

4.4.7 Medical Waste Management

In El Salvador, the Ministry of Health has been working with medical waste programs since 1993 because of the initiatives and technical assistance provided since 1989 by the Pan-American Health Organization. This entity formulated a project for all the capital cities in Central America in 1990, a program that was adopted by the European Union in 1991 and commissioned in April 1994; such program was known as ALA 91/33 agreement whose purpose was to install a medical waste collection and treatment system in the six capital cities of Central America.

The final products of the program consist of four manuals for the following participants: health technicians and inspectors, medical and nursery staff, administrative and managerial personnel, as well as a popular version for the general services staff.

The ALA 91/33 program initiated a training and awareness process that cannot be overlooked, now that the diagnosis of medical waste management is being conducted.

Another remarkable point is that within the framework of the ALA 91/33 program the Ministry of Health installed a bio-infectious waste collection and final disposal system that is working since October 1st, 1997 for the 9 public hospitals in AMSS.

In the beginning hospital wastes were disposed of at ditch made with a machine in Apopa controlled dumping site that was operated by the municipality of San Salvador and provided the service for the entire AMSS. Later, from June to December 1999 a security cell in the current sanitary landfill of AMSS; such landfill is operated by the French-Canadian consortium CINTEC – TREDI as a mixed enterprise working for 10 municipalities and known as MIDES S.E.M de C.V. as of January 1st 2000, which has introduced the autoclave treatment system.

a. Discharge

Most hospitals under MSPAS (Ministry of Public Health and Social Welfare) practice separate discharge for medical and common waste observing the manual⁶ commonly used. Some of ISSS (Salvadorian Social Security Institute) hospitals also establish and practice a separate discharge system. However, many of other medical institutions lack an appropriate system for separate discharge. As for private hospitals and clinics, the great majority discharges the infectious medical waste mixed with common waste.

To cope with this situation, MSPAS (Ministry of Public Health and Social Welfare) presently plans to give such hospitals instructions to implement appropriate medical waste management (e.g., source separation, separate discharge and collection, contract for appropriate treatment/disposal).

b. On-site Medical Waste Incineration

Although 5 out of 39 hospitals in AMSS have incinerators, none of them are currently operated mainly because the neighbors reject it due to its smoke and offensive odor.

⁶ Manual para Personal Médico y de Enfermería, Gestión y Manejo de Desechos Sólidos Hospitalarios ALA91/33

c. Collection and Transport

Most medical institutions receive specialized collection services for medical waste from private entities and for common waste from municipalities. The specialized private collectors visit hospitals for collecting medical waste and transporting them to the MIDES landfill site. Meanwhile, an exclusive small transfer station for medical waste deposit is also located in a zone in San Salvador, and several medical institutions themselves bring their medical waste for depositing there. The private collector collects the waste from there and transport them to the MIDES landfill site.

Workers of the private collection entities wear protection apparatus in handling the red-color plastic bags and/or deposit containers.

d. Treatment and Disposal

All medical waste collected by the specialized collectors is transported to MIDES landfill site. The medical waste received is sterilized by the autoclave equipment there and disposed of at MIDES landfill together with other waste directly disposed of. This autoclave treatment started in January 2000.

4.5 Institutional, Organizational and Financial System

4.5.1 Institutional System of Solid Waste Management⁷

4.5.1.1 Legislation and Regulation

A legal and regulatory framework controls the environmental management for solid waste in El Salvador, including AMSS, with the following juridical hierarchy:

- The Constitution of the Republic
- Treaties and agreements signed and ratified by El Salvador
- Secondary laws related
- Municipal ordinance.

Table 4-47 summarizes the juridical framework related to the management of solid wastes.

⁷ Study on the institutional system is based on the information provided by AMSS municipalities in January 2000, on the "Análisis Sectorial de Residuos Sólidos en El Salvador" carried out by PAHO in May 1998 and on other documents of the bibliography.

Table 4-47: Juridical Framework related to Solid Waste Management

Juridical instrument	Enforced in	Relation with solid wastes	Body in charge	Sanctions	
				Regime	Enforcement
Constitution of the Republic	Throughout the country	Regular	Executive power	NA	NA
International treaties and agreements (Basel convention)	Throughout the country	Partial	MARN	Yes	None
Health Code	Throughout the country	Partial	MSPAS	Yes	Minimal
Municipal code	Municipality	Partial	Each municipality	Yes	Minimal
Environmental Law	Throughout the country	Partial	MARN	Yes	Minimal
Regulatory Ordinance on Cleansing service	Municipality	Partial	Each municipality	Yes	Minimal

