

h.3 Support Services

There are a number of activities that are necessary to be carried out to ensure support for SWM operations. A preliminary list of short courses should pay attention to:

- Preventive and corrective maintenance for vehicles and machinery.
- Safe driving techniques for drivers.
- Safety practices for collection, sweeping, and final disposal workers.
- Basic course on computer use.

M.2.4 Financial System

In order to establish the financial system that enables sustainable municipal SWM with the target year of 2010, present tariff structure and fee collection system should be reviewed and improved to assure the stable income for the SWM services. Furthermore, the efficiency of this service should be raised by technical, administrative and institutional improvement. Practical measures to reduce the present costs should take place.

The M/P proposes projects that schematize the measures to improve the service efficiency. The table below summarizes financial scenarios of the 14 municipalities as a whole, for the cases of without M/P and with M/P (for the period of 2001 to 2010).

Table M-31: Total Expenditure Comparison of With/Without M/P

	With M/P	Without M/P	Difference
Investment cost (million colon)	195.2	197.7	- 2.5
Operation and maintenance cost (million colon)	1,862.0	1,955.1	- 93.1
Total expenditure (million colon)	2,057.2	2,152.8	- 95.6

If the M/P is implemented, about 96million colon expenses will be curtailed for the period of 2001 to 2010.

M.2.4.1 Basic Principles of Metropolitan Approach

In order to implement the proposed projects in the M/P that have metropolitan approaches, total investment costs of about 16 million US\$ and annual O&M costs of about 1 million US\$ will be required during the 2001 to 2010. As a matter of course, those projects in M/P will introduce the beneficial cost saving of the services and environmental benefits that is more than these expenditure amount mentioned here.

Table M-32: Summary of Expenditure of Regional Management System

Unit : US\$ 1,000

		Phase I	Phase II	Phase III	Total
Investment	T/S #1 & Transport	2,845	0	1,096	3,941
	T/S #2 & Transport	1,217	3,867	314	5,398
	Tonacatepeque S/L	814	1,635	0	2,449
	S/P	0	123	1,199	1,322
	MWI	2,795	0	84	2,879
Investment total		7,671	5,625	2,693	15,989
O&M	T/S #1 & Transport	0	951	1,356	2,307
	T/S #2 & Transport	0	1,411	3,013	4,424
	Tonacatepeque S/L	0	112	224	336
	S/P	0	0	465	465
	MWI	0	606	808	1,414
	Exec. Unit in OPAMSS*	240	240	320	800
O&M total		240	3,320	6,186	9,746
Total		7,911	8,945	8,879	25,735

Note: * Total amount of 80,000US\$/year are assumed.

The above costs other than what required for medical waste incineration (MWI), should be incurred by municipalities that utilize these facilities in proportion to the waste amount handled by respective projects.

However, all municipalities are not in such financial conditions that can afford investment costs of in the order of million US\$. Therefore, it will be necessary to have a system that the projects be operated by private initiatives or regional entity or others, and the user municipalities pay the fees (in proportion to the amount handled).

Merits of having the private initiative system for municipalities are that they can avoid peak expenditure in municipal finance, etc., however, in exchanging contract between the user municipalities and private operator, it is important to reach fee rates paying attentions for the following:

- If the fee rate is set at lower than the appropriate range of fee rate (i.e., discounted non-lucrative rate), it means the appropriate works can not be done, or the private sector will not show interests in participating such activities.
- On the contrary, if the rate is set higher than the appropriate rate (i.e., very lucrative rate), private sector will have a strong incentive for the participation, however, cost burden by users (i.e., citizens) will be crucially heavy.

This fee rate should be determined through a public open bid. If the project is to be operated by private initiatives, the prerequisite for that will be that it should have more merits than the case that the project is operated by other means (e.g., the initiative of regional entity, public company, etc.).

Therefore, in order to show guidelines for reaching the appropriate fee rates, three (3) cases of project operation modalities are assumed and fee rates for respective project modalities are calculated with certain conditions.

• **Case 1: Authority's Direct Operation**

OPAMSS/COAMSS becomes the project executor⁴, obtaining financing with conditions of 8.1% interest rate (i.e., London market rate 7.1% at June 2000 plus 1.0% is assumed as available).

Case 2: Public Company

It is assumed that OPAMSS/COAMSS establishes a public company⁵ that will prepare the capital and obtain the financing of low interest rate (e.g., Japan Bank for International Cooperation loan for environmental improvement projects).

