR	Baguio City	23,649	278	572
Region 3	Angeles City	12,935	236	266
Region 3	Tarlac City	31,173	633	603
Region 4	Antipolo City	58,748	1,054	521
Region 4	Calamba City	19,824	494	474
Region 4	Lucena City	15,221	762	411
	Average	222,458	1,131	1,192
Small Other LGUs				
Region 1	Batac	2,645	1,317	1,083
Region 1	Bauang	3,004	1,646	664
Region 1	Calasiao	2,540	303	599
Region 1	Candon City	2,459	337	986
Region 3	Moncada	2,554	3,180	2,504
Region 4	Los Baños	4,562	417	289
Region 4	Sto Tomas	2,058	265	1,322
Region 5	Iriga City	7,833	858	1,391
Region 5	Nabua	3,685	1,496	1,958
Region 5	Pili	2,245	1,025	443
Region 6	Leganes	660	602	146
Region 6	Pototan	1,486	339	869
Region 6	Zarraga	847	2,321	2,456
Region 7	Bais City	8,468	540	2,044
Region 7	San Jose	825	1,107	1,073
Region 7	Sibulan	515	282	79
	Average	2,899	1,002	1,119

* Details of Costs are shown in Appendix Table 2.

3.2 Per Unit Cost

Since the quantity of garbage collected and household and population numbers differed across the LGUs, any comparison of straight costs was not very illuminating. A more meaningful comparison was made by computing costs on a per ton and per household basis.

3.2.1 SWAPP-listed LGUs

On a per ton basis, the average cost of managing solid wastes in SWAPP-listed LGUs amounted to PhP1,188 (Table 7). The highest cost per ton of solid waste was estimated for Passi City (PhP 4,371) while the lowest was for San Fernando in Pampanga (PhP 365). The high cost per ton in Passi City may have been due to the depreciation of heavy equipment, such as a high capacity crusher-bulldozer, used by the LGU. That said, such equipment was underutilized because only a small proportion (6%) of the LGUs' households were served, generating only four tons of solid waste daily. The low cost per ton of waste in San Fernando, Pampanga was due to the low cost of garbage collection in the LGU. This was because the system in this area utilized wooden carts. The two LGUs in the NCR along with Carmona had high costs per ton of waste collected. These figures were due to the high costs that these LGUs paid for waste collection and disposal contractual services. In the case of NCR-LGUs, the high cost was partly due to the contributions they gave to the MMDA.

With 80% of the households served by SWAPP-listed LGUs (Table 3), the average cost of the SWMP per household was PhP 914 per year. Since Passi City served only a small proportion of its households and collected very small quantities of wastes, this LGU had the highest cost per household covered. High costs per household were likewise noted in the two NCR-LGUs and Carmona, while the lowest cost of PhP 244 per household was recorded in Dumaguete. The low figure in Dumaguete was due to the large number of households this LGU served. This allowed for economies of scale in the use of equipment and facilities.

3.2.2 Other LGUs

The average cost per ton for the big other LGUs was PhP1,131 while for small other LGUs, the average cost was PhP 1,002 (Table 7). For the big LGUs, the highest cost per ton was estimated in Quezon City and Marikina, both of which are NCR-LGUs; while for the small LGUs, the highest cost of PhP 3,180 per ton was estimated in Moncada. The high cost per ton incurred by LGUs in the NCR may have been due to the payments they made for both SWM contractual services and for MMDA operations. For Moncada, the high cost per ton may have been due to the low volume of waste collected in the LGU. This, in turn, was due to the segregation and selling of recyclables by a women's cooperative in the region. The income from this project was shared by the LGU and the cooperative. Although the LGU therefore earned from recycling, the high per unit cost implies that equipment and facilities were underutilized.

In terms of cost per household served, the LGUs with the highest cost were also those with high costs per ton of solid waste (Table 7). This implies that these LGUs were inefficient in their solid waste collection and disposal activities. In addition, these LGUs, except for Moncada, undertook a limited amount of solid waste diversion yet reported a high cost in undertaking such activities. The cost per household could therefore have been reduced if the service was extended to more households.

4.0 BENEFITS FROM SOLID WASTE MANAGEMENT ACTIVITIES

As the Filipino saying goes “May Ginto sa Basura” (There is Gold in Garbage). Benefits from the SWMP can be direct, indirect or both. Direct benefits consist of actual revenues that accrue to the LGUs, the revenue and value of recyclables that are collected by other parties, and the cost savings from avoided landfill cost. Revenue can also be classified into non-fee based revenue and fee-based revenue. Non-fee based revenue consists of value and sales from recyclables, compost, and consumer products; while fee-based revenues include garbage fees, sanitary fees, rental fees for the facilities, and savings from avoided landfill/dumpsite costs, among others. Indirect benefits consist of the positive social and environmental effects of SWMP.

This section presents a discussion of the revenues that accrued directly to the LGUs, potential revenues and avoided landfill costs. Potential revenues consisted of revenues that were captured by the LGUs and those that went to other parties such as households, roaming waste pickers and the like. Benefits here refer to potential revenues plus savings from avoided landfill costs.

4.1 Total Revenue Collected by the LGUs

4.1.1 SWAPP-listed LGUs

On average, SWAPP-listed LGUs earned PhP 2.61 million from their SWM activities in 2002. However, this amount came mostly (95.60%) from fee-based revenues, especially garbage and other fees such as sanitary fees, citation tickets, anti littering fees and proceeds from the sale of garbage bags to households (Appendix Table 2). Therefore, it can be deduced that a very small amount was earned from waste diversion activities. Two of the LGUs in this classification did not collect any revenue from the SWMP at all (Table 9). Only one of SWAPP-listed LGUs directly earned revenue from selling recyclables, while 47% collected revenues from composting. Some of the LGUs simply utilized the compost their schemes produced for seedling propagation and for beautification programs, or distributed it free to farmers. One LGU (San Fernando, Pampanga) claimed that they could not meet the demand for compost due to the limited amounts of raw materials they dealt with. This was because they only processed biodegradables from the city’s public market and animal waste from the city’s slaughter house.

Of the SWAPP-listed LGUs, Olongapo had the highest SWM revenue of PhP 18.27 million. This revenue came purely from the LGUs’ household garbage fee. Other LGUs with high revenues were Muntinlupa City, Dumaguete City and Lipa City. In Muntinlupa, revenues came from the sales of recyclables and compost and from garbage fees. It should,

however, be noted that in Muntinlupa the revenue from recyclables and compost will not be sustained due to the closure of the eco-center where composting takes place and the temporary suspension of the operation of the MRF in early 2003. In Dumaguete City, revenues came mainly from sales of garbage bags to households, plus a minimal amount from the sale of compost. In this LGU all the households have to buy color-coded garbage bags from the LGU for degradable and non-biodegradable rubbish. No garbage will be collected if it is not placed in the proper garbage bags. The revenue in Lipa City came purely from the LGUs' garbage fee.

More than half of the SWAPP-listed LGUs earned some revenue from garbage and sanitary permits and anti-littering fees (Appendix Table 2). In Lipa City, the PhP10 garbage fee per household per month was incorporated in the monthly water bill. This scheme was possible since the LGU owned the water utility. In Olongapo, households were charged with a garbage fee of PhP46 per month. This was collected through the electricity bill. As was the case with Lipa City, this scheme was relatively easier to administer since the city owned the electricity company. The rest of the SWAPP-listed LGUs did not collect garbage fees but indicated that they were looking into the possibility of imposing garbage fees once they had identified the appropriate amount to be charged and the best mechanism for collection. Almost one third of the SWAPP-listed LGUs mentioned that they had already estimated the cost but that they were still studying how to implement a charge. Other LGUs raised funds through activities such as the Mr. And Miss SWM contest run by the Dept. of Social Welfare and Development (DSWD) in Batangas City. This award went to whoever could raise the most funds from the sale of recyclable materials. Although funds raised through this activity went to support day care centers in the LGU it did indirectly help SWM.

4.1.2 Other LGUs

Thirty percent of the big other LGUs and 31% of the small other LGUs did not collect any fees for SWM collection. This was also true for SWAPP-listed LGUs, which relied on incomes from recyclables and composting. The other LGUs had even lower total revenues than the SWAPP-listed LGUs (Table 8). Among the big other LGUs, Baguio City had the highest total revenue of PhP 7.30 million in 2002. This came purely from fee-based sources. Three LGUs from the NCR (Las Piñas, Mandaluyong and Quezon City) that did not have direct waste diversion activities had no income at all from SWM activities (Appendix Table 3). Revenue in Marikina came from renting out the LGUs' MRF to a private contractor who paid P75,000 per month as a rental fee. Under this arrangement, the recyclables went to the contractor, who also paid for the sorters and other MRF operating expenses. However, after sorting, the LGU was still responsible for disposal of any residuals.

For the small LGUs, Batac registered the highest revenue, which was obtained mainly from sanitary fees collected from small market stalls. Moncada had a unique partnership with a cooperative for their SWMP. Recycling and composting were jointly undertaken by the LGU and a women's credit cooperative in a way generated revenue (Appendix Table 2). The proceeds from selling recyclables and composts were equally shared by the LGU and the cooperative. The demand for compost in Moncada was quite high. In fact, the LGU could not cope with the demand for their compost due to an inadequate supply of raw materials. This shortfall was due to the fact that the LGU was only using the solid wastes from a public

market and from urban barangays since the wastes from rural areas were being composted in bins in households and farms. They could have collected market wastes from nearby municipalities, however, this was impossible because these LGUs did not segregate solid wastes.

With respect to garbage fees, it was found that all other LGUs did not collect such fees from households. Instead, they generated most of their revenue from sanitary fees collected from small business establishments in the public market (Appendix Table 3). All of the other LGUs explained that it would be difficult to implement garbage fees at the household level due to collection problems. The municipality of Sto. Tomas in Region 4, did not intend to collect garbage fees from household since all its barangays had their own respective MRFs and SWM activities. This municipality was the only LGU which had barangay-level MRFs where composting was done and where revenue from recycling was earned and managed by the barangay. In this case, the municipality got its revenue from sanitary fees levied on public market stalls.

4.2 Per Unit Revenue

4.2.1 SWAPP-listed LGUs

In comparison to per unit cost, the average revenue received by these LGUs per ton of solid waste (PhP112: 9% of the cost) and the average revenue per household served (PhP75: 8% of the cost) was very small (Tables 7 and 9). This may have been due to the fact that the LGUs, and even the households they served, did not realize the monetary value of recyclables. It may have also been because at the household level the economic cost (e.g. opportunity cost of time) of segregating and selling recyclables outweighed any direct benefits. Some LGUs mentioned that they were more concerned with the reduction of household waste than with any income that they could derive from the SWMP. To others, the collection and selling of recyclables and compost was just seen as an additional administrative burden.

Olongapo reported the highest levels of SWM revenue from households: PhP770 per ton of solid waste and PhP424 per household served (100% of the households are covered). The lowest revenue per ton of waste was estimated in San Fernando, Pampanga while Amlan had the lowest revenue collection per household served. These LGUs derived their revenues from the sale of compost. Despite the high demand for compost in these LGUs, the revenue derived was small due to the small quantities of compost that were produced compared to the quantities of solid waste that were collected.

Table 8. Per Capita Income and Per Unit Cost, Revenue and Fiscal Gap of LGUs by Income Group, 2002.