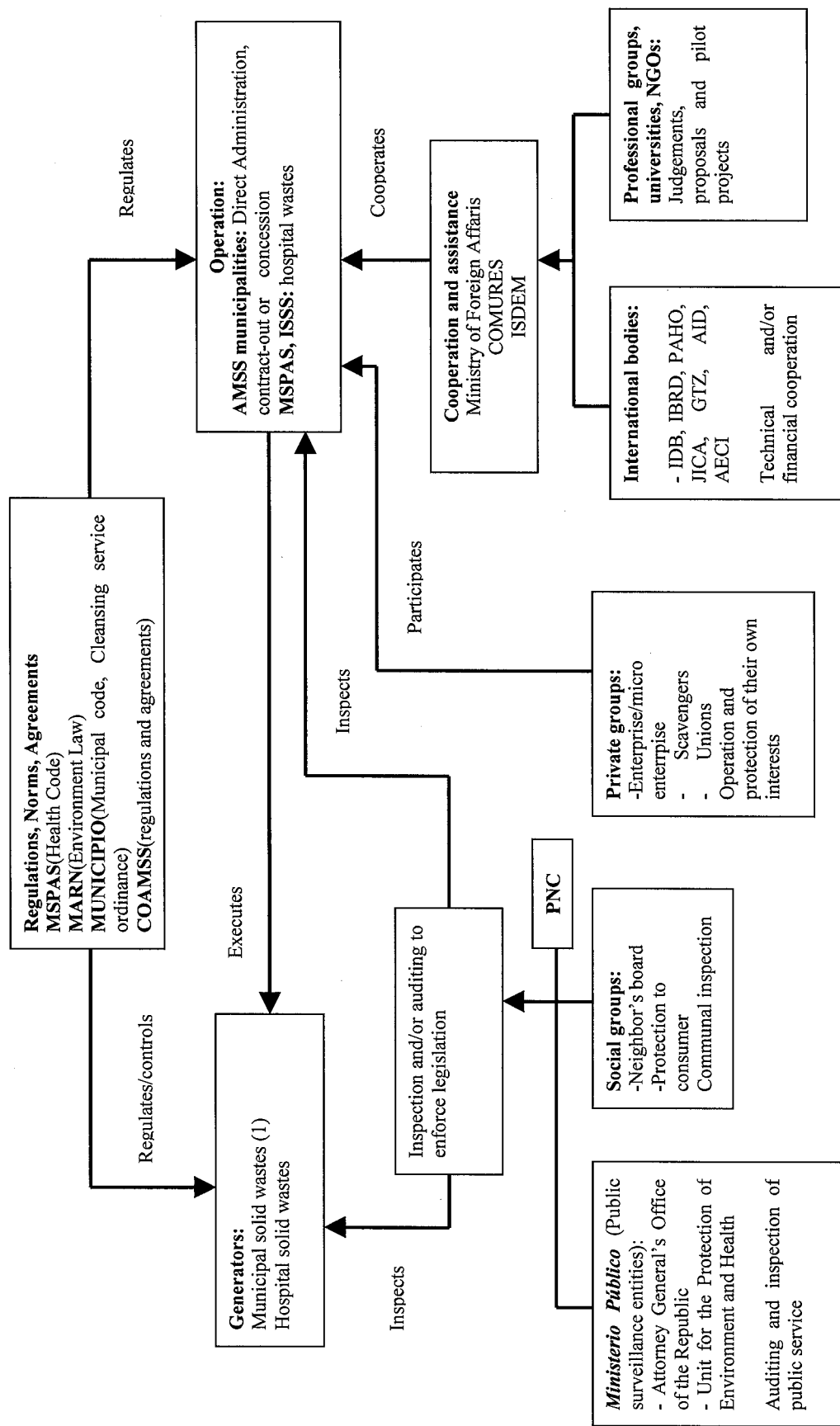
Note: NA: not applicable

Source: Prepared by the Study Team

4.5.1.2 Entities Involved

Figure 4-7 shows the institutional framework that encompasses all public, private and social sectors, as well as international bodies, that permanently and occasionally participate in the regulation, operation, inspection, financing and cooperation for the municipal and hospital solid waste management in AMSS.

Table 4-48: summarizes the functions to be performed by the diverse institutions and bodies in SWM in AMSS.



(1) Municipal solid wastes: domestic, institutional, commercial and street sweeping solid wastes.

Figure 4-7: Regulatory and Operative Institutional Framework of SWM in AMSS

Table 4-48: Functions to be performed by Institutions and Entities of SWM in AMSS (Year 1999)

Bodies	Establishes norms	Plans	Operates	Finances	Commercializes	Manages	Regulates	Inspects/ audits	Punishes	Cooperates/ consults
MSPAS	X	X					X	O	O	O
MARN	X	X					X	X	X	O
Municipalities	X	X	X	X	X	X	X	X	X	
COAMSS	X	X					X		X	O
OPAMSS	X	X					X			X
Solid waste generators		O	X	X		O		O		X
<i>Ministerio Público</i> (Public surveillance entities)								X	X	
Enterprise/micro-enterprise		X	X	X	O	X				
Scavengers			X		X	X				
Unions			X			X				
Prof./Univ/NGOs		O				O	O	O		X
Communal groups		O	O	X		O		X		X
International bodies				X						X

Note: X: Total function O: Partial function Blank: No action

4.5.1.3 Institutional Coordination

Table 4-49 shows the opinion at the municipalities of AMSS regarding the coordination with entities involved in SWM. The following is perceived:

- Coordination with MSPAS is acceptable.
- Coordination with MARN is virtually non existent.
- Regarding other entities, coordination and support by ISDEM, IDB, GTZ, AID on municipal development duties is remarkable, but not in cleansing services.

Table 4-49: Institutional Coordination

Municipality	MSPAS	MARN	Other entities
San Salvador	A good technical correlation	Incipient	IDB, European Community, GTZ in institutional development areas
Mejicanos	It was warned	None	IDB, ISDEM
Ciudad Delgado	Environmental education	None	They do not know
Cuscatancingo	Occupational health	Good	They do not know
Ayutuxtepeque	Occupational health	None	ISDEM, USAID, GTZ
San Marcos	Scarce collaboration	In minor activities	ISDEM, SACDEL, in institutional development
Nueva San Salvador	Support in occupational health	No communication	ISDEM
Antiguo Cuscatlán	Acceptable	It was warned on open dumping site	ISSS
Soyapango	Good coordination	No communication	NGOs, private consultant companies: good; ISDEM: scarce support
Ilopango	Very good	No communication	ISDEM: SAFINO system
San Martín	Very good	None	They do not know
Apopa	Weak	None	ISDEM, GTZ, AID
Nejapa	None	None	ISDEM, GTZ, support in institutional development
Tonacatepeque	Very good	Scarce	They do not know

It is worth mentioning that MSPAS, MARN and the Attorney General's Office randomly warn some municipalities on the inappropriate management of solid wastes, but not to the extent of imposing sanctions.

Coordination among the 13 municipalities and San Salvador is good, and they frequently support between each other when collection equipment is insufficient or when occasional strikes are present.

4.5.1.4 Information

During the meetings held with the 14 municipalities, it has been perceived that their corresponding cleansing operative service does not have enough information or even no data at all, except one municipality. This situation in turn does not allow a management tool for decision-making that might permit the improvement and better quality of the services and thus reduce costs. This becomes more critical with respect

to data on budget and costs, as cleansing teams are completely ignorant of such information. In fact, this might lead to a misinterpretation of priorities, inefficient planning, incorrect extrapolations and wrong decision-making.

Furthermore, insufficient criteria, if any received, applied to obtain information are hardly homologous and it is difficult to compare among AMSS municipalities.

4.5.2 SWM Organizational System

a. Scheme of Municipal Cleansing Service

Based on the information compiled during the visits to the 14 municipalities the Study Team has prepared Table 4-50 and Table 4-51 that show the following:

- The 14 municipalities have their own organization charts. Soyapango (Figure 4-8) and Ayutuxtepeque (Figure 4-9) are attached herein. In general terms all municipalities follow the same model, with certain variables. It can also be noted that at least 4 of these organizational charts lack of the cleansing service.
- Only three municipalities have detailed charts on their cleansing services. San Salvador example is also attached herein (Figure 4-10).
- Likewise, only 4 municipalities have ordinances that regulate the cleansing service; as a consequence, the remaining municipalities collect even hazardous refuse because there is no provision that prohibits such. In the same manner, only 4 municipalities have a Handbook of Cleansing Functions.
- The 14 municipalities have their ordinance for the payment of cleansing fees. However, regarding the payment of fees for the use of MIDES sanitary landfill, 4 municipalities do not have such (Antiguo Cuscatlán, Cuscatancingo, San Martín and Tonacatepeque), and they do not use this sanitary landfill. Nejapa has a fixed fee per user that includes collection and sanitary landfill fees, which are directly charged by the municipality.
- Almost 30% (variation from 9% to 41%) of municipal personnel belongs to the cleansing service; more than 20% (variation from 5% to 48%) of municipality budget are spent on the cleansing service. The aforementioned confirms, as in all the cities, that the cleansing service is the most important activity performed by the municipalities. Nevertheless, it is surprising and contradictory that in spite of being the most important service, its hierarchic rank within the municipal organizational charts of AMSS is so low. It is found at the 5th level in 4 municipalities, at the 4th level in 9 and only the 3rd level in one municipality.
- San Salvador municipality is implementing a re-organization process of its administrative structure that has three phases: transformation is called "terciarización". Phase III that is the final one should be achieved in year 2002. This final organization chart shows the cleansing service as one of the four sections within the Sub-management Office of Urban Services. However, hierarchy of the cleansing service would have moved down from the actual 4th level to the 5th.