Case 3: Private Initiative

It is assumed that a private company execute the project with certain financing conditions estimated as shown in the table below.

Table M-33: Condition for Projects' Cost Estimation

	Case 1	Case 2	Case 3
Debt security	0 %	15.5%	15.5%
Interest rate	8.1 %	1.7 %*	10.75 %
Corporation tax	0%	25%	25%
Capital	0%	20% of capital investment	
Required achievement	FIRR>8.1%	Profit rate (profit after tax/revenue)>5%	Return on own capital>13.5%

Note: * Loan rate for environmental improvement projects by Japan Bank for International Cooperation, 25 year repayment and 7 years deferment.

Based on the financing conditions assumed above, fee rate for respective cases are calculated (see the table below).

Table M-34: Results of Projects' Cost Estimation

		Case 1	Case 2	Case 3
Transfer station #1 & Trailer Transport				
Input waste amount		input amount of year 2004 to 2010		
Project period		20 years (trailer and heavy equipment 7 years)		
Evaluation period		year 2004 to 2010		
Base unit cost (U\$/ton)		5.43		
Required unit cost (U\$/ton)	inc. VAT (13%)	-	7.3	9.6
	exc. VAT(13%)	7.0	6.5	8.5
Transfer station #2 & Trailer Transport				
Input waste amount		input amount of year 2005 to 2010		
Project period		20 years (trailer and heavy equipment 7 years)		
Evaluation period		year 2005 to 2010		
Base unit cost (U\$/ton)		4.70		
Required unit cost (U\$/ton)	inc. VAT (13%)	-	6.2	7.8
	exc. VAT(13%)	5.8	5.5	6.9

⁴ As for the medical waste incineration project, MSPAS is assumed as the project executor.

⁵ As for the medical waste incineration project, MSPAS is assumed to establish a public company.

		Case 1	Case 2	Case 3
Landfill (Tonacatepeque landfill)				
Input waste amount		landfill amount of SMT & TN (2005 to 2022)		
Project period		18 years (heavy equipment 7 years)		
Evaluation period		year 2005 to 2022		
Base unit cost (U\$/ton)		13.6		
Required unit cost (U\$/ton)	inc. VAT (13%)	-	18.8	31.0
	exc. VAT(13%)	20.2	16.6	27.4
Selection Plant				
Input waste amount		recyclable waste from 14 cities (2008 to 2010)		
Project period		15 years (heavy equipment 7 years)		
Evaluation period		year 2005 to 2022		
Base unit cost (U\$/ton)		15.3		
Required unit cost (U\$/ton)	inc. VAT (13%)	-	28.9	41.0
	exc. VAT(13%)	27.2	25.6	36.3
Medical Waste Incineration				
Input waste amount		medical waste from 14 cities (2004 to 2010)		
Project period		15 years (heavy equipment 7 years)		
Evaluation period		year 2001 to 2018		
Base unit cost (U\$/ton)		234		
Required unit cost (U\$/ton)	inc. VAT (13%)	-	371.0	530.0
	exc. VAT(13%)	390.0	328.3	469.0

The above table clearly shows that project fees (US\$---/ton) of Case-3 (private initiative cases) turn out the most expensive, although it exempts authorities from troubles of finance recruitment, etc. Unit costs of Case-2 (public company cases) are almost always the cheapest if the VAT is exempted and the low interest international financing is gained. As the Case-1 (authority's direct operation) does not need to pay the VAT, project fees (US\$---/ton) of the case stand at very competitive places among the set of alternatives listed above.

Meanwhile, in order for a public company to receive an international finance, there are some prerequisites such as that a proper capital equal to 20% of the initial investment should be available for the authority (public company), etc.

M.2.4.2 Basic Principles of Financial System for Individual Municipal SWM

a. Key Issues to Improve

With an aim to consolidate financial sustainability of municipal SWM services, the following are listed as key issues for the improvement:

- Introduction and execution of independent accounting of SWM;
- Revision and improvement of tariff structure and fee collection system;
- Consolidation and utilization of SWM database;
- Expenditure monitoring and its feedback for cost reduction improvement;
- Human resource development and computer use for accounting; and
- Use of private sector.

a.1 Independent Accounting

In order to execute sustainable SWM services, it is necessary to establish an accounting system of not only controlling revenue and expenditure but also enabling

the proper investment for renewal of vehicle etc. by having a depreciation reserve. Accounting of SWM services independent of the municipal general accounting is indispensable to do so.