LGU	CLASSIFICATION	CONDITION OF DISPOSAL SITE	LGU INCOME/ CAPITA (PhP/yr)	BUDGET FOR SWM		PER CAPITA WASTE GENERATION (kg/day)	COST		REVENUE		FISCAL GAP	
				As % of Total Income	Per Capita (PhP/yr)		Per Ton	Per HH Served	Per Ton	Per HH Served	Per Ton	Per HH Served
Low Income LGUs												
Antipolo City	Big LGU	Controlled	410	11	44	0.28	1,054	521	13	7	1,041	514
Marilao	SWAPP-listed	Semi Controlled (private)	625	10	63	0.30	662	385	36	21	625	364
Pototan	Small LGU	Open (private)	658	2	16	1.39	339	869	10	27	329	843
Nabua	Small LGU	Open (private)	686	1	9	0.44	1,496	1,958	-	-	1,496	1,958
Calasiao	Small LGU	MRF cum controlled	824	2	18	0.29	303	599	14	27	289	572
Pili	Small LGU	Open	830	3	27	0.19	1,025	443	-	-	1,025	443
Moncada	Small LGU	Open	856	2	14	0.38	3,180	2,504	226	178	2,954	2,326
Caloocan City	SWAPP-listed	Open	857	30	257	0.34	2,010	1,230	-	-	2,010	1,230
Leganes	Small LGU	Open	880	2	21	0.13	602	146	-	-	602	146
San Jose	Small LGU	Controlled	981	3	27	0.30	1,107	1,073	18	18	1,088	1,055
Los Baños	Small LGU	Open	983	1	6	0.35	417	289	-	-	417	289
Sibulan	Small LGU	Open	1,031	3	35	0.15	282	79	107	30	175	49
Angeles City	Big LGU	Semi Controlled	1,072	1	6	0.50	236	266	20	23	216	243
Average			822	5.5	42	0.39	978	797	34	25	944	772
Middle Income LGUs												
Bauang	Small LGU	Open	1,100	4	47	0.22	1,646	664	85	34	1,561	630
Zarraga	Small LGU	Open	1,133	1	11	0.54	2,321	2,456	12	13	2,309	2,443
Amlan	SWAPP-listed	Open	1,208	3	32	0.13	833	315	33	13	800	302
Batac	Small LGU	Open	1,319	1	8	0.48	1,317	1,083	352	290	965	794
Sto Tomas	Small LGU	Open	1,355	4	55	0.23	265	1,322	43	213	223	1,109
Iriga City	Small LGU	Open (private)	1,462	1	19	0.85	858	1,391	-	-	858	1,391
San Fernando, Pam	SWAPP-listed	Open	1,500	5	71	0.63	365	444	11	13	354	431
Baguio City	Big LGU	Semi Controlled	1,566	5	72	0.41	278	572	86	177	192	395
Lucena City	Big LGU	Open	1,567	5	71	0.50	762	411	56	30	706	381
Tarlac City	Big LGU	Open (private)	1,591	6	94	0.51	633	603	69	65	564	538
Iloilo City	SWAPP-listed	Open	1,635	10	157	0.80	452	714	29	46	423	668
Lipa City	SWAPP-listed	Open	1,845	5	91	0.31	744	1,081	89	129	655	952
Calamba City	Big LGU	Open (private)	1,897	3	64	0.35	494	474	31	30	463	445
Marikina City	Big LGU	Open	1,962	6	115	0.61	2,447	3,504	10	10	1,063	1,121
Average			1,510	4.2	65	0.47	958	1,074	65	76	795	828

(Continued...)
Table 8 continued.

LGU	CLASSIFICATION	CONDITION OF DISPOSAL SITE	LGU INCOME/ CAPITA (PhP/yr)	BUDGET FOR SWM		PER CAPITA WASTE GENERATION (kg/day)	COST		REVENUE		FISCAL GAP	
				As % of Total Income	Per Capita (PhP/yr)		Per Ton	Per HH Served	Per Ton	Per HH Served	Per Ton	Per HH Served
Low Income LGUs												
Dumaguete City	SWAPP-listed	Controlled	1,991	2	35	0.50	486	244	375	188	111	56
Las Piñas City	Big LGU	Open (private)	1,996	5	106	0.42	1,335	995	-	-	1,335	995
San Fernando, LU	SWAPP-listed	Semi Controlled (LGU)	2,103	11	225	0.45	867	1,014	48	57	818	957
Naga City	SWAPP-listed	Semi Controlled	2,249	5	102	0.45	971	870	-	-	971	870
Laoag City	SWAPP-listed	Controlled	2,478	5	117	0.40	961	666	107	74	854	592
Carmona	SWAPP-listed	Controlled (private)	2,482	8	237	0.25	1,720	998	60	35	1,660	963
Batangas City	SWAPP-listed	Controlled	2,482	6	145	0.40	656	1,390	21	45	635	1,345
Muntinlupa City	SWAPP-listed	Open	2,742	11	308	0.48	1,780	1,516	100	85	1,680	1,431
Quezon City	Big LGU	Open	2,830	12	352	0.66	2,996	3,440	-	-	2,996	3,440
Passi City	SWAPP-listed	Open	2,968	2	45	0.91	4,371	2,323	-	-	4,371	2,323
Bais City	Small LGU	Sanitary Landfill	3,119	4	138	0.56	540	2,044	-	-	540	2,044
Candon City	Small LGU	Open	3,240	1	35	0.38	337	986	44	129	293	857
Olongapo City	SWAPP-listed	Semi Controlled (LGU)	3,931	3	112	0.36	948	522	770	424	178	98
Mandaluyong City	Big LGU	Open	4,009	22	869	0.71	1,073	1,131	-	-	2,447	3,504
Average			2,759	6.9	202	0.50	1,360	1,296	109	74	1,349	1,391

4.2.2 Other LGUs

On the average, the per unit revenues of the big other LGUs were relatively low compared to the SWAPP-listed LGUs (Table 9). This may have been due to the large areas covered by these LGUs. The highest per unit revenue among the big LGUs was estimated for Baguio City which also had the highest total revenue.

The small other LGUs had higher per unit revenues than the big other LGUs. For the small LGUs, the average revenues per ton of SW and per household served were PhP 57 and PhP 60 per year, respectively. Batac, which did not undertake any waste diversion activities had the highest revenues per ton and per household served. It should, however, be noted that the revenues of most of the other LGUs came from fee-based sources (Appendix Table 2). Two LGUs (Sto. Tomas and Candon City) in this category, had no records of revenues from recyclables since segregation and sales of recyclables and composting were done at the barangay level.

Table 9. Total and Per Unit Revenue that Accrue to the LGU, by Classification and Region, Philippines, 2002 (PhP).

CLASSIFICATION/ REGION	LGU	REVENUE*		
		TOTAL ('000)	Per Ton	Per HH Served
SWAPP-listed LGUs				
NCR	Caloocan City	0	0	0
NCR	Muntinlupa City	6,669	100	85
Region 1	Laoag City	1,465	107	74
Region 1	San Fernando, LU	849	48	57
Region 3	Marilao	480	36	21
Region 3	Olongapo City	18,272	770	424
Region 3	San Fernando, Pam	624	11	13
Region 4	Batangas City	816	21	45
Region 4	Carmona	364	60	35
Region 4	Lipa City	2,223	89	129
Region 5	Naga City	0	0	0
Region 6	Iloilo City	3,240	29	46
Region 6	Passi City	0	0	0
Region 7	Amlan	31	33	13
Region 7	Dumaguete City	4,108	375	188
	Average	2,609	112	75
Big Other LGUs				
NCR	Las Piñas	0	0	0
NCR	Mandaluyong	0	0	0
NCR	Marikina City	900	10	10
NCR	Quezon City	0	0	0
CAR	Baguio City	7,305	86	177
Region 3	Angeles City	1,100	20	23
Region 3	Tarlac City	3,380	69	65
Region 4	Antipolo City	744	13	7
Region 4	Calamba City	1,243	31	30
Region 4	Lucena City	1,119	56	30
	Average	1,579	28	34

(continued...)

Table 9 continued.

CLASSIFICATION/ REGION	LGU	REVENUE*		
		TOTAL ('000)	Per Ton	Per HH Served
Small Other LGUs				
Region 1	Batac	707	352	290
Region 1	Bauang	155	85	34
Region 1	Calasiao	115	14	27
Region 1	Candon City	322	44	129
Region 3	Moncada	181	226	178
Region 4	Los Baños	0	0	0
Region 4	Sto Tomas	332	43	213
Region 5	Iriga City	0	0	0
Region 5	Nabua	0	0	0
Region 5	Pili	0	0	0
Region 6	Leganes	0	0	0
Region 6	Pototan	45	10	27
Region 6	Zarraga	4	12	13
Region 7	Bais City	0	0	0
Region 7	San Jose	14	18	18
Region 7	Sibulan	196	107	30
	Average	129	57	60

* Details of Revenues are shown in Appendix Table 3.

4.2.3 Per Unit Revenue by Income Group

As was the case with cost, LGU revenues from SWM activities increased with increasing income (Table 8). This may have been because of the relatively large amounts of SW that were generated in those LGU with large incomes. It may have also been the case that in those areas where more wastes were generated, more recyclables were taken out and sold. In addition, the SWAPP-listed LGUs (Olongapo, Lipa City and Dumaguete) that were classified under the high income group had established strong mechanisms for garbage fee collection and revenue generation, mechanisms which themselves contributed to high revenue generation.

4.3 Direct Economic Benefits from SWMP

Direct economic benefits from the SWMP consisted of revenues from non-fee and fee-based sources and the value of avoided landfill costs due to solid waste diversion. The revenues encompassed the earnings of the LGUs and the earnings of other parties including private contractors and waste pickers (from, for example, selling recyclables). Avoided landfill costs were estimated by multiplying the overall amount of waste diverted by the cost of the operation and maintenance of landfill per unit of waste.⁷

4.3.1 Total and Per Unit Potential Revenues

Calculations on potential revenues were based on estimates by key people in the LGUs and on information given by junkshops operators and a few waste pickers. These

⁷ Based on the estimates of MMDA, operation cost and development cost of a landfill are PhP 45/cu m and PhP 60/cu m., respectively.

values, however, may have been understated since only a few LGUs (only 33%, 10% and 12% among the SWAPP-listed, big other LGUs and small other LGUs, respectively) had information on the value of recyclables taken by other parties. Even when segregation was carried out at the source or at the barangay levels, only a few LGUs had records since there had been no solid waste composition analysis done. Where information did exist, most revenues came from the sale of recyclables, although there was very little income from the sale of compost (Appendix Table 3).

For the SWAPP-listed LGUs it was found that on average ‘other parties’ obtained a significantly greater proportion of revenues than did the LGUs (Tables 9 and 10). For the other LGUs, very few (only one from the big other LGUs and three from the 16 small other LGUs) had information on the revenues taken by other parties. In the case of big other LGUs, the value of recyclables and compost taken as revenue by the local government were a little higher (56%) than those obtained by the other parties (Table 10). It should be noted, however, that the records for the big other LGUs was only for Mandaluyong. In this LGU the amount taken by other parties constituted the value of recyclables and compost in just one barangay. The rest of the big other LGUs did not have any idea of the quantity or value of recyclables that were collected by other parties. For them, what was important was the reduction in the amount of wastes that were being collected.

For the small other LGUs, 64% of revenue was captured by three municipalities (Table 10). In Moncada, the LGU and the cooperative shared equally the revenue from recyclables and compost. While in Sto. Tomas and Los Banos, revenue accrued mainly to households in the different barangays.

For the rest of the other LGUs, the values of recyclables and composts could not be estimated due to the absence of information.

4.3.2 Total and Per Unit Economic Benefits

Total economic benefits consisted of all revenues along with savings from avoided landfill costs. By classification, the SWAPP-listed LGUs appeared to have the highest total and per unit economic benefits, while the small other LGUs had the lowest (Table 11).