Table 4-50: Organization chart and Municipal Ordinances in AMSS

Municipality	Organization Chart		C.S. Regulating ordinance	Ordinance Fees		C.S. functioning handbook
	Municipality	C.S.		C.S.	S/L	
San Salvador	Yes	Yes	Yes (May 1989)	9/4/99		Yes
Mejicanos	Yes	-	-	14/5/99	19/1/200	-
Delgado	Yes	-	-		20/5/99	-
Cuscatancingo	Yes	Yes	-		-	-
Ayutuxtepeque	Yes	-	-	22/1/93	26/3/99	-
San Marcos	Yes	-	-	3/6/99	17/3/99	-
Nueva San Salvador	Yes	-	-	26/3/99	26/3/99	-
Antiguo Cuscatlán	Yes	-	Yes (Jan. 3, 1998)	1/6/94	-	-
Soyapango	Yes	Yes	Yes (Nov 25, 1998)		17/3/99	Yes
Ilopango	Yes	-	-	12/1/2000	12/1/2000	-
San Martín	Yes	-	-	26/5/95	-	Yes
Apopa	Yes	-	Yes (Feb 22, 1993)	21/5/99	25/5/99	-
Nejapa	Yes	-	-	10/12/98	-	Yes
Tonacatepeque	Yes	-	-	3/2/99	-	-

Note:

C.S.: Cleansing service
S/L: Sanitary landfill

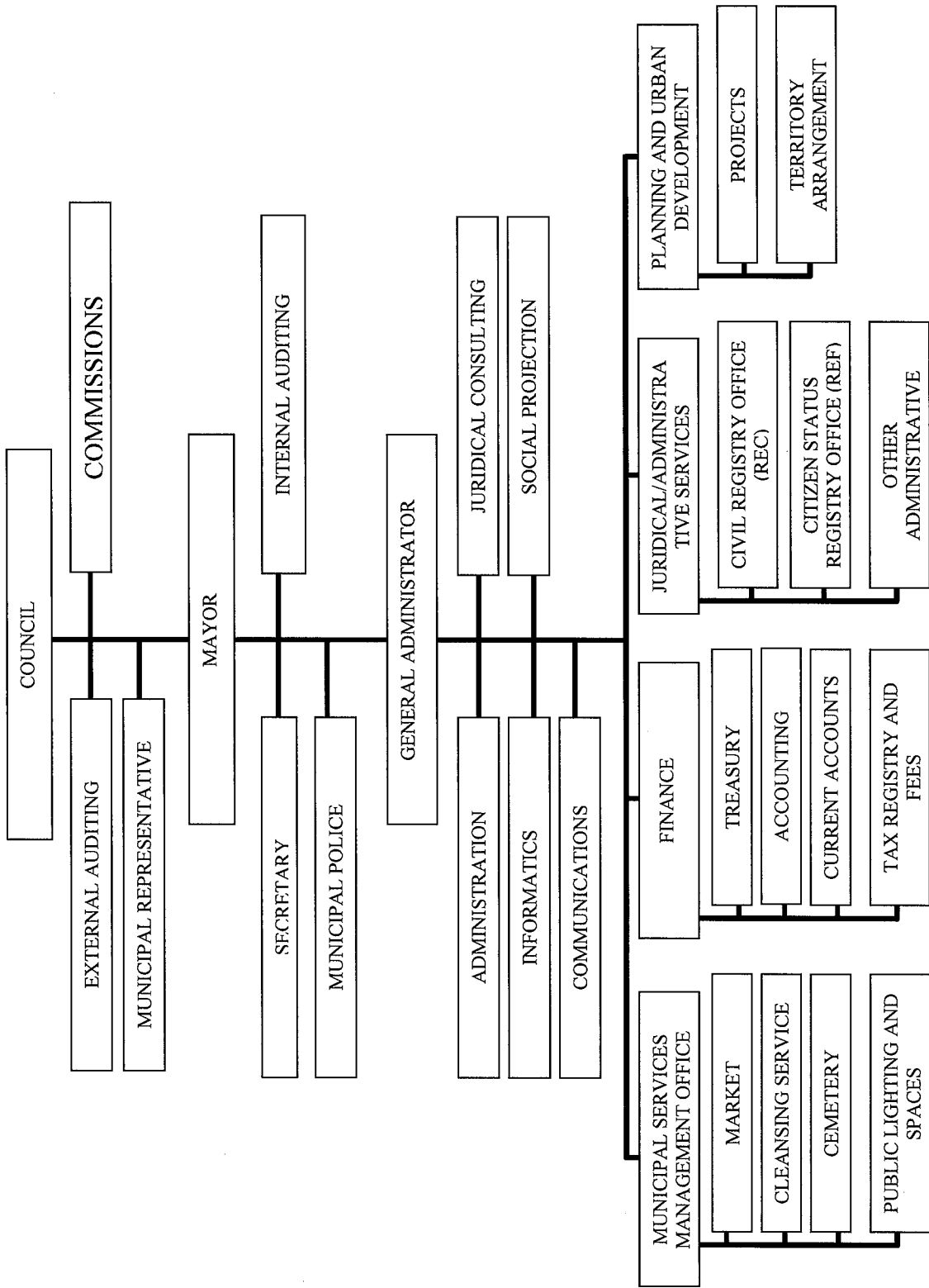


Figure 4-8: Organizational Structure of Soyapango Municipality

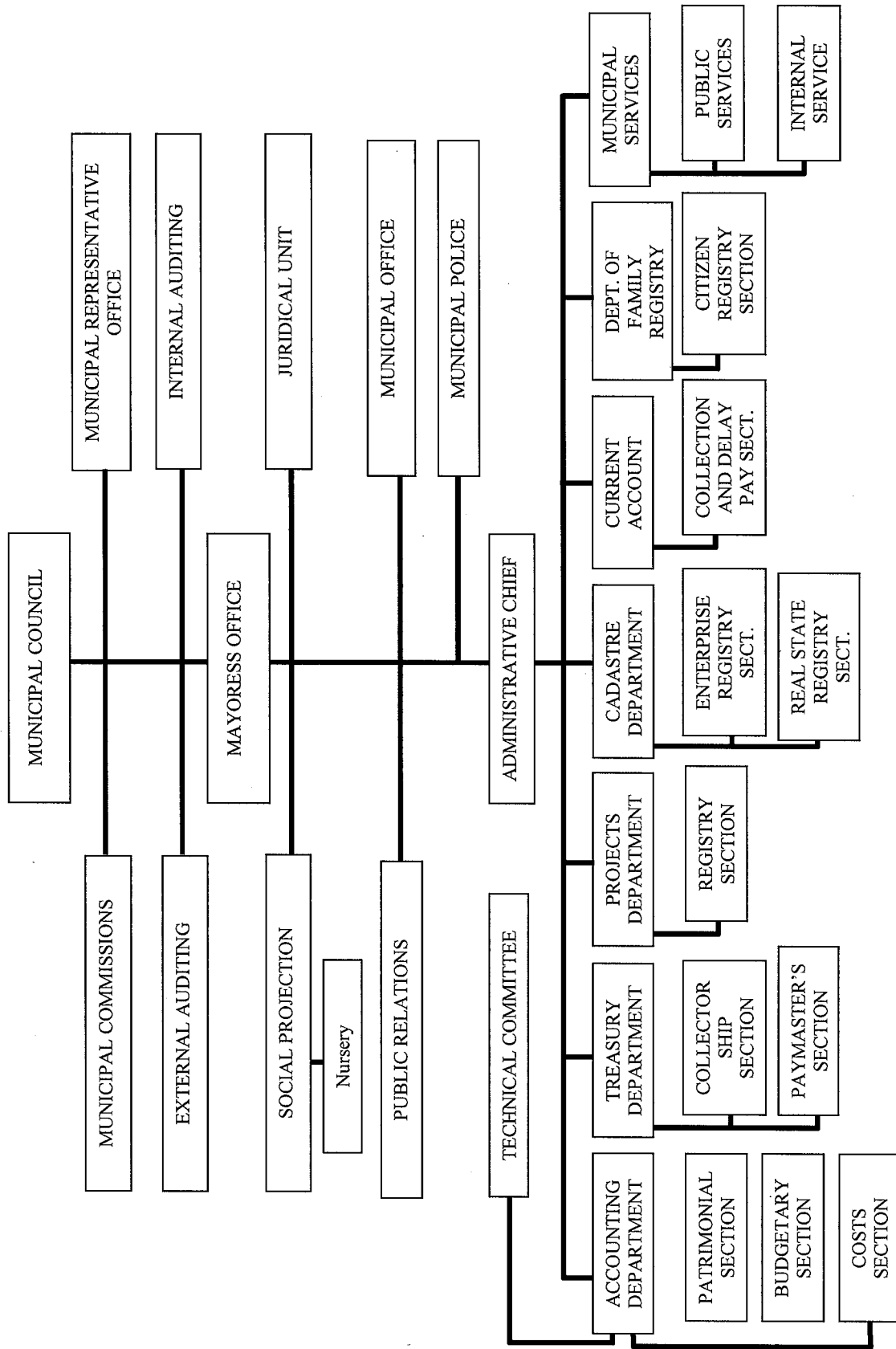


Figure 4-9: Organizational Structure of Ayutuxtepeque Municipality

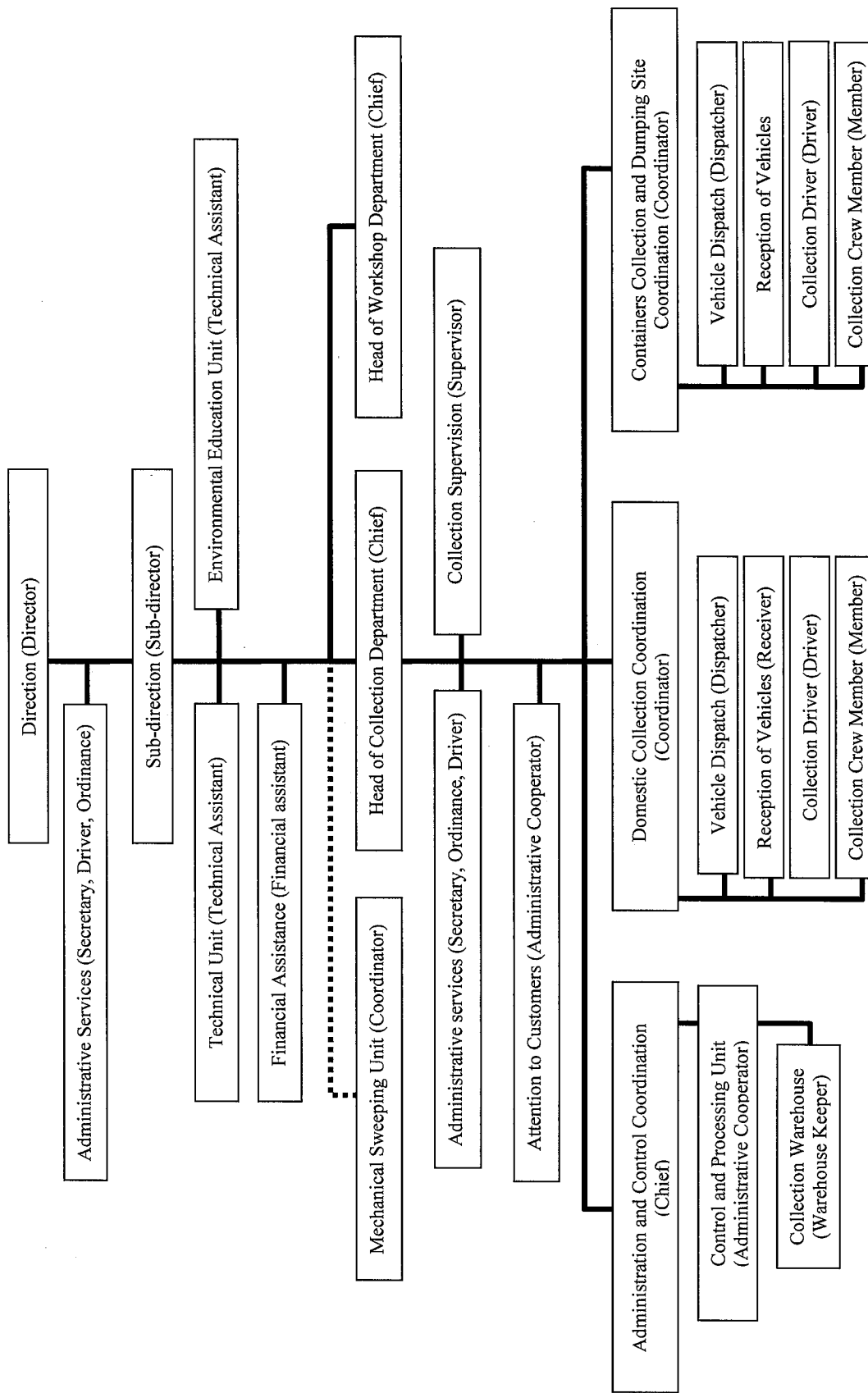


Figure 4-10: Organizational Structure of Cleansing Department in San Salvador Municipality

Table 4-51: Hierarchy of the Cleansing Service in Municipalities of AMSS
(Staff and resources), 1999