If the municipal general accounting in any municipality does not have sectional division of SWM expenses and other expenses, such municipality should immediately establish the accounting with sectional divisions.

a.2 Tariff Structure and Fee Collection System

It is proposed to improve the current tariff structure and fee collection system to a new ones reminding the following key issues:

- **generator pays principle:** who generates wastes should pay for the costs of waste management services:
- **affordable fee collection:** the least affordable users should pay lesser for the service, and the more affordable should pay more for the services. It may consequently constitute a cross-subsidy system that should be fairly acceptable for all.
- **minimization of fee collection costs:**
 - efficient and imperative fee collection system (**joint billing** with electricity charges)
 - appropriate fees for specialized SWM services (e.g., **specific duty** system: fee rate proportional to waste volume)

Accordingly, following actions might be suggested:

- Cleansing fee (tasa de aseo), which are currently charged in proportion to real estate size, should be collected through the joint billing with electricity charges. In so doing, cleansing fee collection efficiency should be targeted to raise up to 90% till year 2010.
- Municipalities that have not yet collected the landfill fee (tasa de relleno), should establish the tariff structure that includes the fee collection from citizens that do not own real estate.
- The fee rate for the marginal low income citizen should consider their affordability to pay.
- A specific duty system (fee rate proportional to waste volume) should be applied for the larger commercial/institutions waste. Smaller commercial/institutions such as small shops would be exempted from the specific duty system and be subject to the same system for the households. In order to minimize the fee collection costs, joint billing with electricity charges should be used for the fee collection system.

a.3 Database Management

All municipalities should establish and/or consolidate the database of fee collection (both cleansing fee and landfill fee). Such municipal database should be linked with the database of CAESS/DELSUR, especially when some municipalities start the joint

billing of cleansing fee, in order to be able to monitor the fee collection efficiency (e.g., delayed payment, update of users, etc.).

a.4 Expenditure Monitoring and its Feedback for Cost Reduction Improvement

Database of weighbridge should be linked for monitoring the efficiency of waste collection services. The monitoring should be utilized for planning and implementation of collection work improvement etc.

Expenditure respectively for collection vehicle and/or collection team should be thoroughly monitored and respective cost-efficiency should be reviewed. Personal costs, working hours, fuel/lubricant consumption, maintenance record and waste collection amount should be monitored and induce respective productivity for comparison and improvement.

a.5 Human Resource Development and Computer Use for Accounting

In order to improve the above mentioned revenue/expenditure management, human resource development for accounting and computer works should be expedited. Collaboration of the accounting manager and cleansing office manager should be indispensable for this revenue/expenditure management and improvement. Accordingly the cleansing office manager could take actions for rationalize the human and physical resources of the cleansing services.

a.6 Use of Private Sector

Case-by-case reviews should be made for examining the viability of private sector participation in collection service activities. The examination should always investigate the pros and cons of these alternatives e.g., whether and how the private participation reduces or increases the municipal burden of SWM services.

b. Expenditure Estimation

In order to estimate the total expenditure of municipal SWM by respective municipalities till the year 2010, it is necessary to internalize the costs of regional SWM projects proposed in the M/P. Therefore, unit rates for respective regional projects of T/Ss, Tonacatepeque S/L, New ESPIGA S/L, S/P etc. are estimated as shown below, with reference to unit cost estimations from case studies assumed and as summarized in Table M-34.

Table M-35: Regional Projects Unit Rate to be Internalized for Respective Municipal Expenditures

		Unit Price	Remarks
Transfer Station	T/S 1 (350 t/d)	7.0US\$/ton	In proportion to deposited amount (from year 2004)
	T/S 2 (900 t/d)	5.8US\$/ton	Ditto above (from year 2005)
Intermediate treatment	S/P	27.2US\$/ton	In proportion to amount of recyclable materials deposited (from year 2008)
Landfill*	MIDES Nejapa	20.43US\$/ton (18US\$/ton+VAT)	In proportion to amount disposed (from year 2001)
	Tonacatepeque	20.2US\$/ton	Ditto above (from year 2005)
	New ESPIGA**	20.2US\$/ton	Ditto above (from year 2004)
Medical waste treatment	MIDES Nejapa	200US\$/ton+VAT	These costs are not reflected for municipal expenditures.
	Incineration	390US\$/ton	

Note: * The present costs for ESPIGA is assumed to be 5 US\$/ton, and the present costs of open dumping (SMT, TN) is assumed to be 1 US\$/ton.