For the SWAPP-listed LGUs, revenues made up 77% of the economic benefits. Batangas City and Olongapo City had the highest values of economic benefits. This was due mainly to the high value of revenue that these LGUs obtained from recyclables (Table 10). In Lipa City, 100 % of the economic benefits was attributed to revenues since the City has no LGU-led waste diversion activities. In contrast, San Fernando, Pampanga recorded economic benefits that were dominated by cost savings from avoided landfill costs.

The economic benefits enjoyed by the other LGUs were smaller in absolute terms to those enjoyed by the SWAPP-listed LGUs. In the small other LGUs, this was due to the

Table 10. Potential Revenue from SWM Programs of Selected LGUs, Philippines, by Classification and Region, (Php).

CLASSIFICATION/ REGION	LGU	POTENTIAL REVENUE*				
		TAKEN BY LGU ('000)	TAKEN BY OTHER PARTIES ('000)	TOTAL ('000)	Per Ton	Per HH Served
SWAPP-listed LGUs						
NCR	Caloocan City	0	3,558	3,558	21	13
NCR	Muntinlupa City	6,669	0	6,669	100	85
Region 1	Laoag City	1,465	0	1,465	107	74
Region 1	San Fernando, LU	849	8,430	9,279	528	618
Region 3	Marilao	480	585	1,065	80	47
Region 3	Olongapo City	18,272	41,301	59,572	2,511	1,382
Region 3	San Fernando, Pam	624	0	624	11	13
Region 4	Batangas City	816	850	1,666	43	91
Region 4	Carmona	364	0	364	60	35
Region 4	Lipa City	2,223	0	2,223	89	129
Region 5	Naga City	0	0	0	0	0
Region 6	Iloilo City	3,240	0	3,240	29	46
Region 6	Passi City	0	0	0	0	0
Region 7	Amlan	31	0	31	33	13
Region 7	Dumaguete City	4,108	0	4,108	375	188
	Average	2,609	4,560	6,258	266	182
Big Other LGUs						
NCR	Las Piñas City	0	0	0	0	0
NCR	Mandaluyong City	0	12,264	12,264	140	200
NCR	Marikina City	900	0	900	10	10
NCR	Quezon City	0	0	0	0	0
CAR	Baguio City	7,305	0	7,305	86	177
Region 3	Angeles City	1,100	0	1,100	20	23
Region 3	Tarlac City	3,380	0	3,380	69	65
Region 4	Antipolo City	744	0	744	13	7
Region 4	Calamba City	1,243	0	1,243	31	30
Region 4	Lucena City	1,119	0	1,119	56	30
	Average	1,579	1,226	2,806	47	60
Small Other LGUs						
Region 1	Batac	707	0	707	352	290
Region 1	Bauang	155	0	155	85	34
Region 1	Calasiao	115	0	115	14	46
Region 1	Candon City	322	0	322	44	76
Region 3	Moncada	181	181	363	452	356
Region 4	Los Baños	0	0	0	0	0
Region 4	Sto Tomas	332	57	389	50	250
Region 5	Iriga City	0	0	0	0	0
Region 5	Nabua	0	0	0	0	0
Region 5	Pili	0	0	0	0	0
Region 6	Leganes	0	0	0	0	0
Region 6	Pototan	45	0	45	10	27
Region 6	Zarraga	4	0	4	12	13
Region 7	Bais City	0	0	0	0	0
Region 7	San Jose	14	0	14	18	18
Region 7	Sibulan	196	0	196	107	30
	Average	129	15	14	72	70

* Details of revenues are shown in Appendix Table 3.

Table 11. Economic Benefits from SWM Programs of Selected LGUs, Philippines, by Classification and Region, 2002 (Php).

CLASSIFICATION/ REGION	LGU	ECONOMIC BENEFITS				
		Potential Revenue ('000)	Cost Savings from Avoided Landfill ('000)*	Total ('000)	Per Ton	Per HH Served
SWAPP-listed LGUs						
NCR	Caloocan City	3,558	14,134	17,692	103	63
NCR	Muntinlupa City	7,203	2,216	9,419	142	121
Region 1	Laoag City	1,465	1,807	3,272	239	166
Region 1	San Fernando, LU	9,279	2,289	11,567	659	771
Region 3	Marilao	1,065	1,712	2,777	209	122
Region 3	Olongapo City	59,572	3,252	62,824	2,648	1,457
Region 3	San Fernando, Pam	624	25,918	26,542	454	553
Region 4	Batangas City	73,220	5,427	78,647	2,035	4,309
Region 4	Carmona	364	344	708	118	68
Region 4	Lipa City	50,078	0	50,078	2,003	2,911
Region 5	Naga City	0	5,774	5,774	255	229
Region 6	Iloilo City	3,240	0	3,240	29	46
Region 6	Passi City	0	0	0	0	0
Region 7	Amlan	31	269	300	274	121
Region 7	Dumaguete City	4,108	193	4,301	393	197
	Average	14,254	4,222	18,476	637	742
Big Other LGUs						
NCR	Las Piñas City	0	0	0	0	0
NCR	Mandaluyong City	12,246	2,819	15,083	172	247
NCR	Marikina City	900	7,026	7,926	87	92
NCR	Quezon City	0	0	0	0	0
CAR	Baguio City	7,305	0	7,305	86	177
Region 3	Angeles City	1,100	4,095	5,195	95	107
Region 3	Tarlac City	3,380	271	3,651	74	71
Region 4	Antipolo City	744	1,004	1,748	31	15
Region 4	Calamba City	1,243	0	1,243	31	30
Region 4	Lucena City	1,119	0	1,119	56	30
	Average	2,806	1,521	4,327	63	77
Small Other LGUs						
Region 1	Batac	707	0	707	352	290
Region 1	Bauang	155	0	155	85	34
Region 1	Calasiao	115	3,509	3,624	432	854
Region 1	Candon City	322	2,570	2,891	396	1,160
Region 3	Moncada	363	271	634	789	621
Region 4	Los Baños	3,534	0	3,534	323	224
Region 4	Sto Tomas	389	1,536	1,924	248	1,236
Region 5	Iriga City	0	0	0	0	0
Region 5	Nabua	0	0	0	0	0
Region 5	Pili	0	0	0	0	0
Region 6	Leganes	0	0	0	0	0
Region 6	Pototan	45	0	45	10	27
Region 6	Zarraga	4	0	4	12	13
Region 7	Bais City	0	5,770	5,770	368	1,393
Region 7	San Jose	14	312	325	436	423
Region 7	Sibulan	196	60	256	140	39
	Average	365	877	1,242	225	395

* Obtained by multiplying the % solid wastes diverted with the MMDA estimates of landfill operation and development costs of Php 45/cu m and Php 65/cu m, respectively.

small area serviced by the SWMP in these areas. For the big other LGUs, the low levels of economic benefit were due to the absence of information. Considering the volume of waste generated by the big other LGUs, particularly those from the NCR (Table 3), it is ironic that they were not earning much revenue from SWM, nor fully capitalizing on the benefits of diverting waste from landfill.

On a per unit basis, it was obvious that all the LGUs had higher per unit economic benefits than the actual per unit revenues that they earned. It should be noted that, despite the lower total values estimated for the small LGUs, they had far better per unit economic benefits than the big other LGUs (Table 11).

5.0 FISCAL GAP IN PROVIDING THE SWMP

The fiscal gap was defined as the difference between the total cost incurred by an LGU and the total revenue that it gained from the provision of SWMP. A higher fiscal gap therefore implied that more funds were needed to provide SWM services. To allow meaningful comparisons and analysis, the fiscal gap was translated into per unit cost (per ton of solid waste, per household served). In general, the big other LGUs appeared to have the highest total and per unit fiscal gaps.

5.1 SWAPP-listed LGUs

On average the fiscal gap for the SWAPP-listed LGUs in 2002 was PhP 42.91 million. The LGU with the least gap (PhP0.75 million) was Amlan, although this was not true on a per unit basis due to the small volume of garbage this LGU handled and the small number of households it covered. The LGUs with the highest recorded gaps were Caloocan and Muntinlupa (Table 12).

On a per unit basis, the total cost per ton of solid waste was greater than the total revenue collected per ton of solid waste by PhP1,076. On average, this was equivalent to a PhP1.076 cost per kilogram of solid waste. This figure gives an indication of the amount to be charged to household for every kilogram of waste they produced.

On a per household basis, the average difference between the total cost and the total revenue from the provision of SWM services amounted to PhP839 per year. In other words, for the SWMP to be self-sustaining, households would have to pay an average of PhP70 per month. Passi City, which was among the LGUs with smaller total fiscal gaps, appeared to have the highest per household fiscal gap of PhP 2,323 in 2002 (PhP 193 per month). As discussed in the section on cost, this may have been due to underutilized equipment. The NCR LGUs (Caloocan and Muntinlupa) and Carmona also had high costs per household served. All of these are urban LGUs that relied on contract services for SW collection and disposal. In addition, Carmona also paid for the soil cover and the compaction of SW at its disposal site.

The lowest per household SWM costs were computed for Dumaguete and Olongapo. In the case of Dumaguete City, the revenue from the sales of garbage bags to households contributed greatly to the reduction in SWM costs. However, since its households were

already charged for the use of color-coded garbage bags, the LGU faced a particularly tough challenge to find ways by which the fiscal gap of PhP 4.67 per household per month could be recovered. For Olongapo, the monthly garbage fee collected from the household helped cover the financial burden of providing SWM services. This meant that the LGU only had to subsidize the service by the relatively small amount of PhP 8.00 per household.

Marilao also recorded relatively low expenses for waste disposal. This was because homeowners associations in several subdivisions took care of their own solid wastes and the LGU only paid for the cost of covering waste with soil. Although this may seem like an attractive solution, the non-payment for using the disposal site had social and environmental costs. In particular, the owner of the dumpsite accepted solid wastes from other LGUs (e.g. Caloocan) on the payment of a tipping fee of P1,500 per truck. This was without any provision for treatment. Thus, while the owner earned from collecting disposal fees from Caloocan, the presence of the dumpsite posed health and social hazards to the community. The Provincial Environment and Natural Resources Officer (PENRO) of Bulacan even stated that the provincial government was considering sending a letter of reprimand to the Mayor of Marilao for allowing the owner of the dumpsite to accept solid wastes from other LGUs.

5.2 Other LGUs

The big other LGUs had an average fiscal gap of PhP 220.88 million. They also had an average per unit fiscal gap of PhP 1,102 per ton of SW and PhP 1,158 per household served in 2002. This meant that on average, the monthly burden on the LGUs for providing SWM services was PhP 96.50 per household (Table 12). The NCR-LGUs stood out in terms of their cost-revenue differential per ton of solid wastes and per household served. This may have been because the clean and green program of these LGUs was incorporated in their SWM expenses. These LGUs also employed numerous street sweepers. It should also be noted that two LGUs (Las Piñas and Marikina) that did not rely on contractual services for waste collection and disposing had lower per unit costs compared to those that depended on contractors (Table 11). The data also shows that the big other LGUs outside of the NCR had more or less the same per unit fiscal gaps as the NCR LGUs.

The small other LGUs had the lowest average total fiscal gap. However, they had a higher average per household cost-revenue gap than the SWAPP-listed LGUs. Specifically, Moncada and Zarraga had the highest fiscal gap per ton of waste and per household served (Table 12). This implied that, while these LGUs were earning revenues from recyclables and composting activities, the costs of providing the services such as the collection and disposal of residues were quite high. It must be remembered that Moncada claimed that they were not able to meet demand for compost due to limited supplies of raw materials. In addition, the high fiscal gap per household served by these LGUs may have been due to the limited number of households they served, which itself was a result of the fact that the rural barangays managed their own SW.