Municipality	1999 budget (million ¢)			Personnel(N°)			Position of cleansing service within municipal organization
	M	CS	CS/M%	M	CS	CS/M%	
San Salvador	353.0	54.6	15	4,000	1,000	25	Environmental sanitation manager (4 th level)
Mejicanos	17.0	6.6	39	237	85	36	Does not appear in environmental sanitation (4 th level)
Delgado	18.0	5.0	28	124	45	36	Does not appear in cleansing department (5 th level)
Cuscatancingo	24.1	1.6	7	200	37	19	One of 12 departments (3 rd level)
Ayutuxtepeque	8.7	1.6	18	52	11	21	One of 2 units of Public Services section (5 th level)
San Marcos	10.7	1.8	17	102	42	41	One of 9 Sections of Services (4 th level)
Nueva San Salvador	34.6	5.4	16	530	172	32	One of 8 Sections of Services (4 th level)
Antiguo Cuscatlán	18.6	5.9	32	370	97	26	One of 8 Units of public services (5 th level)
Soyapango	40.3	14.5	36	375	116	31	One of 4 Sections from the Municipal Services Management Office (4 th level)
Ilopango	13.0	6.2	48	208	72	35	One of 5 Sections of public services (4 th level)
San Martín	7.1	2.8	39	106	24	23	One of 4 Sections of public services (4 th level)
Apopa	12.2	2.2	18	179	41	23	One of 9 Sections of Services (4 th level)
Nejapa	8.5	0.5	6	45	12	27	Does not appear in Public Services (4 th level)
Tonacatepeque	6.0	0.3	5	45	13	29	

Note: M: Municipality
CS: Cleansing service

Source: Table prepared by the Study Team based on information collected during the visits.

b. Planning of Cleansing Services

Table 4-52 shows the people or bodies in charge of planning and regulating cleansing services and plans on projects to be carried out as from year 2000, as a response to the main problems identified by officials of the cleansing service during the visits to the 14 municipalities.

Table 4-52: Planning System of the Cleansing Service

Municipality	Planning	Regulation	Route design	Future plans/projects
San Salvador	Environmental sanitation management office	Environmental sanitation management office/jurist	Environmental cleansing management office	Modernization of environmental sanitation
Mejicanos	Environmental sanitation management office	Jurist	Environmental sanitation management office	Equipment replacement
Delgado	Services Department	Mayor/Jurist	Services department	Equipment replacement
Cuscatancingo	Mayor/Secretariat	Jurist	Collection team	Equipment replacement
Ayutuxtepeque	Municipal services department	Jurist	Public services	Compost and recycling through micro-enterprises
San Marcos	Juridical Committee	Jurist	Cleansing section	- Community education, - Equipment replacement - Modernization of fee collection
Nueva San Salvador	Communal services management office	Juridical consulting	Cleansing management office/Cleansing chief	- Community education - Modernization of commercial system
Antiguo Cuscatlán	Services management office	Representative (Sindico)	Services management office	- Final disposal - Study on fee structure
Soyapango	Municipal services	Juridical department	Municipal services	Modernization of commercial system
Ilopango	Public services	Administrative commission	Public services chief	Equipment replacement
San Martín	Mayor/representative (Sindico)	Juridical consulting	Mayor/representative (Sindico)	Final disposal
Apopa	Communal services	Jurist	Communal services	Improve commercial and cadastre system
Nejapa	Public services	Representative (Sindico)	Public services	Expand service coverage to other places
Tonacatepeque	Mayor	Representative (Sindico)	Mayor/representative (Sindico)	Final disposal

This table suggests the following:

- Yet planning and regulations such as route design is in charge of public service management offices or cleansing units in most of the municipalities, only in few of these their human resources are qualified to perform such functions and empirical solutions to these problems are frequent.
- Besides, since they do not have performance or management indicators nor cost accounting, planning possibilities become limited.
- Main projects are those concerning the replacement of the equipment, modernization of administration, improvement of the commercial system and therefore the financial one, and a sanitary final disposal of solid wastes of 4 municipalities that do not dispose of their wastes at the current sanitary landfill.

c. Operative System

55% to 95% of urban population of the municipalities in AMSS are rendered the collection service.

12 municipalities utilize contractors and/or concessionaires, which in most of the cases are micro-enterprises or one-person companies for the collection service in some specific areas or special wastes. In the case of contracts, the municipality pays the contractor per ton collected, whereas for concessions users directly make the payment of the service to the concessionaire.

Street sweeping service is conducted mainly in downtown streets of the municipalities and markets, and most of the former is provided by municipal cleansing services.

Likewise, there are more than 200 public containers within AMSS that are operated by the corresponding cleansing services. However –especially because of a lack of community education- an important amount of the containers become illegal dumping sites. Several municipalities are thinking about getting rid of such containers.

d. Financial System

Table 4-53 shows some financial information gathered during the visits to the 14 municipalities; it should be noted that revenues and expenditures are only estimations not based on accounting data.

The table suggests the following:

- The 14 municipalities charge cleansing fees, be it directly or by means of CAESS/DELSUR.
- 9 municipalities charge the fee of the sanitary landfill through CAESS/DELSUR.
- No municipality conducts cost accounting, which turns the decision-making process into a difficult matter.
- Treasury works with only one and whole accounting for all the activities of the municipality.

Table 4-53: Financial System 1999

Municipality	Fee		Budget control	Cost accounting	Treasury
	Cleansing fee	S/L			
San Salvador	Yes	Yes	Internal services management office	No	Only one and whole account
Mejicanos	Yes	Yes	Management office	No	" "
Delgado	Yes	Yes	Secretariat/treasurer	No	" "
Cuscatancingo	Yes	-	Secretariat/treasurer	No	" "
Ayutuxtepeque	Yes	Yes	Administrative chief	No	" "
San Marcos	Yes	Yes	Accounting	No	" "
Nueva San Salvador	Yes	Yes	Financial management office	No	" "
Antiguo Cuscatlán	Yes	-	Financial management office	No	" "
Soyapango	Yes	Yes	General management office	No	" "
Ilopango	Yes	Yes	Management office	No	" "
San Martín	Yes	-	Secretariat/treasurer	No	" "
Apopa	Yes	Yes	Administrative chief	No	" "
Nejapa	Yes	-	Administrative office	No	" "
Tonacatepeque	Yes	-	Secretariat/treasurer	No	" "

e. Administrative System

Table 4-54 shows the ratios of the cleansing staff in the municipalities of AMSS. Although the ratio of 1.1 workers per 1000 inhabitants in AMSS is similar to that of other Latin American metropolitan cities, there is a distortion between the indicator in San Salvador (2.3 cleaning workers per 1000 people) and that of other municipalities being less than 1.0 workers per 1000 inhabitants. Various metropolitan areas in Latin America also have the indicator below this 1.0 worker/1000 inhabitant ratio.

Table 4-54: Cleansing Service Staff in AMSS (1999)

Municipality	Urban population (000)	Staff							Workers/1000 HAB.
		Collection	Sweeping	Markets	Maintenance	Administration	Other staff	Total	
San Salvador	473	500	450	60	40	30		1,080	2.3
Mejicanos	185	49	34		2	4		89	0.5
Delgado	149	25	9	3	2	3	3	45	0.3
Cuscatancingo	90	22	9		3	1	2	37	0.4
Ayutuxtepeque	28	8	2			1		11	0.4
San Marcos	70	28	8	4		2		42	0.6
Nueva San Salvador	139	74	66	18	7	6	2	172	1.2
Antiguo Cuscatlán	43	55	30	5	5	4		99	2.3
Soyapango	284	90	12	12	4	6	7	131	0.5
Ilopango	127	56	3		3	4	6	72	0.6
San Martín	73	20	4					24	0.4
Apopa	164	28	10		2	1		41	0.3
Nejapa	15	6	4		1	1		12	0.8
Tonacatepeque	29	8	3	2		1		14	0.5
Total	1,869	969	644	104	69	64	20	1,870	1.0

Table 4-55 shows the participation of micro-enterprises in AMSS' solid waste management. 45 micro-enterprises and cooperatives having more than 300 persons collect around 400 tons per day, sweeping certain streets and markets and some participate in disposing of around 70 tons per day at "La Chuca(Espiga)" final disposal site.