** As the tipping fee of the New Espiga S/L is unknown, it is assumed to be same as that in Tonacatepeque S/L.

In addition to the expenditures estimated based on the above unit rates, an indirect expenditure for operating the Execution Unit in OPAMSS is estimated to be about 80,000US\$/year and is proportionally distributed for respective municipalities as their indirect costs.

Accordingly the expenditure of SWM services for 14 municipalities till year 2010 is estimated as summarized in the table below.

Table M-36: Summary of Expenditure of Individual Management System

Unit : 1,000 colon

		Phase I	Phase II	Phase III	Total	
SS	Investment	50,157	6,168	56,252	112,577	
	O&M	Disposal	100,497	112,134	165,674	378,305
		Collection	68,495	58,679	79,546	206,720
		T/S	0	19,994	37,983	57,977
		Others*	117,963	120,840	164,072	402,875
	O&M total	286,955	311,647	447,275	1,045,877	
Total	337,112	317,815	503,527	1,158,454		
MJ	Investment	6,094	705	6,974	13,773	
	O&M	Disposal	14,615	15,829	22,672	53,116
		Collection	8,799	7,760	10,029	26,588
		T/S	0	3,011	6,384	9,395
		Others*	6,097	6,465	9,227	21,789
	O&M total	29,511	33,065	48,312	110,888	
Total	35,605	33,770	55,286	124,661		
CD	Investment	3,369	873	3,377	7,619	
	O&M	Disposal	6,314	6,855	9,837	23,006
		Collection	3,790	4,132	5,966	13,888
		T/S	0	0	0	0
		Others*	4,439	4,726	6,732	15,897
	O&M total	14,543	15,713	22,535	52,791	
Total	17,912	16,586	25,912	60,410		

		Phase I	Phase II	Phase III	Total	
CT	Investment	2,504	0	3,369	5,873	
	O&M	Disposal	2,956	6,614	9,513	19,083
		Collection	4,060	3,300	3,916	11,276
		T/S	0	1,124	2,384	3,508
		Others*	3,191	3,526	5,287	12,004
	O&M total	10,207	14,564	21,100	45,871	
	Total	12,711	14,564	24,469	51,744	
AY	Investment	896	8	896	1,800	
	O&M	Disposal	2,108	2,291	3,294	7,693
		Collection	1,220	1,378	1,957	4,555
		T/S	0	0	0	0
		Others*	1,117	1,194	1,717	4,028
	O&M total	4,445	4,863	6,968	16,276	
	Total	5,341	4,871	7,864	18,076	
SM	Investment	3,369	15	3,377	6,761	
	O&M	Disposal	6,458	7,018	10,095	23,571
		Collection	5,365	4,089	4,680	14,134
		T/S	0	1,351	2,867	4,218
		Others*	1,763	1,809	2,475	6,047
	O&M total	13,586	14,276	20,117	47,979	
	Total	16,955	14,291	23,494	54,740	
ST	Investment	7,687	880	8,583	17,150	
	O&M	Disposal	17,713	19,139	27,336	64,188
		Collection	13,617	8,623	12,548	34,788
		T/S	0	6,470	9,233	15,703
		Others*	8,158	8,456	11,849	28,463
	O&M total	39,488	42,688	60,966	143,142	
	Total	47,175	43,568	69,549	160,292	
AC	Investment	4,272	15	4,295	8,582	
	O&M	Disposal	4,641	10,090	14,682	29,413
		Collection	6,638	4,023	5,929	16,590
		T/S	0	3,336	4,932	8,268
		Others*	6,069	6,633	9,210	21,912
	O&M total	17,348	24,082	34,753	76,183	
	Total	21,620	24,097	39,048	84,765	
SY	Investment	12,832	53	13,751	26,636	
	O&M	Disposal	29,034	32,042	46,855	107,931
		Collection	19,092	15,553	19,119	53,764
		T/S	0	5,799	12,953	18,752
		Others*	5,768	6,108	8,933	20,809
	O&M total	53,894	59,502	87,860	201,256	
	Total	66,726	59,555	101,611	227,892	
IL	Investment	4,272	15	5,153	9,440	
	O&M	Disposal	9,048	9,838	14,200	33,086
		Collection	6,874	5,510	6,620	19,004
		T/S	0	1,867	4,020	5,887
		Others*	2,564	2,783	4,032	9,379
	O&M total	18,486	19,998	28,872	67,356	
	Total	22,758	20,013	34,025	76,796	
SMT	Investment	2,489	873	2,489	5,851	
	O&M	Disposal	739	3,949	7,856	12,544
		Collection	2,082	2,747	4,335	9,164
		T/S	0	0	0	0
		Others*	829	1,812	2,952	5,593
	O&M total	3,650	8,508	15,143	27,301	
	Total	6,139	9,381	17,632	33,152	