The lowest per unit costs was estimated for Sibulan. This finding could be explained by the LGUs' low operating costs and the higher percentage of households it served. This result must, however, be taken with caution since lower per unit costs may be attractive financially but may also have some negative externalities. Sibulan was among those LGUs

that carried out no SWM activities apart from collection and disposal and did not treat any waste.

Table 12. Fiscal Gap in Providing SWM in Selected LGUs, by Classification and Region, Philippines, 2002 (Php).

CLASSIFICATION/ REGION	LGU	FISCAL GAP*		
		Total ('000)	Per Ton	Per HH Served
SWAPP-listed LGUs				
NCR	Caloocan City	344,273	2,010	1,230
NCR	Muntinlupa City	111,613	1,680	1,431
Region 1	Laoag City	11,691	854	592
Region 1	San Fernando, LU	14,367	818	957
Region 3	Marilao	8,294	625	364
Region 3	Olongapo City	4,229	178	98
Region 3	San Fernando, Pam	20,667	354	431
Region 4	Batangas City	24,551	635	1,345
Region 4	Carmona	9,996	1,660	963
Region 4	Lipa City	16,373	655	952
Region 5	Naga City	21,981	971	870
Region 6	Iloilo City	47,268	423	668
Region 6	Passi City	6,381	4,371	2,323
Region 7	Amlan	750	800	302
Region 7	Dumaguete City	1,216	111	56
	Average	42,910	1,076	839
Big Other LGUs				
NCR	Las Piñas City	97,485	1,335	995
NCR	Mandaluyong City	214,335	2,447	3,504
NCR	Marikina City	96,983	1,063	1,121
NCR	Quezon City	1,653,331	2,996	3,440
CAR	Baguio City	16,344	192	395
Region 3	Angeles City	11,835	216	243
Region 3	Tarlac City	27,793	564	538
Region 4	Antipolo City	58,004	1,041	514
Region 4	Calamba City	18,581	463	445
Region 4	Lucena City	14,102	706	381
	Average	220,879	1,102	1,158
Small Other LGUs				
Region 1	Batac	1,937	965	794
Region 1	Bauang	2,849	1,561	630
Region 1	Calasiao	2,426	289	572
Region 1	Candon City	2,137	293	857
Region 3	Moncada	2,372	2,954	2,326
Region 4	Los Baños	4,562	417	289
Region 4	Sto Tomas	1,727	223	1,109
Region 5	Iriga City	7,833	858	1,391
Region 5	Nabua	3,685	1,496	1,958
Region 5	Pili	2,245	1,025	443
Region 6	Leganes	660	602	146
Region 6	Pototan	1,441	329	843
Region 6	Zarraga	843	2,309	2,443
Region 7	Bais City	8,468	540	2,044
Region 7	San Jose	811	1,088	1,055
Region 7	Sibulan	319	175	49
	Average	2,770	945	1,059

* The difference between Total Cost and Total Revenue. Details of the Total Cost and Total Revenue are shown in Appendix Tables 2 and 3

5.3 Ranking of LGUs in Terms of Per Ton of SW Collected

All of the LGUs were ranked in terms of their fiscal gap per ton of SW collected. They were then divided into two groups: those with low fiscal gaps and those with high fiscal gaps. The average fiscal gap per ton of those that belong to the first 'low' group was PhP 399 (ranging from PhP111 to PhP 706), while for the second group the average fiscal gap was PhP 1,633 (ranging from PhP 800 to PhP 4,371)(Table 13).

The group with low fiscal gaps consisted of 47% of the SWAPP-listed LGUs and 50% of both the big and small other LGUs (Table 13). In other words, more than half of the SWAPP-listed LGUs had high fiscal gaps per ton of SW collected.

The LGU with the lowest fiscal gap was Dumaguete while the one with the highest was Passi City. Both these LGUs were SWAPP-listed and had exemplary SWM practices. In Dumaguete, an old open dumpsite had been converted into an ecological park and the site of the LGUs' waste recycling plant (composting activity). The LGU did not charge any fee for visitors to the ecological park. Instead revenues were earned from the sale of colour-coded garbage bags to all households. Charging an entrance fee to the park would be one way for this LGU to reduce its the fiscal gap still further. Passi City's SWM Information Education Campaign (IEC) was widely praised, however it earned no income from this activity. The LGUs' high fiscal gap was attributable to this factor, to the very limited area it served and also to the sophisticated equipment it employed. In particular, the yearly depreciation on this equipment raised the LGUs' per unit costs.

Apart from the SWAPP-listed LGUs, those in the low fiscal gap group were LGUs without SWM activities aside from the collection and disposal of garbage. For the small other LGUs in this group, their low fiscal gaps may have been partly due to low SWM coverage and limited levels of equipment and personnel. For the big other LGUs in this group, like Baguio City and Angeles, their low fiscal gaps could have been partly explained by the fact that they had used public lands as disposal sites. They therefore avoided depreciation charges and lowered their up front costs.

Those SWAPP-listed LGUs that were in the high fiscal gap group were those that provided recycling and composting facilities and services yet were not getting any revenue from them. For example, Amlan had a composting facility with a plant nursery and organic garden. Yet, the LGU did not aim for earnings but only to demonstrate to the public that garbage could be put to good use. In San Fernando, La Union, the LGU provided proper gear and medical assistance to waste pickers. All income from recyclables was kept by the waste pickers themselves. In Laoag, compost was not sold but given free to farmer co-operators.

All the big other LGUs in the NCR were classified in the high fiscal gap group. This was due to the large amounts they paid to contract out SW collection and disposal and also because of the money they had to pay to the MMDA. In addition, these LGUs employed numerous under-utilized casual workers, including street sweepers, as part of their SWMP. This was part of a strategy to provide employment, however, it had the knock-on effect of

Table 13. Ranking of LGUs by Fiscal Gap per Ton, Philippines, 2002 (PhP)

REGION	LGU	CLASSIFICATION	FISCAL GAP ('000)	FISCAL GAP/TON
Low Fiscal Gap				
Region 7	Dumaguete City	SWAPP-listed	1,216	111
Region 7	Sibulan	Small LGU	319	175
Region 3	Olongapo City	SWAPP-listed	4,229	178
CAR	Baguio City	Big LGU	16,344	192
Region 3	Angeles City	Big LGU	11,835	216
Region 4	Sto Tomas	Small LGU	1,727	223
Region 1	Calasiao	Small LGU	2,426	289
Region 1	Candon City	Small LGU	2,137	293
Region 6	Pototan	Small LGU	1,441	329
Region 3	San Fernando, Pam	SWAPP-listed	20,667	354
Region 4	Los Baños	Small LGU	4,562	417
Region 6	Iloilo City	SWAPP-listed	47,268	423
Region 4	Calamba City	Big LGU	18,581	463
Region 7	Bais City	Small LGU	8,468	540
Region 3	Tarlac City	Big LGU	27,793	564
Region 6	Leganes	Small LGU	660	602
Region 3	Marilao	SWAPP-listed	8,294	625
Region 4	Batangas City	SWAPP-listed	24,551	635
Region 4	Lipa City	SWAPP-listed	16,373	655
Region 4	Lucena City	Big LGU	14,102	706
	Average		11,650	399
High Fiscal Gap				
Region 7	Amlan	SWAPP-listed	750	800
Region 1	San Fernando, LU	SWAPP-listed	14,367	818
Region 1	Laoag City	SWAPP-listed	11,691	854
Region 5	Iriga City	Small LGU	7,833	858
Region 1	Batac	Small LGU	1,937	965
Region 5	Naga City	SWAPP-listed	21,981	971
Region 5	Pili	Small LGU	2,245	1,025
Region 4	Antipolo City	Big LGU	58,004	1,041
NCR	Marikina City	Big LGU	96,983	1,063
Region 7	San Jose	Small LGU	811	1,088
NCR	Las Piñas City	Big LGU	97,485	1,335
Region 5	Nabua	Small LGU	3,685	1,496
Region 1	Bauang	Small LGU	2,849	1,561
Region 4	Carmona	SWAPP-listed	9,996	1,660
NCR	Muntinlupa City	SWAPP-listed	111,613	1,680
NCR	Caloocan City	SWAPP-listed	344,273	2,010
Region 6	Zarraga	Small LGU	843	2,309
NCR	Mandaluyong City	Big LGU	214,335	2,447
Region 3	Moncada	Small LGU	2,372	2,954
NCR	Quezon City	Big LGU	1,653,331	2,996
Region 6	Passi City	SWAPP-listed	6,381	4,371
	Average		126,846	1,633

increasing the operating costs of the SWMP.

5.4 Ranking of LGUs by Fiscal Gap per Household Served

All of the LGUs were ranked in terms of their fiscal gap per household served and divided into 'high' and 'low' groups. As with the fiscal gap per ton ranking, 47% of the SWAPP-listed LGUs were among those with low group. However, there were more (60%) big other LGUs and fewer (44%) small other LGUs in this group compared to the rankings by fiscal gap per ton (Table 14).

Among the SWAPP-listed LGUs, Dumaguete and Olongapo cities were the LGUs with the lowest fiscal gap per household served. This could be explained by their revenues from garbage fees and sales from colour-coded garbage bags. On average, each household in Dumaguete spent PhP 24 per month on colour-coded garbage bags. This was equivalent to almost half the garbage fee collected by Olongapo for each household served.

Lipa City and Batangas City had low fiscal gaps per ton of SW, but had high fiscal gaps per household served. This was thought to be due to the low proportion of household served in these LGUs: 34% and 41% of the total households in Batangas City and Lipa City, respectively. None of the NCR-LGUs belonged to the low fiscal gap per household served group.

The reasons why SWAPP-listed and other LGUs had high fiscal gaps per household were similar to those that explained why such LGUs had high fiscal gaps per ton of SW.

5.5 Net Loss/Surplus in the SWMP of the LGUs

Net loss/surplus was calculated as the difference between the total cost of the SWMP to an LGU and the economic benefits that were obtained from it. After calculating the value of revenues and avoided landfill and dumpsite costs, it was found that 33% of the SWAPP-listed LGUs and 12.50% of the small other LGUs turned had surpluses (Table 15).

Because the full economic benefits of the SWMP were considered in the calculations of LGUs' net losses or surpluses, it was found that this calculation painted a more positive financial picture of SWM activities than those for fiscal gaps. The largest absolute and percentage reductions in the gap between SWM costs and revenues were among the SWAPP-listed LGUs. In these organisations, the average cost-revenue gap decreased by 49% of the fiscal gap per ton and by 79% of the fiscal gap per household served. The group of LGUs with the lowest absolute and percentage reductions was the big other LGUs. For these LGUs, the cost-revenue gaps decreased by only 3% and 4% per ton and per household served, respectively. The decrease in cost-revenue gaps for the small other LGUs was 18% (on a per ton basis) and 32% (on a per household served basis).