Table 4-55: Participation of Enterprises and Micro-enterprises in SWM in AMSS

Municipality	Operation	No. of enterprises	Enterprise/ micro-enterprise	Staff number	Activity type	Amount handled ton/day	Payment
San Salvador	Collection	7	3 Coop./4 micro-enterprise	80	Concession (F)	40	13¢/ house/month
	"	2	MEDEL/ REDES	12	Concession (F)	100	60 ¢/ton
	"	4	Micro-enterprises	40	Concession (F)	150	1500¢/ ton
	Sweeping	2	Cooperative	15	Contract (F)	20.6 km.	70,000 ¢/month
Mejicanos	Collection	3	1 Coop./2 micro-enterprise	43	Concession (I)	5.5	12-15¢/ month
	Market	1	Coop/ABASAP	16	Contract (F)	Market/Compost	4,500¢/ month
Delgado	Collection	1	Nuevo Amanecer enterprise	15	Contract (F)	9	44.775¢/ month
San Marcos	Collection	1	Maquila	3	Concession (I)	12	\$18/day
	"	1	Brooklin	3	Concession (F)	3	\$ 18/day
	Pre-collection	1	Former scavengers	6	Concession (I)	3	
Nueva San Salvador	Collection	2	Morales/Herrera	20	Concession (F)	12	15¢/ month
Antiguo Cuscatlán	Collection	1	Sevilla	5	Concession (F)	3	
	Final disposal	1	"Espiga"	5	Contract (F)	70	40 ¢/ton
Soyapango	Collection	1	Cooperative	5	Concession (I)	2	8 ¢/month
	"	3	Former scavengers	17	Concession (I)	4	10¢/ month
Ilopango	Collection	6	Micro-enterprises	12	Concession (I)	18	15¢/ month
	"	1	Coop./ABA	8	Concession (F)	15	15¢/ month
San Martín	Collection	1	Micro-enterprise Sta.Teresa	4	Concession (I)	4	8 ¢/month
	"	1	Micro La Palma	2	Concession (I)	1	8 ¢/month
Apopa	Collection	1	Former scavengers	8	Concession (I)	6	15¢/ month
	Sweeping	1	Former scavengers	5	Contract (F)		12.50¢/ month
Tonacatepeque	Collection	3	Micro: 3 cantons	3	Concession (I)	2	10¢/ month

Note: (F): Formal
(I): Informal

Source: Table prepared by the Study Team based on information collected during the visits.

f. Management of Hospital Solid Wastes

Table 4-56 shows the management of these pathological wastes, which includes intra-hospital separation, collection, haulage and treatment.

Table 4-56: Management of Pathological Hospital Wastes

Concept	MSPAS	ISSS	Private hospitals
Intra-hospital separation	Managed by health professionals (certain regulations exist)	Same	Same
Collection and haulage	MSPAS does it directly by means of 2 vans with 2 drivers and 4 assistants. They collect 1.2 ton/day. "SAE" will start operations as from year 2000.	"Transporte Guadalupe" that uses one transfer vehicle and 4 small vehicles. Servicios Ambientales Especializados (SAE) will start operations as from year 2000.	"Transporte Guadalupe". "SAE" will start operations as from year 2000. As a whole and along with MSPAS and ISSS, 2.7 ton/day are collected.
	Frequency: daily, Monday through Saturday (6 a.m. - 11 a.m.)	Daily frequency (Monday through Saturday).	Same
	Personnel: Trained by MSPAS.	"Transporte Guadalupe" staff trained by MSPAS.	Same
	Cost: each hospital should allocate US\$ 0.36/kg in their annual budget for the collection and treatment of pathological wastes.	ISSS pays "Guadalupe" ¢ 1.50 lb. transported. In small hospitals, "Guadalupe" charges ¢ 1,300/month. Contracts are entered with ISSS.	Same as ISSS
Treatment	"Autoclave" treatment operated by CINTEC, next to Nejapa's S/L. In total for MSPAS, ISSS and private hospitals, 2.7 ton/day are treated.	Same	Same
	Contractor: CINTEC Fee: US\$ 0.20/kg + V.A.T. MSPAS has not paid yet for this treatment, since MSPAS and MARN have not authorized this Autoclave yet.	Same	Private hospitals should be paying the treatment fee (US\$ 0.226/kg)
	Duration of contract: MSPAS accepted one year renewable	Same	Same
	Minimum amount proposed by contractor to be treated: 1000 ton/year		

4.5.3 Financial System

4.5.3.1 Actual Financial Situation of Municipalities

The municipal finance for the 14 municipalities in AMSS mainly consists of:

- Municipal fund (Sección I) and
- Subsidies from Central Government (Sección II and Sección III).

Since Sección I used to be categorized as autonomous funds, it had been basically managed at municipality's discretion.

However, since "Fondo de Desarrollo Economico Social(FODES)" was established in 1998, whose subsidy has been granted to municipalities for the establishment of their infrastructure through "Fondo de Inversion Social para el Desarrollo Local(FISDL)" and "Instituto Salvadoreño de Desarrollo Municipal (ISDEM)", 20% of the subsidy became available as funds for municipal operations. That accounts for a part of present Sección I.

a. Cost Accountability of SWM

Municipalities formerly collected only cleansing fee (tasa de aseo) from citizens for covering the expenditure of cleansing services. Since Nejapa landfill site started to be operated in 1999 by the MIDES, 10 municipalities collect landfill fee (tasa de relleno sanitario) from citizens to cover the final disposal cost in addition to the cleansing fee.

Cost accountability of municipal SWM further becomes unclear for most of the municipal officers, because landfill fee collection from the citizens and its payment to the MIDES has started just recently and an independent (revenue and expenditure) accounting for the sanitary landfill is started to be employed.

b. Trends of Annual Revenue and Expenditure

Table 4-57 shows trends of annual revenue and expenditure of respective municipalities from 1997 to 1999. Comparing (Tax + Non-tax) per population of municipal revenue projected for 1999, the following municipalities which encompass high-income residential areas ranked top among the 14 municipalities.