		Phase I	Phase II	Phase III	Total	
AP	Investment	4,288	865	4,310	9,463	
	O&M	Disposal	9,467	10,281	14,755	34,503
		Collection	4,600	5,047	7,286	16,933
		T/S	0	0	0	0
		Others*	3,689	4,054	5,990	13,733
	O&M total	17,756	19,382	28,031	65,169	
	Total	22,044	20,247	32,341	74,632	
NJ	Investment	880	0	880	1,760	
	O&M	Disposal	988	1,076	1,554	3,618
		Collection	647	800	1,162	2,609
		T/S	0	0	0	0
		Others*	207	350	504	1,061
	O&M total	1,842	2,226	3,220	7,288	
	Total	2,722	2,226	4,100	9,048	
TN	Investment	1,799	0	2,489	4,288	
	O&M	Disposal	214	3,283	6,850	10,347
		Collection	1,845	2,003	2,995	6,843
		T/S	0	0	0	0
		Others*	609	905	1,315	2,829
	O&M total	2,668	6,191	11,160	20,019	
	Total	4,467	6,191	13,649	24,307	

Note: * including street sweeping, administration, workshop and S/P.

c. Revenue Plan

c.1 Stepwise Improvement

The following stepwise improvement measures are proposed. The table below shows financial improvement of total balance during 2001 to 2010 when the proposed improvement measures are taken place in a stepwise manner.

- **Fee collection efficiency improvement by joint billing with electricity charges:** As for landfill fee (tasa de relleno), many municipalities utilize the system of joint billing with electricity charges. However, a few municipalities have the joint billing system for the cleansing fee (tasa de aseó). All fees should be jointly billed with electricity charges from year 2003. Fee collection efficiency will be gradually raised up to 90% in year 2010 from the present one. It will also reduce the delayed payment by users.
- **Specific duty system:** A specific duty system (fee rate proportion to waste volume) will be applied for commercial/institutions waste from year 2002. Assuming that 50% of such waste is from large dischargers, the fee rate for such dischargers is to cover the direct costs of collection/transport services (including vehicle depreciation costs) and the landfill tipping fee.

Table M-37: Income Improvement of Total Balance until year 2010 by
Adopting Respective Measures

Unit :1,000 colon

	Balance without measures	Measures 1 Balance improvement after "joint-billing with electricity" and "Fee collection rate increase"	Measures 2 Further balance improvement after "specific duty on large dischargers"
San Salvador	121,217	180,526	- ditto -*
Mejicanos	-17,179	8,160	- ditto -*
Delgado	355	9,441	14,375
Cuscatancingo	-22,047	-18,379	-15,195
Ayutuxtepeque	3,713	7,392	8,732
San Marcos	-21,931	-13,400	-10,192
Nueva San Salvador	73,368	93,594	100,813
Antiguo Cuscatlan	-37,872	-32,633	-27,457
Soyapango	-39,668	-9,795	8,886
Ilopango	8,750	17,869	- ditto -*
San Martin	-5,962	-2,320	503
Apopa	-7,241	1,606	6,347
Nejapa	-5,449	-3,665	-3,416
Tonacatepeque	-19,607	-18,076	-16,386

The above table shows that even the respective measures proposed are to be realized, municipalities of Cuscatancingo, San Marcos, Antiguo Cuscatlan, Nejapa, and Tonacatepeque will still remain in negative figures in the total balance until year 2010.

For these municipalities, the succeeding measures could be one or both of: (i) to raise the services fee that users should pay; and/or (ii) to demand a national subsidy to counterbalance the additional costs necessitated to comply with the recently published national environmental legislation.

c.2 Possibility to Raise Service Fee and Burden on Citizen's Income

Trial calculation is made herewith to obtain the minimum increase of service fee to make the total balance of 2001 to 2010 just a little positive. It assumed that the service fee is raised in year 2006. The raised fees for the respective municipalities are measured with the parameter of the burden on citizen's income (BCI) in 2010 accordingly. (See the table below.)