Despite the revenue from the sale of recyclables and compost that was earned by other parties, it is ironic that the LGUs did not think of collecting revenues from these sources. It may have been the case that the cost of doing this would have outweighed the benefits. It is the case the LGUs would be better off leaving the collection and marketing

Table 14. Ranking of LGUs by Fiscal Gap per HH Served, Philippines, 2002 (PhP)

REGION	LGU	CLASSIFICATION	FISCAL GAP ('000)	FISCAL GAP/ HH SERVED
Low Fiscal Gap				
Region 7	Sibulan	Small LGU	319	49
Region 7	Dumaguete City	SWAPP-listed	1,216	56
Region 3	Olongapo City	SWAPP-listed	4,229	98
Region 6	Leganes	Small LGU	660	146
Region 3	Angeles City	Big LGU	11,835	243
Region 4	Los Baños	Small LGU	4,562	289
Region 7	Amlan	SWAPP-listed	750	302
Region 3	Marilao	SWAPP-listed	8,294	364
Region 4	Lucena City	Big LGU	14,102	381
CAR	Baguio City	Big LGU	16,344	395
Region 3	San Fernando, Pam	SWAPP-listed	20,667	431
Region 5	Pili	Small LGU	2,245	443
Region 4	Calamba City	Big LGU	18,581	445
Region 4	Antipolo City	Big LGU	58,004	514
Region 3	Tarlac City	Big LGU	27,793	538
Region 1	Calasiao	Small LGU	2,426	572
Region 1	Laoag City	SWAPP-listed	11,691	592
Region 1	Bauang	Small LGU	2,849	630
Region 6	Iloilo City	SWAPP-listed	47,268	668
Region 1	Batac	Small LGU	1,937	794
	Average		12,789	397
High Fiscal Gap				
Region 6	Pototan	Small LGU	1,441	843
Region 1	Candon City	Small LGU	2,137	857
Region 5	Naga City	SWAPP-listed	21,981	870
Region 4	Lipa City	SWAPP-listed	16,373	952
Region 1	San Fernando, LU	SWAPP-listed	14,367	957
Region 4	Carmona	SWAPP-listed	9,996	963
NCR	Las Piñas City	Big LGU	97,485	995
Region 7	San Jose	Small LGU	811	1,055
Region 4	Sto Tomas	Small LGU	1,727	1,109
NCR	Marikina City	Big LGU	96,983	1,121
NCR	Caloocan City	SWAPP-listed	344,273	1,230
Region 4	Batangas City	SWAPP-listed	24,551	1,345
Region 5	Iriga City	Small LGU	7,833	1,391
NCR	Muntinlupa City	SWAPP-listed	111,613	1,431
Region 5	Nabua	Small LGU	3,685	1,958
Region 7	Bais City	Small LGU	8,468	2,044
Region 6	Passi City	SWAPP-listed	6,381	2,323
Region 3	Moncada	Small LGU	2,372	2,326
Region 6	Zarraga	Small LGU	843	2,443
NCR	Quezon City	Big LGU	1,653,331	3,440
NCR	Mandaluyong City	Big LGU	214,335	3,504

Table 15. Net Loss of SWM of Selected LGUs, by Classification and Region, Philippines, 2002 ('000 Php).

CLASSIFICATION/ REGION	LGU	TOTAL ECONOMIC BENEFITS	TOTAL COST	NET LOSS
SWAPP-listed LGUs				
NCR	Caloocan City	17,692	344,273	326,581
NCR	Muntinlupa City	9,419	118,2818	108,62
Region 1	Laoag City	3,272	13,156	9,884
Region 1	San Fernando, LU	11,567	15,216	3,648
Region 3	Marilao	2,777	8,774	5,997
Region 3	Olongapo City*	62,824	22,500	(40,324)
Region 3	San Fernando, Pam	26,542	21,291	(5,251)
Region 4	Batangas City*	78,647	25,367	(53,280)
Region 4	Carmona	708	10,360	9,652
Region 4	Lipa City*	50,078	18,596	(31,482)
Region 5	Naga City	5,774	21,981	16,207
Region 6	Iloilo City	3,240	50,508	47,268
Region 6	Passi City	0	6,381	6,381
Region 7	Amlan	301	782	481
Region 7	Dumaguete City	4,301	5,324	1,023
	Average	18,476	45,519	27,043
Big Other LGUs				
NCR	Las Piñas City	0	97,485	97,485
NCR	Mandaluyong City	15,083	214,335	199,252
NCR	Marikina City	7,926	97,883	89,957
NCR	Quezon City	0	1,653,330	1,653,331
CAR	Baguio City	7,305	23,649	16,344
Region 3	Angeles City	5,195	12,935	7,739
Region 3	Tarlac City	3,651	31,173	27,522
Region 4	Antipolo City	1,748	58,748	57,000
Region 4	Calamba City	1,243	19,824	18,581
Region 4	Lucena City	1,119	15,221	14,102
	Average	4,327	222,458	218,131
Small Other LGUs				
Region 1	Batac	707	2,645	1,937
Region 1	Bauang	155	3,004	2,849
Region 1	Calasiao	3,624	2,540	(1,083)
Region 1	Candon City	2,891	2,459	(433)
Region 3	Moncada	634	2,554	1,920
Region 4	Los Baños	3,534	4,562	1,028
Region 4	Sto Tomas	1,924	2,058	133
Region 5	Iriga City	0	7,833	7,833
Region 5	Nabua	0	3,685	3,685
Region 5	Pili	0	2,245	2,245
Region 6	Leganes	0	660	660
Region 6	Pototan	45	1,486	1,441
Region 6	Zarraga	4	847	843
Region 7	Bais City	5,770	8,468	2,698
Region 7	San Jose	325	825	500
Region 7	Sibulan	256	515	259
	Average	1,242	2,899	1,657

* These LGUs turned to have surplus.

of recyclables and compost to private individuals or groups. In the absence of statistics or information that would explain why the LGUs did not care to earn revenue from recycling, there is a need for further research on the cost and benefits of this activity.

Among the SWAPP-listed LGUs, Olongapo City, Batangas City and Lipa City had surpluses due to the high value of the revenues they received, while San Fernando, Pampanga had a surplus due to the high value of its savings on landfill cost (Appendix Table 4). For the small other LGUs, Calasiao and Candon City had surpluses mainly because of the high value of their landfill cost savings.

5.6 Projection⁸ of the Present Value of the Fiscal Gap

The Ecological Solid Waste Management (ESWM) Act mandates that LGUs should divert at least 25% of all their waste away from landfill (at the time when the Act was put into law). Some LGUs had adopted waste diversion activities before the law was enacted, others had not (Table 16). If, however, all the LGUs adopted this waste diversion target, there should be a reduction in the overall fiscal gap despite any increases in population.

To calculate the potential reduction in the fiscal gap, the following assumptions were made: For those LGUs with more than 25% waste diversion, it was assumed that their current levels of waste diversion would continue for ten years. For those that had no diversion activities, it was assumed that over the next five years they would gradually increase waste diversion activities up to 25% and then continue at that level until the 10th year of implementation.

Given current level of waste diversion activities, the average fiscal gap of the LGUs in the year 2002 amounted to PHP 42,910 M, PhP 220,88 M and PhP 2.77 M for the SWAPP-listed, big other and small other LGUs respectively. If the ESWM waste diversion targets were adopted the average annual fiscal gap is projected to decrease by 29% for the SWAPP-listed LGUs and 31% each for the big and small other LGUs. The net loss of the LGUs would also be reduced by the same percentages.

⁸ For projection purposes, the 2002 population level, population growth rate and waste generation data of each LGU were used. Projection of Fiscal Gap was done as follows: First, the population was projected as $\text{Popn}_{2000} (1+r)^n$ where: r = population growth rate; n = number of years to be projected; Second, projection of solid waste generation as 2002 per capita waste generation x projected population; Third, projection of waste diverted as 2002 % waste diversion x projected solid waste; Fourth, projection of cost and revenue by multiplying the 2002 financial cost and revenue with the population growth rate; fifth, projection of fiscal gap by getting the cost-revenue differential per year and last, discounting the fiscal gap to get the NPV using 10% discount rate. The population growth rate, current waste diverted and the assumed waste diversion level are shown in Appendix Table 1.

Table 16. Percentage Solid Waste Diverted by Selected LGUs, by Classification and Region, Philippines, 2002 ('000 PhP).

CLASSIFICATION/ REGION	LGU	% SOLID WASTE DIVERTED
SWAPP-listed LGUs		
NCR	Caloocan City	13
NCR	Muntinlupa City*	5
Region 1	Laoag City	30
Region 1	San Fernando, LU	30
Region 3	Marilao	82
Region 3	Olongapo City*	27
Region 3	San Fernando, Pam	70
Region 4	Batangas City*	62
Region 4	Carmona*	30
Region 4	Lipa City	0
Region 5	Naga City	90
Region 6	Iloilo City	87
Region 6	Passi City	8
Region 7	Amlan	0
Region 7	Dumaguete City*	0
	Average	36
Big Other LGUs		
NCR	Las Piñas City	0
NCR	Mandaluyong City	6
NCR	Marikina City*	25
NCR	Quezon City	0
CAR	Baguio City	0
Region 3	Angeles City	17
Region 3	Tarlac City	5
Region 4	Antipolo City	0
Region 4	Calamba City	0
Region 4	Lucena City	0
	Average	5
Small Other LGUs		
Region 1	Batac	0
Region 1	Bauang	0
Region 1	Calasiao*	95
Region 1	Candon City*	80
Region 3	Moncada*	75
Region 4	Los Baños	0
Region 4	Sto Tomas*	45
Region 5	Iriga City	0
Region 5	Nabua	0
Region 5	Pili	0
Region 6	Leganes	0
Region 6	Pototan	0
Region 6	Zarraga	0
Region 7	Bias City*	58
Region 7	San Jose*	95
Region 7	Sibulan	15
	Average	29

* These LGUs have records of the estimates of SW diverted, others are based on perception of the person in charge of SWMP while those with zero entry simply collect and dispose their SW.

Table 17. Net Present Value of Fiscal Gap and Net Loss of Selected LGUs, by Classification and Region, Philippines, 2002 ('000PhP)

Classification/ Region	LGU	NET PRESENT VALUE (10%)	
		Fiscal Gap	Net Loss(Surplus)
SWAPP-listed LGUs			
NCR	Caloocan City	2,522,961	2,393,304
NCR	Muntinlupa City	728,810	710,851
Region 1	Laoag City	77,713	65,703
Region 1	San Fernando, LU	99,547	25,280
Region 3	Marilao	67,755	48,991
Region 3	Olongapo City	28,617	(272,870)
Region 3	San Fernando, Pam	152,071	(38,640)
Region 4	Batangas City	84,170	(389,551)
Region 4	Carmona	179,502	81,274
Region 4	Lipa City	119,711	(230,177)
Region 5	Naga City	149,087	109,923
Region 6	Iloilo City	324,506	324,506
Region 6	Passi	44,242	44,242
Region 7	Amlan	7,947	3,145
Region 7	Dumaguete	4,905	6,686
	Average	306,103	192,178
Big Other LGUs			
NCR	Las Piñas	709,050	709,050
NCR	Mandaluyong City	1,399,565	1,301,078
NCR	Marikina City	666,960	618,641
NCR	Quezon City	11,343,911	11,343,911
CAR	Baguio	84,500	114,689
Region 3	Angeles City	198,903	55,259
Region 3	Tarlac City	114,689	196,963
Region 4	Antipolo City	498,207	489,586
Region 4	Calamba City	144,469	144,469
Region 4	Lucena City	96,646	96,646
	Average	1,525,690	1,507,029
Small Other LGUs			
Region 1	Batac	12,877	12,877
Region 1	Bauang	19,739	19,739
Region 1	Calasiao	17,122	(7,646)
Region 1	Candon City	14,603	(2,957)
Region 3	Moncada	16,978	13,740
Region 4	Los Baños	35,470	7,993
Region 4	Sto Tomas	12,624	977
Region 5	Iriga City	53,130	53,130
Region 5	Nabua	24,994	24,994
Region 5	Pili	15,227	15,227
Region 6	Leganes	4,573	4,573
Region 6	Pototan	9,987	9,987
Region 6	Zarraga	5,843	5,843
Region 7	Bais City	55,360	17,639
Region 7	San Jose	5,305	3,268
Region 7	Sibulan	2,085	1,691
	Average	19,120	11,317

5.7 Financing the Fiscal Gap

As presented earlier, it was found that all the LGUs were incurring fiscal gaps in the provision of SWM. Although it may appear that revenues from recyclables and compost

could reduce these gap, the costs associated with these activities may outweigh the benefits, resulting in even wider cost-revenue gaps.