- San Salvador: 492.2 colon/person (US\$ 56.3/person)
- Antigua Cuscatlan: 367.4 colon/person (US\$ 42.0/person)
- Nueva San Salvador: 271.0 colon/person (US\$ 31.0/person)

As for the other 11 municipalities, it fluctuates around one-tenth of the top 3 cities. An average of all 14 municipalities is as follows:

- AMSS average: 187.3 colon/person (US\$ 21.4/person)

Table 4-57: Trend of Annual Revenue and Expenditure

Unit : 1000colon

	San Salvador	Mejicanos	Delgado	Cuscatancingo	Ayutuxtepeque	San Marcos	Nueva San Salvador	Antiguo Cuscatlan	Soyapango	Ilopango	San Martin	Apopa	Nejapa	Tonacatepeque
1997 Real	Total	237,909	14,946	9,930	NA	2,757	NA	20,302	29,625	10,512	NA	NA	1,907	NA
	Tax revenue	91,745	1,505	NA	NA	789	NA	NA	6,622	NA	NA	NA	NA	NA
	Non-Tax revenue	71,951	7,608	1,480	NA	675	NA	6,090	6,234	NA	NA	NA	NA	NA
	Others	74,213	5,833	8,450	NA	1,313	NA	NA	16,769	NA	NA	NA	NA	NA
Expenditure(B)	254,369	NA	5,074	NA	2,757	NA	27,987	19,712	32,327	5,907	NA	NA	2,491	NA
	Balance(A-B)	-16,460	NA	4,856	NA	0	NA	590	-2,702	4,605	NA	NA	-584	NA
1998 Real	Total	298,632	14,945	10,358	NA	3,533	NA	22,754	31,364	11,254	6,517*	NA	6,034	1,906*
	Tax revenue	90,942	1,909	NA	NA	1,295	NA	NA	6,163	NA	1,045	NA	NA	NA
	Non-Tax revenue	97,028	7,720	5,059	NA	900	NA	7,160	7,123	NA	3,490	NA	NA	NA
	Others	110,662	5,316	5,299	NA	1,338	NA	NA	18,078	NA	1,982	NA	NA	NA
Expenditure(B)	281,664	16,538	8,700	NA	3,543	NA	30,437	20,046	34,563	9,957	NA	NA	7,472	NA
	Balance(A-B)	16,968	-1,593	1,658	NA	-10	NA	2,708	-3,199	1,297	NA	NA	-1,438	NA
1999 Budget	Total	322,537	15,227	18,175	13,017	8,652	10,662	21,265	40,332	12,970	6,743	13,994	8,554	5,986
	Tax+ Non-tax(c)	233,013	9,312	11,486	4,959	1,740	4,622	15,713	19,585	7,274	4,534	8,420	1,265	1,785
	Tax revenue	115,299	1,621	1,363	227	114	1,191	14,716	7,003	2,081	1,044	3,082	55	24
	Non-Tax revenue	117,714	7,691	10,123	4,732	1,626	3,431	26,675	12,582	5,193	3,490	5,338	1,210	1,761
Others	89,524	5,915	6,689	8,058	6,912	6,040	15,394	5,552	20,747	5,696	2,209	5,574	7,289	4,201
	(c)/population (colones/person)	492.2	50.3	76.9	55.1	45.6	66.4	271.0	69.1	57.1	44.9	51.3	40.2	44.8
(c)/population (US\$/person)	56.3	5.7	8.8	6.3	5.2	7.6	31.0	42.0	7.9	6.5	5.1	5.9	4.6	5.1
	322,537	15,227	18,175	13,017	8,652	10,662	56,785	21,265	40,332	12,970	6,743*	13,994	8,554	5,986
Balance(A-B)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	360,804	10,553	21,171	11,665	5,216	10,298	38,497	24,698	48,806	16,660	7,278*	10,222*	5,440	4,333
1999 Real	Total	93,532	2,545	1,068	235	174	1,434	8,536	7,865	2,633	1,662	3,196	319	34
	Tax revenue	146,023	5,056	6,345	5,684	2,379	4,759	8,846	17,954	6,762	3,582	5,310	1,220	3,061
	Non-Tax revenue	121,249	2,952	13,758	5,746	2,663	4,105	6,676	22,987	7,265	2,034	1,716	3,901	1,238
	Others	383,030	18,240	20,841	11,750	6,754	9,436	34,600	18,597	41,728	13,337	7,875*	11,297*	4,963
Expenditure(B)	-22,226	-7,687	330	-85	-1,538	862	3,897	6,101	7,078	3,323	-597	-1,075	477	681
	473,374	185,204	149,394	90,079	38,158	69,660	152,723	42,773	283,598	127,434	101,086	163,974	31,466	39,871

sources : financial department of each municipalities, note : ** projection, Non-tax revenue: mainly the fee for municipal service; NA: not available
1US\$=8.75colones

c. Tax Collection Capability

“Municipal tax + fee” in budget, which are self-financing component, and amount of “municipal tax + fee” collected per population of 14 municipalities are compared in the table below.

Table 4-58: Tax and Fee Collection

Unit	1999 Budget 1,000 colon	Share of (Tax+ Fee) in Budget %	1999 Balance in Real 1,000 colon	(Tax+Fee)/population		Reference population Nos.
				1999 Budget colon	Real in 1999 Colon	
San Salvador	322,537	72.2	-22,226	492.2	506.1	473,374
Mejicanos	15,227	61.2	-7,687	50.3	41.0	185,204
Delgado	18,175	63.2	330	76.9	49.6	149,394
Cuscatancingo	13,017	38.1	-85	55.1	65.7	90,079
Ayutuxtepeque	8,652	20.1	-1,538	45.6	66.9	38,158
San Marcos	10,662	43.3	862	66.4	88.9	69,660
Nueva San Salvador	56,785	72.9	3,897	271.0	208.4	152,723
Antiguo Cuscatlan	21,265	73.9	6,101	367.4	406.4	42,773
Soyapango	40,332	48.6	7,078	69.1	91.0	283,598
Ilopango	12,970	56.1	3,323	57.1	73.7	127,434
San Martin	6,743	67.2	-597	44.9	51.9	101,086
Apopa	13,994	60.2	-1,075	51.3	51.9	163,974
Nejapa	8,554	14.8	477	40.2	48.9	31,466
Tonacatepeque	5,986	29.8	681	44.8	77.6	39,871

4.5.3.2 Cleansing Fee and Landfill Fee

Fees of municipal SWM consist of cleansing fee (tasa de aseo) and landfill fee (tasa de relleno sanitario) for 10 municipalities that use MIDES landfill. 4 municipalities that do not use MIDES landfill collect cleansing fee (tasa de aseo) only.

While the cleansing fee (tasa de aseo), which has been collected for quite some time, is generally levied in proportion to the size of real estate, landfill fee is levied in proportion to the electricity(kilowatts) consumed in San Salvador municipality. In some other municipalities, a certain fixed fee set per rank is levied in accordance with the amount of electricity consumed. Nejapa municipality sets a fixed landfill fee per user.

9 municipalities that use the MIDES landfill collect landfill fee through the electric power companies (CAESS or DELSUR). Nejapa municipality collects the landfill fee directly from the users.

a. Cleansing Fee (Tasa de Aseo)

Table 4-59 summarizes rates of cleansing fee in 14 municipalities. San Salvador, Cuscatancingo and Nueva San Salvador municipalities collect the cleansing fee through the electric power companies.