Table M-38: Minimum Increase of Fee and its Burden on Citizen's Income

Year	Increase rate of Cleansing tax (%)	Total Balance (1000 colons)	Average waste taxes (cleansing tax + disposal tax) (Colon/month/ household)	Burden on Citizen's Income (%)
	2006	2001 – 2010	2010	2010
Cuscatancingo	88 %	101	15.3	0.33
San Marcos	82 %	38	18.9	0.29
Antiguo Cuscatlan	90 %	289	45.3	0.37
Nejapa	127 %	7	19.4	0.52
Tonacatepeque	552 %	20	26.9	0.82

In view of the above trail calculation, it seems very difficult for Tonacatepeque municipality to raise the service fee as high as 6.5 times of the present fee suddenly in year 2006. Therefore, the M/P proposes that Tonacatepeque municipality raises the service fee double in 2003 when joint billing with electricity is adopted, and then again in 2006 said fee should be raised to its about three-fold value.

If the revenue improvement measures described above are implemented, the fee collection rate and total annual revenue of the SWM service as shown in the table below can be achieved in respective phase end years (2003, 2006 and 2010).

Table M-39: Revenue Plan

Unit: 1000 colon

		1999	2003	2006	2010
SS	Tax collection rate (%)	83	85.5	87.5	90
	Total amount	96,839	121,829	136,351	156,222
MJ	Tax collection rate (%)	65	77.3	82.7	90
	Total amount	7,152	11,846	13,715	16,190
CD	Tax collection rate (%)	70	77.3	82.7	90
	Total amount	3,906	6,754	7,714	8,962
CT	Tax collection rate (%)	72	77.3	82.7	90
	Total amount	2,100	3,077	6,341	7,674
AY	Tax collection rate (%)	79	83	86	90
	Total amount	1,321	2,379	2,793	3,370
SM	Tax collection rate (%)	83	85.5	87.5	90
	Total amount	2,394	4,181	6,604	7,666
ST	Tax collection rate (%)	85	86.8	88.2	90
	Total amount	16,110	22,937	26,769	32,166
AC	Tax collection rate (%)	70	77.3	82.7	90
	Total amount	3,191	4,894	10,819	13,923
SY	Tax collection rate (%)	70	77.3	82.7	90
	Total amount	13,194	21,424	24,285	28,616
IL	Tax collection rate (%)	85	86.8	88.2	90
	Total amount	5,357	8,653	9,755	11,224
SMT	Tax collection rate (%)	60	79.1	84.5	90
	Total amount	1,553	2,731	3,568	4,539
AP	Tax collection rate (%)	83	85.5	87.5	90
	Total amount	3,981	7,355	8,423	9,875
NJ	Tax collection rate (%)	50	77.3	82.7	90
	Total amount	250	529	1,254	1,458
TN	Tax collection rate (%)	55	77.3	82.7	90
	Total amount	276	1,073	3,635	4,383

In order to realize the fee collection rate and amount mentioned above, it is necessary not only to establish and utilize the revenue database, but also to implement specific duty system for large commercial/institution dischargers and to issue a demand letter for delayed payment etc.

c.3 Cash Flow of Each Municipality

With above measures proposed for revenue improvement, the total balance of revenue/expenditure during 2001 to 2010 will become positive for all 14

municipalities. As for some municipalities such as Mejicanos, Delgado, Soyapango, Ilopango, San Martin, Apopa, Nejapa and Tonacatepeque, the annual balance will become negative in some years such as year 2010 when collection vehicles are renewed. However, as the total balance during 2001 to 2010 will become positive also for those municipalities, it would be judged that sustainable financial system in SWM services will be maintained.

Table M-40: Financial Status in 2010

Unit: 1000 colon, %

	Balance of SWM in 2010			Burden on Municipal Budget in 2010 (%)	Burden on Citizen	
	Revenue (1,000 colon)	Costs* (1,000 colon)	Covering rate R/C (%)		Average waste tax (Colon/month /household)	Burden on Citizen's Income (%)
San Salvador	156,222	123,326	127	0.0	45.8	0.47
Mejicanos	16,190	13,526	120	5.0	18.8	0.26
Delgado	8,962	5,792	155	0.4	11.9	0.22
Cuscatancingo	7,674	5,642	136	0.0	15.3	0.33
Ayutuxtepeque	3,370	1,932	174	0.0	21.5	0.41
San Marcos	7,666	5,650	136	0.0	18.9	0.29
Nueva San Salvador	32,166	16,819	191	0.0	28.5	0.35
Antiguo Cuscatlan	13,923	9,844	141	0.0	47.2	0.38
Soyapango	28,616	24,835	115	7.5	18.7	0.26
Ilopango	11,224	8,173	137	5.7	17.6	0.34
San Martin	4,539	4,441	102	15.9	9.7	0.33
Apopa	9,875	7,963	124	6.8	10.4	0.26
Nejapa	1,458	954	153	1.6	19.4	0.52
Tonacatepeque	4,383	3,222	136	2.0	24.9	0.76

Note: * direct cost including depreciation cost.