It was also found that some of the LGUs that collected garbage fees from household had smaller financial gaps. However, this does not mean that all LGUs could go down this path, since cost and practicality considerations may count against it.

The LGUs, through the MENRO/CENRO (City Environment and Natural Resources Office and the Officer Municipal Environment and Natural Resources Office/Officer), have already established rates for garbage fees for commercial establishments (see Appendix 5 for sample). However, since these fees are incorporated in the existing permits/license fees, the money is not allocated nor used for SWM. Even the persons in charge of the SWM have no idea as to the amount of garbage fees collected⁹ since the total amount for the permits/license fees go to the general fund of each LGU. If the garbage fees were separated and properly accounted for, this could be a way for LGUs to fill-in their fiscal gaps for SWM activities. At the same time, it could provide incentives among implementors to identify activities that could further improve the provision of SWM services.

6.0 PROBLEMS IN SWMP IMPLEMENTATION AND FUTURE PLANS OF LGUS

6.1 Problems Encountered by the LGUs Related to SWMP Implementation

Under the ESWM, the LGUs were given authority over the management and implementation of the SWMP. Hence, they have no recourse but to comply with it. However, there are problems associated with the SWMP that the LGUs and program implementors have had to deal with.

The main problem faced by the LGUs was the fact that many of their SWMP implementors and supervisors lacked the necessary technical skills. Seventy one percent of all the surveyed LGUs indicated that this was the main constraint they faced. Sixty seven percent of the SWAPP-listed LGUs admitted that they lacked the necessary skills needed for the tasks, despite the fact that they had been cited for their exemplary SWM practices. All of the big other LGUs and 56% of the small other LGUs reported that a lack of technical skills had slowed down the implementation of their SWMPs (Table 18). These LGUs mentioned that, more often than not, the staff assigned to manage the program were not technical people. They also highlighted the need for adequate training to make their SWMPs efficient and effective. Training was needed in areas such as the establishment and operation of MRFs, in the preparation of feasibility studies for the conversion of dumpsites into sanitary landfills, and in full cost accounting methods and market linkages.

⁹ The process of collection passes through several offices as follows: a) the rates were established by the MENRO/CENRO; b) permit/license if filed at the permit/licenses section; c) fees are assessed by the assessor's office; d) payment of fees at the cashier section; and e) total amount collected remitted to the treasurer's office. The researcher tried to get an indication of the garbage fee collected from the establishment but they are constrained by time due to the LGU bureaucracy.

Another important problem mentioned by the LGUs concerned the lack of resources for program implementation. It was also indicated that LGU officials had other priority programs that negatively affected the implementation of the SWMP. There were even cases where the budget for the SWMP had been diverted for other programs. Other highlighted problems included examples of poor attitude and a lack of discipline amongst those involved in SWM programs, a lack of appropriate disposal sites and concerns about the overall sustainability of the SWMP.

6.2 Plans for the SWMP

In light of the problems they faced, SWMP implementors outlined some plans that would help them better implement the program. According to 73% of the LGUs visited, the top priority was the intensification of the use of MRFs and the provision of relevant training to allow this to happen. This was not as big a priority for SWAPP-listed LGUs (only 44% mentioned it) since most already had such training in place. Their main requirement was the resources to put what had been learned into action. However, 80% of the big other LGUs and 94% of the small other LGUs still identified this activity as something that they have in the pipeline (Table 18).

Other plans highlighted the need for finding and securing disposal sites that could be upgraded and improved. Most LGUs also identified the need to have a separate division that would be solely responsible for the management and implementation of the SWM. This was believed to be a key step towards the efficient delivery of SWM services.

Table 18. Problems Encountered in SWM Implementation of Selected LGUs, Philippines, by Classification, 2002 (%)*

PROBLEMS	SWAPP- LISTED LGUs (n=15)	BIG OTHER LGUs (n=10)	SMALL OTHER LGUs (n=16)	ALL (n=41)
Lack of technical skills of implementers/supervisors	67	100	56	71
Lack of or insufficient resources (financial & human)	40	50	63	51
Problems of finding disposal site and strict requirement for the Environmental Clearance Certificate	20	30	38	29
Different priority programs of LGU officials	27	40	19	27
Attitude/Discipline of constituents towards ESWM programs of LGUs	33	30	13	24
Sustainability of ESWM Program	20	0	6	10
Determination of household charges	7	0	0	2
Others**	13	10	19	15

* Multiple Response

** Include unregulated waste picking by scavengers in the disposal sites, lack of market linkages for recyclables and compost, injudicious use of plastic bags in supermarkets and groceries and insufficient raw materials for composting that lead to underutilization of equipment and manpower.

Table 19. Future Plans on SWM of Selected LGUs, Philippines, 2002 (%)*

PLAN	SWAPP- LISTED LGUs (n=15)	BIG OTHER LGUs (n=10)	SMALL OTHER LGUs (n=16)	ALL (n=41)
Intensify the use of the Material Recovery Facility	47	80	94	73
Upgrade and improve disposal site	41	20	44	37
Establish separate division to handle SWMP	20	20	44	29
Study the mechanism on how to implement garbage fee	13	0	0	5
Others: Organize scavengers into a cooperative	7	10	0	5

* Multiple Response

7.0 SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

7.1 Summary

In the Philippines, the economic, social and environmental problems associated with the entire process of SWM have been particularly bad. They led to calls for legislative intervention to safeguard social interest and public health. This resulted in the Ecological Solid Waste Management Act or Republic Act 9003. This law set guidelines and targets for solid waste avoidance and volume reduction. It also mandated LGUs to take the responsibility for the management and implementation of the provisions of the Act. However, despite the authority they have been given, LGUs are still in a quandary about the implementation of the Act. Specifically, the ESWM Act requires financial resources that many LGUs do not have. Although the Act allows LGUs to charge fees, many do not have proper guidelines on how these fee could be best imposed among their constituents.

This study was conducted to analyze the financial costs and benefits of the SWMP in selected LGUs in the Philippines. A total of 41 LGUs consisting of 15 SWAPP-listed LGUs, 10 big other LGUs; and 16 small other LGUs were visited (big LGUs were those with more than 35,000 households). The people in charge of the SWMP were interviewed regarding the management and implementation of the program. Costs and revenues linked to the implementation of the SWMP were obtained from staff interviews and LGU records. In addition, estimates were made of incomes that accrued to other parties from the sales of recyclables and compost. These other parties included waste pickers, junkshops and private individual. The savings from avoided landfill or dumpsite costs were also estimated. Using this information the difference between the actual costs and revenues collected by the LGUs was calculated. This gave an indication of the fiscal gap relating to the SWMP that needs to be financed. The overall net cost/surplus was also estimated by calculating the difference between economic benefits and costs. Fiscal gap and economic cost/surplus streams were projected and discounted (10% discount rate) over a period of 10 years to arrive at their net present values.

As expected, there were wide variations in terms of socio-economic characteristics among the LGUs. Per capita waste generation varied widely depending on the level of

urbanization of the LGUs with the big other LGUs (more urban LGUs) having higher average per capita waste levels compared with the SWAPP-listed and small other LGUs. In general, per capita waste generation and budget allocation for SWM increased alongside LGU income. It was apparent that the small other LGUs (often rural LGUs) served a limited number of households due to the agricultural nature of their areas. They also had a limited budget allocated to SWM activities. In terms of SWM activities undertaken, it was surprising that some SWAPP-listed LGUs had no solid waste diversion activities and still used opened dumpsites, although they implemented strong SWM IEC programs and had well organized waste collection systems.

None of the SWAPP-listed and big other LGUs has sanitary landfills that complied with the conditions prescribed by RA 9003. However, there was one small other LGU that met the sanitary landfill criteria set by the law, although it did not practice solid waste diversion. There were also some LGUs (3 SWAPP-listed, 2 big other LGUs and 4 small other LGUs) that rented private lots as waste disposal sites. Hence, the role of private landowners in providing service for the disposal sites cannot be overemphasized. This calls for an economic assessment to determine the marginal social benefits and marginal social costs of this arrangement.

Although the LGUs claimed to have controlled or semi-controlled dumpsites, when verified with the guidelines set by the Act, only 20% (3 out of 15) among the SWAPP-listed LGUs and one each from the big and small other LGUs could be classified as having controlled dumpsites. The rest were disposing of their waste in either semi-controlled or open dumpsites.

The average cost of managing solid waste did not vary too much across the LGUs although the highest (PhP1,188 per ton) was estimated in the SWAPP-listed LGUs and the lowest (PhP 1,002 per ton) in the small other LGUs. However, slight variations in the cost per household served were observed. The highest (PhP 1,192 per household per year or PhP 99.00 per month) was in the big other LGUs and the lowest (PhP 914 per year or PhP7 per month) was in the SWAPP-listed LGUs. The NCR LGUs are also among those with a high cost (PhP 995 to PhP 3,504/year) per household served. This would mean monthly costs for each household of between PhP 83.00 and PhP292.00. This was attributed to the high cost of contracting out the collection and disposal of solid waste and also to the cost of contributions the LGUs made to the MMDA.

Among the SWAPP-listed LGUs, Passi City had the highest cost (PhP 4,371per ton of SW) due to the sophisticated equipment that the LGU had acquired. Since the amount of SW collected in this relatively small city was quite modest, this resulted in a high per unit cost.

Benefits from the SWMP were divided into financial and economic benefits. Financial benefits were the revenues that the LGUs earned either from sales of recyclables and compost or from the collection of garbage and other fees. Economic benefits consisted of those collected by the LGUs, the value of recyclables collected by other parties (waste pickers, junkshops, cooperatives) and the value of avoided landfill/dumpsite costs. The SWAPP-listed LGUs were the ones with the highest average revenue per ton and per household served while the big other LGUs had the least. This may have been because the

SWAPP-listed LGUs had records of their collections, information lacked by most of the big and small other LGUs. In fact, only one of the LGUs from the NCR collected revenues from SWM activities. This was anomalous considering that these LGUs collected sanitary fees from market vendors. However, officials said that they did not consider the fees income from SWM but payment for the use of space.

The big other LGUs were found to enjoy the lowest level of economic benefits from SWM. This was partly due to the low value attributed to 'avoided landfill' in these LGUs, which practiced minimal levels of SW diversion.

The comparison of cost and revenue yielded the fiscal gap each LGU faced in providing SWM services. The big other LGUs had the highest average costs both on a per weight (PhP 1102 per ton) and per household served (PhP 1,158 per year or PhP 96.50 per month) basis. The small other LGUs had the lowest average fiscal gap per ton (PhP 945 per ton) while the SWAPP-listed LGUs had the lowest gap per household served (PhP 839 per household per year or PhP 70 per month). The fiscal gap, on the average, increased alongside LGU per capita income, which itself corresponded to higher levels of SW generation.