M.2.5 Social Aspect (Sanitary Education and Public Participation)

a. Basic concept

The sanitary education is an important component in SWM. It is well known that the constant presence of waste confined in a densely populated area with faulty practices on hygiene and inadequate waste handling has serious impacts on health of the inhabitants. Therefore, the public should be informed of the potential risks and illness caused by direct contact with waste and inappropriate procedures of waste handling.

Another important reason for providing sanitary education is to let the public be aware of their individual responsibility regarding health improvement and proper handling of waste.

An informed citizen is more likely to take initiatives in waste minimization, recycling programs in the communities; and change in the consumption patterns and they are more likely to pass their knowledge and experiences to the future generations. That is to say, the introduction of the sanitary education and the public participation would open the road to achieve a final goal of this study: the application of an appropriate waste management.

b. Guideline of the Master Plan

The effect of the sanitary education largely depends on several intrinsic factors of a society. Therefore, it should be planned and implemented appropriately. The following are general guidelines for sanitary education plan, taking into account that the specification and details of a long term educational program should be devised and undertaken by the counterpart and the Salvadoran educational sectors.

b.1 Importance of the Aesthetic and Environmental Aspects

Raising public awareness on regional environmental issues and informing the benefits from cleaner environment to the residents contribute to the improvement of aesthetic and sound environment.

b.2 Importance of Appropriate Waste Handling Practices

Proper use of containers and waste storage manners before waste being collected are important practices. Public should be informed of physical risks associated with the careless waste discharge, faulty storage and incorrect habits, such as injuries of waste collection workers and children who are likely to have contact with the deposited waste. The necessity to avoid direct contact with the waste should also be emphasized.

b.3 Aspects of Risks and Illness Associated with Waste

The problems associated with waste are for example the chronic and acute sickness that result from exposure to toxic substances in the wastes such as, house cleansing liquids, batteries, heavy metals, etc. and contagious illnesses transmitted by vectors and pathological microorganisms that infest on the accumulated waste.

b.4 Responsibilities of Individual, Groups and Authorities Related to the Waste Handling

In order to improve sanitary/environmental conditions, public cooperation and coordination with the authorities who manage the collection, transport, treatment and disposition of waste. It is also important for the minimization and the recycling of waste.

b.5 How the Public Realizes the Change. What Could be Made for the Future SWM

Public as voter is entitled to know how the SWM is executed by the authorities. As consumers, public has a power of changing the consumption patterns, as well as the quality and packaging of the manufactured products through selective purchases. That is to say, abstaining from buying non-biodegradable plastics, etc. but promoting the use of products made from recyclable materials. Public as waste generator can cooperate with waste reduction, recycling and appropriate ways of waste disposal.

b.6 Promotion of the public interests in the future SWM in AMSS

Public participation and devising a SWM system unique to the local conditions are indispensable for realizing sustainable SWM.

c. Guidelines to Develop the Programs on Sanitary Education and Public Participation

Since education is an very important factor to foster the citizens of the society, it should be planned and provided very carefully taking into account its culture, values, and prevalent perceptions of the society

The following guidelines are preliminary. Programs of community education need to be developed in detail in joint collaboration among pertinent institutions, experts of government and not governmental organizations.

c.1 General Objectives

It is vital to raise awareness on sanitary/environmental issues in AMSS so that waste generators can assume the corresponding responsibility.

c.2 Specific Objectives

- Education on appropriate practices of SWM and mainly the negative impact on the health and the environment caused by inadequate handling of SW.
- To promote sanitary/environmental education programs in the current educational system, emphasizing the negative aspects and benefits of the appropriate handling of waste in all the education levels, especially in the primary and secondary education.
- To assist the minimization of the waste generation.
- To inform the community of projects and proposals related with SWM topics.
- Training and upgrading the municipalities' staff and residents on the sanitary/environmental aspects.
- To promote public participation.

c.3 Components

This objective has the purpose that the citizens take conscience in relation to the sanitary conditions and the environmental degradation so that they understand that we all are causing the environmental deterioration and it is each individual's responsibility to manage the environment appropriately.

The components of the program of sanitary education and public participation are:

- Education on the SWM
- Programs of sanitary/environmental education at schools
- Promotion of sanitary/environmental activities
- Assistance to reduce the numbers of generators that deteriorate the sanitary conditions
- Provision of information to the community
- Training
- Promotion of the public participation

c.4 Phases of the Program of Sanitary Education and Public Participation

The different components of the program of the sanitary education and public participation would have the following phases:

- **Phase of sensitization:** this phase creates effective situations so that the citizens can perceive the sanitary/environmental conditions related with the SWM of the AMSS as a real problem, in which citizens are part and should participate in the improvement.
- **Phase of information:** this phase disseminates the information to the different types of users to whom the component of sanitary education and public participation program on SWM should be directed.
- **Education phase:** this phase seeks behavior changes in people to make sustainable SWM; the sanitary education, training and upgrade of the human resources; the education at school; the public participation in the different sanitary/environmental projects and others.
- **Evaluation phase:** this phase consists of the annual evaluation, conclusion of each activity or project and the execution of its goals.

c.5 Program Execution Unit

It is proposed that the OPAMSS and the municipalities should form an Execution Unit as their office, with the cooperation of the Ministries and the Official Institutions (MARN, MSPAS, MINED and other pertinent organizations). That plans, outlines goals and strategies, advises to the community and evaluates the program of sanitary education and public participation regarding the SWM. The first one (unit of central level in the OPAMSS) should coordinate and assure the participation of all the concerned delegations of the AMSS. The second unit (inside the municipalities), through the social promotion department, should coordinate and assure the participation of communal associations or directive/residents meetings of the community, with the objective of unifying efforts to achieve the improvement of the sanitary environmental and aesthetic conditions of the communities and of the municipality.

c.6 Formation of Communal Associations

The municipalities should expedite the formation of communal associations, the incorporation of the citizens in the same ones and the organized participation of citizens through this association. In a same manner, the associations should expedite the support and participation in the programs of sanitary education and campaign of public sensitization for general or communal benefit.

The municipality, the ministries and the autonomous official institutions should coordinate the activities to improve the living environment of inhabitants in collaboration with communal associations. This guarantees that the neighbors' necessities and suggestions should be taken into account in the social programs and projects that benefit them, and it also guarantees their willingness to participate in the planning and the execution of these programs and projects.

Ignorance of communal associations in the planning and the execution of social development activities directed to the communities will result in losing the whole support that the community organization can contribute to them.

c.7 Plan of Sanitary Education and Public Participation

The program of sanitary education and public participation presented in the previous section provides the guidelines to develop this component. Objectives, components, phases and the execution unit are presented in this proposal.

The table below summarizes the program of sanitary education and public participation that the Execution Unit could implement in the period from 2001 to 2010.

Table M-41: Program of Sanitary Education and Pubic Participation (Draft)

Phase 1 2001 – 2003	Phase 2 2004 – 2006	Phase 3 2007 - 2010	Post Phase 2011
<ul style="list-style-type: none"> • Constitution of the Central Execution Unit and Units inside the municipalities • Formation or consolidation of communal associations • Preparation of educational projects with the participation of pertinent organizations • Information to the community • Sensitization and practices • Beginning of the educational program for specific areas • Personnel's training (social promoters and teachers) 	<ul style="list-style-type: none"> • Intensive education in specific areas • Education to the community through training workshops • Promotion of the sanitary education in schools 	<ul style="list-style-type: none"> • Continuation of the intensive education • Continuation of the training program • Follow-up of implemented projects • Intermediate evaluation (2006) • Interim readjustment of the program 	<ul style="list-style-type: none"> • Final evaluation (2011) • Readjustment to the program of sanitary education and public participation

M.3 Project Cost Estimates

M.3.1 Basic Conditions

This section presents key design data, unit costs and other basic conditions for project cost estimates.

The prices and foreign exchange rates are based on them in April 2000. OPAMSS, the 14 municipalities and Fondo de Inversion Social para el Desarrollo Local de El Salvador are information sources.

M.3.1.1 Exchange Rates

$$\text{US\$1.00} = 8.75 \text{ colones} = \text{JP¥105}$$

M.3.1.2 Service Life

Vehicles & Equipment: 7 years

Transfer Station *: 20 years

* Integrated service life of the facilities including buildings, machines and so on necessary.