It was also noted that all the NCR-LGUs were in the high fiscal gap category. These LGUs and Carmona, a SWAPP-listed LGU, relied on private contractors for the collection and disposal of their solid wastes. This implied that LGUs that contracted out solid waste services were facing higher costs than those that managed their own SWMP. In addition, LGUs that collected revenue (both fee based and non-fee based) were among those with the lowest fiscal gaps. When the economic benefits of SWM were considered, a number of LGUs (3/15 from the SWAPP-listed and 1/16 from the small other LGUs) had surpluses. However it was found that when LGUs themselves attempted to gain revenue from recyclables and composts, the costs associated with these operations may actually have outweighed the revenues achieved. LGUs would therefore be better off leaving recycling activities to private individuals or groups who can do it more efficiently. One source of revenue to finance the fiscal gap could be the garbage fees that are currently incorporated in the permit/license fees paid by commercial establishments. If these garbage fees are properly allocated for SWM, the financial burden of the LGU in the provision of SWM may be eased.

The major problems faced by the LGUs in managing and implementing SWMP included: a lack of technical skills amongst implementors and supervisors; insufficient financial and human resources; the problem of identifying disposal sites; and, the strict requirements that needed to be met to obtain an environmental clearance certificate. In relation to these problems, the LGUs planned to intensify the use of MRF and to strengthen the training of the people operating such facilities. They also aimed to find disposal sites that could be upgraded and improved and to create separate divisions that would be solely responsible for the SWMP.

7.2 Conclusions

From the results of the study the following can be concluded:

- The SWAPP-listed LGUs were relatively more advanced than the other LGUs in terms of activities and practices related to SWM. This was because, being members of the SWAPP, they had access to information and training related to SWM. In fact, the organisation publishes examples of exemplary practice its member LGUs. However, the activities of the two NCR LGUs need to be reviewed since the projects highlighted by SWAPP no longer exist.
- There were other LGUs with exemplary practices, like those in Moncada, Calasiao, Candon, and Sto Tomas in Luzon and San Jose, in the Visayas. Since these LGUs were not SWAPP members, their activities were not recognized or documented.
- It was costly to implement SWMP. This was shown by the high per unit costs of LGUs with wide SWM coverage. In addition, as shown by the NCR LGUs, it was even more expensive to rely on private contractors for the collection and disposal of SW than to do it 'in house'. LGUs must find ways in which costs can be reduced.
- There were revenues that the LGUs could obtain from recyclables and compost. However, the LGUs did not want to be business oriented since they perceived SWM as a social responsibility. They also felt that the collection and sale of recyclables would create a large administrative load and create other problems. Because of this they feared that the costs associated with such activities might outweigh the benefits.
- The cost of SWMP was higher than the actual revenues that the LGUs earned from implementing it. Thus, there was a fiscal gap that needed to be financed either through fee-based or non-fee based revenues or both. The fiscal gap was lower for those LGUs that collected revenue. Although there were potential revenues that the LGUs could collect from recyclables and composts, the LGUs felt that the cost of venturing into these activities could outweigh the benefits. Studies on the financial profitability of the various SWM measures are therefore needed.
- One of the potential sources of revenue to meet the fiscal gap was the garbage fee incorporated into the business permits/licenses of commercial establishments. Earmarking these fees for SWMP is therefore a priority.

7.3 Policy Implications

From the conclusions above, one general recommendation can be forwarded. The LGUs need to raise funds to finance the SWMP. The commercialization of recyclables and composting materials need to be explored as revenues from these activities could reduce the SWMP's financial gap. A solid financial analysis of the profitability of these activities needs

to be undertaken. This should investigate the current belief of some LGUs that this commercialization initiative would cost more than the revenue it would generate.

An immediate source of funding could be freed up by earmarking the garbage fees paid by business and commercial establishments for SWMP. The LGUs costs could also be reduced if LGUs operate their own SW collection and disposal activities.

In addition to the above recommendations, the LGU may wish to consider the following suggestions:

- The LGUs should undertake a study to investigate the level of garbage fee they should charge households and also the mechanisms by which such fees can be imposed and collected. This move may not be politically attractive but the LGUs should undertake it if they are to comply with the provisions of the ESWM Act.
- The assistance of the Department of Environment and Natural Resources (DENR) should be sought to reduce the problems associated with finding appropriate disposal sites. This move could help reduce the bureaucracy associated with the Environmental Compliance Certificate (ECC).
- There are many LGUs where private landholders provide their lands as dumping sites for a fee. The other LGUs may want to consider this option, with the proviso that the location of any site complies with the provision of the ESWM Act. This should ensure the protection of the local community. Specific guidelines and regulations that would enhance government and private land owners partnership may need to be formulated.
- The National Solid Waste Management Commission (NSWMC) should be asked to assist LGUs in the provision of SWMP training programs. The NSWMC should consider collaborating with SWAPP and other NGOs on this initiative. This would help to address the lack of technical skills among SWMP supervisors and implementors.

Appendix Table 1. Population growth rate and levels of solid wastes diversion used in projection.

Region	LGU	Population growth rate*	2002 level of Waste Diverted (%)	Projected level of waste diversion in five years** (%)
SWAPP-listed LGUs				
NCR	Caloocan City	3.06	13.00	5,10,15,20,25
NCR	Muntinlupa City	1.06	5.00	5,10,15,20,25
Region 1	Laoag City	1.37	30.00	30
Region 1	San Fernando, LU	2.09	30.00	30
Region 3	Marilao	4.93	82.00	82
Region 3	San Fernando, Pam	3.13	70.00	70
Region 3	Olongapo City	1.68	27.00	27
Region 4	Batangas City	3.02	62.00	62
Region 4	Lipa City	3.02	-	5,10,15,20,25
Region 4	Carmona	5.45	30.00	30
Region 5	Naga City	1.72	90.00	90
Region 6	Iloilo City	1.93	-	5,10,15,20,25
Region 6	Passi	2.1	-	5,10,15,20,25
Region 7	Dumaguete	1.08	8.00	5,10,15,20,25
Region 7	Amlan	1.08	87.00	87
Big Other LGUs				
NCR	Las Piñas	2.93	-	5,10,15,20,25
NCR	Mandaluyong City	1.06	6.00	5,10,15,20,25
NCR	Marikina City	1.96	25.00	25
NCR	Quezon City	1.92	-	5,10,15,20,25
CAR	Baguio	2.31	-	5,10,15,20,25
Region 3	Angeles City	2.61	17.00	5,10,15,20,25
Region 3	Tarlac City	2.65	5.00	5,10,15,20,25
Region 4	Antipolo City	5.79	-	5,10,15,20,25
Region 4	Calamba City	4.08	-	5,10,15,20,25
Region 4	Lucena City	1.9	-	5,10,15,20,25
Small Other LGUs				
Region 1	Batac	1.37	-	5,10,15,20,25
Region 1	Bauang	2.09	-	5,10,15,20,25
Region 1	Calasiao	2.41	95.00	95
Region 1	Candon City	1.85	80.00	80
Region 3	Moncada	2.65	75.00	75
Region 4	Los Baños	4.08	-	5,10,15,20,25
Region 4	Sto Tomas	3.02	45.00	45
Region 5	Iriga City	1.72	-	5,10,15,20,25
Region 5	Nabua	1.72	-	5,10,15,20,25
Region 5	Pili	1.72	-	5,10,15,20,25
Region 6	Leganes	2.1	-	5,10,15,20,25
Region 6	Pototan	2.1	-	5,10,15,20,25
Region 6	Zarraga	2.1	-	5,10,15,20,25
Region 7	Bais City	1.08	58.00	58
Region 7	San Jose	1.08	95.00	95
Region 7	Sibulan	1.08	15.00	5,10,15,20,25

* Population growth rate for 2002 except for Muntinlupa and Mandaluyong where population growth rates for 2000 were used.

** R.A. 9003 indicates that the LGUs should divert at least 25% of solid waste within five years.

For those LGUs with solid waste diversion of 25% and above, it was assumed that the current level of diversion will continue, otherwise, a graduated level of 5% per year starting 2004 was assumed.

Appendix Table 2. Cost of Solid Waste Management of Selected LGUs, Philippines, by Classification and Region, 2002 ('000 PhP)

CLASS./ REGION	LGU	UP-FRONT COST				OPERATING COST									BACK- END COST	TOTAL
		Dep. Of Vehicles and Equip	Dep. of Land Fill	ECC/ IEC	SUB TOTAL	Salaries, Wages and Benefits	Maintenan ce	Power and Fuel	Supplies	Travel	Contract Service/ Rental	Oversight and Support Services	Others*	SUB TOTAL		
SWAPP-listed LGUs																
NCR	Caloocan City	22	0	60	82	65,946	6	18	12	35	242,000	174	36,000	344,191	0	344,273
NCR	Muntinlupa City	168	0	251	419	17,389	205	60	120	35	74,703	64	25,287	117,863	0	118,281
Region 1	Laoag City	1,243	22	30	1,295	8,219	1,117	2,278	0	52	0	0	196	11,861	0	13,156
Region 1	San Fernando, LU	1,741	637	170	2,548	7,785	1,749	2,100	37	0	0	233	765	12,668	0	15,216
Region 3	Marilao	521	0	0	521	2,969	660	904	60	0	979	126	2,555	8,253	0	8,774
Region 3	Olongapo City	389	157	157	702	15,914	1,048	3,080	244	40	0	0	0	20,326	1,472	22,500
Region 3	San Fernando, Pam	478	696		1,174	13,009	457	539	20	12	6,023	58	0	20,117	0	21,291
Region 4	Batangas City	2,405	117	90	2,612	19,376	1,381	1,600	200	0	0	197	0	22,755	0	25,367
Region 4	Carmona	461	0	50	511	4,131	309	250	0	5	5,037	116	0	9,849	0	10,360
Region 4	Lipa City	1,137	50	33	1,221	15,023	713	1,291	150	2	0	197	0	17,376	0	18,596
Region 5	Naga City	8,894	800	18	9,712	6,940	3,975	1,200	10	23	0	121	0	12,269	0	21,981
Region 6	Iloilo City	16	0	0	16	18,509	50	100	0	0	31,514	100	219	50,492	0	50,508
Region 6	Passi City	2,460	0	0	2,460	3,267	0	0	180	0	0	29	445	3,921	0	6,381
Region 7	Amlan	86	5		91	372	71	90	2	0	0	145	10	690	0	782
Region 7	Dumaguete City	1,492	25	145	1,662	2,817	135	184	183	15	0	30	298	3,662	0	5,324
	Average	1,434	167	67	1,668	13,444	792	913	81	15	24,017	106	4,385	43,753	98	45,519
Big Other LGUs																
NCR	Las Piñas City**	1,430	0	0	1,430	14,756	10,422	5,897	5,099	0	0	0	59,880	96,055	0	97,485
NCR	Mandaluyong City	0	0	0	0	20,503	120	105	172	0	126,000	0	67,435	214,335	0	214,335
NCR	Marikina City	2,971	0	10	2,981	23,997	2,202	4,800	10	25	23,868	0	40,000	94,902	0	97,883
NCR	Quezon City***	556	0	150	706	21,524	300	0	730	60	540,000	0	1,090,011	1,652,625	0	1,653,331
CAR	Baguio City	528	0	100	628	14,494	0	5,263	949	250	0	424	1,641	23,021	0	23,649
Region 3	Angeles City	1,549	0	0	1,549	10,349	280	560	192	5	0	0		11,386	0	12,935
Region 3	Tarlac City	191	0	30	221	6,679	40	190	530	23	23,100	364	27	30,952	0	31,173
Region 4	Antipolo City	2,244	0	0	2,244	4,241	76	3,913	4,495	15	36,000	0	7,764	56,504	0	58,748
Region 4	Calamba City	576	0	0	576	10,569	200	800	700	0	0	229	6,750	19,248	0	19,824
Region 4	Lucena City	167	160	220	547	11,512	456	1,483	883	0	0	0	340	14,674	0	15,221
	Average	1,021	16	51	1,088	13,862	1,410	2,301	1,376	38	74,897	102	127,385	221,370	0	222,458
Small Other LGUs																
Region 1	Batac	233	50		283	270	500	1,117	335	23	0	116	0	2,361	0	2,645
Region 1	Bauang	699	0	114	812	1,543	275	200	0	29	0	145	0	2,192	0	3,004
Region 1	Calasiao	192	120	0	312	1,586	162	160	190	0	0	0	130	2,228	0	2,540
Region 1	Candon City	494	33	9	537	1,510	150	0	0	52	0	0	210	1,922	0	2,459

(Continued...)

Appendix Table 2 continued.

Region 3	Moncada	1,027	28	0	1,055	469	117	13	858	13	0	29	0	1,499	0	2,554
Region 4	Los Baños	600	0	0	600	2,686	477	750	15	6	0	29	0	3,962	0	4,562
Region 4	Sto Tomas	313	5	0	318	919	336	250	0	0	120	116	0	1,741	0	2,058
Region 5	Nabua	150	0	0	150	2,185	800	372	35	6	0	137	0	3,535	0	3,685
Region 5	Pili	44	8	0	52	1,305	210	140	10	29	294	145	60	2,193	0	2,245
Region 5	Iriga City	557	0	0	557	6,710	250	54	16	23	0	224	0	7,277	0	7,833
Region 6	Leganes	38	60	46	144	190	6	61	6	0	0	253	0	516	0	660
Region 6	Pototan**	107	0	0	107	904	90	150	10	0	0	174	50	1,378	0	1,486
Region 6	Zarraga	47	48	0	95	358	20	74	0	0	0	300	0	752	0	847
Region 7	Bais City	459	814	0	1,273	5,088	480	600	800	0	0	227	0	7,195	0	8,468
Region 7	San Jose	28	69	105	202	411	11	26	3	0	0	172	0	623	0	825
Region 7	Sibulan	76	0	0	76	212	8	13	1	2	0	203	0	439	0	515
	Average	316	77	17	410	1,647	243	249	142	11	26	142	28	2,488	0	2,899

* Include expenses on citation tickets, clean and green activities, share to MMDA, commissioned studies and reports and other rental costs

** Other Expenses for these LGUs include rental of disposal site.

*** For Quezon City, Other Expenses include expenses on postages, subscriptions, general services, grants and donations

Appendix Table 3. Total Revenue Collected by LGUs from SWM of Selected LGUs, by Classification and Region, Philippines, 2002 ('000 PhP).

CLASSIFICATION/ REGION	LGU	Non-Fee Based Revenue			Fee-Based Revenue		TOTAL
		Recyclables	Compost	Customer Product	Garbage/ Other Fees*	Others	
SWAPP-listed LGUs							
NCR	Caloocan City	0	0	0	0	0	0
NCR	Muntinlupa City	132	36	0	6,501	0	6,669
Region 1	Laoag City	0	397	0	1,068	0	1,465
Region 1	San Fernando, LU	0	0	0	849	0	849
Region 3	Marilao	0	480	0	0	0	480
Region 3	Olongapo City	0	0	0	18,272	0	18,272
Region 3	San Fernando, Pam	0	144	0	480	0	624
Region 4	Batangas City	0	135	0	0	681	816
Region 4	Carmona	0	364	0	0	0	364
Region 4	Lipa City	0	0	0	2,223	0	2,223
Region 5	Naga City	0	0	0	0	0	0
Region 6	Iloilo City	0	0	0	3,240	0	3,240
Region 6	Passi City	0	0	0	0	0	0
Region 7	Amlan	0	31	0	0	0	31
Region 7	Dumaguete City	0	0	8	4,100	0	4,108
	Average	9	106	0.5	2,449	45	2,609
Big Other LGUs							
NCR	Las Piñas	0	0	0	0	0	0
NCR	Mandaluyong	0	0	0	0	0	0
NCR	Marikina City	0	0	0	0	900	900
NCR	Quezon City	0	0	0	0	0	0
CAR	Baguio City	0	0	0	7,305	0	7,305
Region 3	Angeles City	0	0	0	1,100	0	1,100
Region 3	Tarlac City	0	0	0	3,380	0	3,380
Region 4	Antipolo	0	0	0	744	0	744
Region 4	Calamba City	0	0	0	1,243	0	1,243
Region 4	Lucena City	0	55	0	1,064	0	1,119
	Average	0	5	0	1,484	90	1,579
Small Other LGUs							
Region 1	Batac	0	0	0	707	0	707
Region 1	Bauang	0	0	0	155	0	155
Region 1	Calasiao	53	31	0	30	0	115
Region 1	Candon City	0	0	0	322	0	322
Region 3	Moncada	80	101	0	0	0	181
Region 4	Los Banos	0	0	0	0	0	0
Region 4	Sto Tomas	0	0	0	332	0	332
Region 5	Iriga City	0	0	0	0	0	0
Region 5	Nabua	0	0	0	0	0	0
Region 5	Pili	0	0	0	0	0	0
Region 6	Leganes	0	0	0	0	0	0
Region 6	Pototan	0	0	0	45	0	45
Region 6	Zarraga	0	0	0	4	0	4
Region 7	Bais City	0	0	0	0	0	0
Region 7	San Jose	2	0	0	12	0	14
Region 7	Sibulan	0	0	0	196	0	196
	Average	8	8	0	113	0	129

*Include sanitary permits, citation tickets and anti-littering fines, and sales of garbage bags to households (LGUs that collect garbage fee from households are Laoag, San Fernando, LU, Olongapo, Iloilo, Las Piñas, Lipa, Baguio and Sibulan)

Appendix Table 4. Economic Benefits from SWM Programs of Selected LGUs, Philippines, 2002 ('000 PhP)

CLASS./ REGION	LGU	VALUE TAKEN BY THE LGU*	VALUE TAKEN BY OTHER PARTIES				COST	TOTAL
			Recyclables	Compost	Customer Product	Sub-Total	SAVINGS FROM AVOIDED LANDFILL	
SWAPP-listed LGUs								
NCR	Caloocan City	0	2,808	750	0	3,558	14,134	17,692
NCR	Muntinlupa City	6,669	5,340	0	0	5,340	2,216	14,225
Region 1	Laoag City	1,465	0	0	0	0	1,807	3,272
Region 1	San Fernando, LU	849	8,430	0	0	8,430	2,289	11,568
Region 3	Marilao	480	585	0	0	585	1,712	2,777
Region 3	Olongapo City	18,272	41,301	0	0	41,301	3,252	62,825
Region 3	San Fernando, Pam	624	0	0	0	0	25,918	26,542
Region 4	Batangas City	816	72,404	0	0	72,404	5,427	78,647
Region 4	Carmona	364	0	0	0	0	344	708
Region 4	Lipa City	2,223	47,855	0	0	47,855	0	50,078
Region 5	Naga City	0	0	0	0	0	5,774	5,774
Region 6	Iloilo City	3,240	0	0	0	0	0	3,240
Region 6	Passi City	0	0	0	0	0	0	0
Region 7	Amlan	31	0	0	0	0	269	301
Region 7	Dumaguete City	4,108	0	0	0	0	192	4,302
	Average	2,609	11,594	50	0	11,644	4,222	18,475
Big Other LGUs								
NCR	Las Piñas City	0	0	0	0	0	0	0
NCR	Mandaluyong City	0	6,985	5,279		12,264	2,819	15,083
NCR	Marikina City	900	0	0	0	0	7,026	7,926
NCR	Quezon City	0	0	0	0	0	0	0
CAR	Baguio City	7,305	0	0	0	0	0	7,305
Region 3	Angeles City	1,100	0	0	0	0	4,095	5,195
Region 3	Tarlac City	3,380	0	0	0	0	271	3,651
Region 4	Antipolo City	744	0	0	0	0	1,004	1,748
Region 4	Calamba City	1,243	0	0	0	0	0	1,243
Region 4	Lucena City	1,119	0	0	0	0	0	1,119
	Average	1,579	698	528	0	1,226	1,521	4,326
Small Other LGUs								
Region 1	Batac	707	0	0	0	0	0	707
Region 1	Bauang	155	0	0	0	0	0	155
Region 3	Calasiao	115	0	0	0	0	3,510	3,625
Region 1	Candon City	322	0	0	0	0	2,570	2,892
Region 3	Moncada	181	80	101	0	181	271	633
Region 4	Los Banos	0	3,534	0	0	3,534	0	3,534
Region 4	Sto Tomas	332	57	0	0	57	1,536	1,925
Region 5	Iriga City	0	0	0	0	0	0	0
Region 5	Nabua	0	0	0	0	0	0	0
Region 5	Pili	0	0	0	0	0	0	0
Region 6	Leganes	0	0	0	0	0	0	0
Region 6	Pototan	45	0	0	0	0	0	45
Region 6	Zarraga	4	0	0	0	0	0	4
Region 7	Bais City	0	0	0	0	0	5,770	5,770
Region 7	San Jose	14	0	0	0	0	312	326
Region 7	Sibulan	196	0	0	0	0	60	256
	Average	129	229	6	0	236	877	1,242

* Based on information in Appendix Table 3.

Appendix Table 5. Example of rates of garbage fee that are incorporated in the business permits/license fee that are charged by LGUs to business/commercial establishments.

Area (sq m)	Factory	Brewers, distilleries, compounds & public eating places	Business offices, establishments rendering services	Independent wholesaler dealer, distributors, retailers
More than 1000	2,500	2,500	1,500	2,000
500 - < 1000	1,750	1,750	1,100	1,400
200 - < 500	1,200	1,200	800	1,000
100 - < 200	900	900	500	600
50 - < 100	600	600	200	300
25 - < 50	200	200	100	160
Less than 25	100	100	50	50

For Specifics (PhP/quarter)

Type of Business	Garbage fee
Administrative offices	50
Appartelles	20 - 40
Banks	400 (rural) 2,000 (main branch)
Bars	1,000
Gas Stations	300 (<1,000 sq m) 1,000 (>1,000 sq m)
Hospitals	200 (< 25 beds) 2,000 (>500 beds)
Hotels	25/room (3 star) 100/room (5 star)
Peddlers/ambulant vendors	25
Shopping center	None - garbage not collected by LGU
Export/Import	500
Café/restaurant	See rates in above

Note: Source: Quezon City Hall, CENRO Office.

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ACRONYMS

CAR	Cordillera Autonomous Region
CENRO	City Environment and Natural Resources Office
CPDO	City Planning and Development Office
DENR	Department of Environment and Natural Resources
DSWD	Department of Social Welfare and Development
EMB	Environmental Management Bureau
ESWM	Ecological Solid Waste Management
FBCA	Financial Benefit-Cost Analysis
FCA	Full Cost Accounting
GSO	General Service Office
HH	Households
IEC	Information Education Campaign
IRA	Internal Revenue Allotment
LGU	Local Government Unit
MENRO	Municipal Environment and Natural Resources Office/Officer
MMDA	Metro Manila Development Authority
MPDO	Municipal Planning and Development Office
MRF	Material Recovery Facility
NCR	National Capital Region
NGO	Non-Government Organization
NPV	Net Present Value
NSWMC	National Solid Waste Management Commission
RA	Republic Act
SW	Solid Waste
SWAPP	Solid Waste Management Association of the Philippines
SWM	Solid Waste Management
SWMP	Solid Waste Management Program