Table 4-59: Cleansing Fee

	Housing (colon/m ² /month)	Industrial/ Commercial (colon/m ² /month)	Condominium (colon/m ² /month)			Remarks
			business activity	housing	common area	
San Salvador	0.253*	>1000m ² 0.446 1000m ² > 0.428			0.178	Oct.1999
Mejicanos	0.15	0.36/0.24	36.30**	12.10**	0.12	May 1999
Delgado	100m ² > 6.00** >100m ² 0.10	100m ² > 15.00** >100m ² 0.15	0.15	8.00**	0.10	
Cuscatancingo	0.12	0.20/0.15				Oct 1999
Ayutuxtepeque	0.07	0.21/0.14				Jan 1993
San Marcos	0.05	0.12/0.10			10.00	Jun 1999
Nueva San Salvador						
Antiguo Cuscatlan	0.07	0.20/0.15				Jul 1994
Soyapango	0.08	0.08/0.08		0.08		Jan 1993
Ilopango	0.07	0.30/0.25				Nov 1998
San Martin	0.10	0.20/0.12				Apr 1995
Apopa	0.07	0.20/0.12				May 1999
Nejapa	16.00*	70/30*				Dec 1998
Tonacatepeque	0.10	0.15				Feb 1999

Note: * Property in the marginal area is 8 colon/lot/month.
** colon/apt./month

b. Landfill Fee(tasa de relleno sanitario)

b.1 San Salvador

San Salvador municipality collects the landfill fee in proportion to the amount of electricity consumed (i.e., 0.075 colon/kWh). However, it also establishes the minimum charge (5 colones/month) and maximum charge (300 colones/month) for its citizens. In other words, where the monthly consumption is between 67 to 4000 kWh, the fee is charged proportionally.

b.2 Mejicanos

As for Mejicanos municipality, the fee rate was established as agreed with CINTEC-MIDES at the initial stage, however, that was later revised with more detailed classification per consumption ranks. Meanwhile the municipality established the maximum charge per household as 50 colones/month.

Table 4-60: Landfill Fee of Mejicanos Municipality

	Power consumption amount (kWh/month)	Waste disposal fee (colon/month)
Household	0-49	5.00
	50-99	10.00
	100-149	20.00
	150-199	30.00
	200-249	35.00
	250-299	40.00
	300-399	45.00
	400-	50.00
Institution, Commercial, Industry	0-399	30.00
	400-599	50.00
	600-799	70.00
	800-999	90.00
	1000-1199	120.00
	1200-1399	150.00
	1400-1599	200.00
	1600-	300.00

Source: Mejicanos Municipality

b.3 Delgado

The landfill fee rate of Ciudad Delgado is summarized in Table 4-61. Fee rates for institutions, commercials and industries are ranked in detail in accordance with electricity consumed. Furthermore, fee rates for milling industry and restaurants are set separately with maximum charge of 150 colones/month.

Table 4-61: Landfill Fee of Delgado Municipality

	Power consumption amount (kWh/month)	Waste disposal fee (colon/month)
Household	0-49	4.00
	50-99	9.00
	100-199	24.00
	200-299	55.00
	300-	80.00
Institution, Commercial & Industry	0-50	15.00
	51-100	30.00
	101-150	50.00
	151-200	60.00
	201-250	70.00
	251-300	75.00
	301-350	84.00
	351-400	150.00
	401-450	175.00
	451-500	200.00
	501-550	250.00
	551-600	300.00
	601-650	350.00
	651-700	400.00
	701-750	500.00
	751-800	600.00
	801-850	700.00
	851-1000	800.00
1001-	900.00	

	Power consumption amount (kWh/month)	Waste disposal fee (colon/month)
Other agency	Church and temple	20.00
	Clinic	15.00
	Public school	20.00
	Clinicas de Salud Publica	15.00
	Communal house	20.00

Source: Diario Oficial (TOMO No.342 and No.343)

b.4 Ayutuxtepeque, San Marcos, Soyapango, Ilopango, Apopa

Ayutuxtepeque, San Marcos, Soyapango, Ilopango, Apopa municipalities maintain the rates agreed with CINTEC-MIDES to date (as of February 2000).

Table 4-62: Landfill Fee of Five (Ayutuxtepeque, San Marcos, Soyapango, Ilopango, Apopa) Municipalities

	Power consumption amount (kWh/month)	Waste disposal fee (colon/month)
Household	0-49	3.00
	50-99	9.00
	100-199	30.00
	200-299	40.00
	300-	60.00
Institution, commercial, industry	0-350	70.00
	351-650	110.00
	650-	300.00

Source: Diario Oficial (TOMO No.342, Marzo 1999)

However, Ilopango raised the minimum landfill tariff to 5.00 colon/month, and introduced a specific duty of 225 colon/ton in April 2000.

b.5 Nueva San Salvador

Nueva San Salvador municipality set the maximum fee rate at 40 colones/month for household and 500 colones/month for institution, commercials and industries.

Table 4-63: Landfill Fee of Nueva San Salvador Municipality

	Power consumption amount (kWh/month)	Waste disposal fee (colon/month)
Household	0-99 kWh	3.00
	100-199	6.00
	200-299	15.00
	300-	40.00
Institution, commercial, industry	0-150	35.00
	151-300	70.00
	301-500	125.00
	501-650	300.00
	650-	500.00

Source: Diario Oficial (TOMO No.342, Marzo 1999)

b.6 Nejapa

Nejapa municipality is supposed to receive compensation of US\$ 2.0 million from CINTEC-MIDES in exchange for giving them a permission to establish the landfill within the municipality.

However to date, only US\$200,000 was paid to the municipality from MIDES as part of the compensation, therefore, the municipality has not started to pay the landfill fee to MIDES. As Nejapa municipality collects the fixed landfill fee directly from citizens (not through electric bills), the municipal revenue of the fee is substantially very small.

4.5.3.3 Actual Situation of Fee Collection

Table 4-64 shows the municipal revenue collected as SWM fees in 1999 in respective municipalities.

Table 4-64: Collected Fee in 1999

	Cleansing Fee (1,000 colones)	Landfill Fee** (1,000 colones)	Total (1,000 colones)	per capita (colon/capita)
San Salvador	73,296***	23,540	96,839	204.6
Mejicanos	2,228	4,924	7,152	38.6
Delgado	1,011	2,895	3,906	26.1
Cuscatancingo	2,100	-	2,100	23.3
Ayutuxtepeque	589	732	1,321	34.6
San Marcos	1,152	1,242	2,394	34.4
Nueva San Salvador	10,492	5,618	16,110	105.5
Antiguo Cuscatlan	3,191	-	3,191	74.6
Soyapango	3,702	9,492	13,194	46.5
Ilopango	2,582	2,775	5,357	42.0
San Martin	1,553	-	1,553	15.4
Apopa	883	3,098	3,981	24.3
Nejapa	*	*	250	7.9
Tonacatepeque	276	-	276	6.9

Note: * breakdown is not available, sources: each municipality
 ** payment to MIDES + commission to CAESS/DELSUR
 *** estimated from CAESS/DELSUR data base plus revenue of specific collection service

4.5.3.4 Annual Expenditure of Cleansing Department

a. Trends of Annual Expenditure

Table 4-65 shows trends of annual expenditure on SWM in respective municipalities obtained through inquiries to C/P. It illustrates that expenditure (i.e., cost accountability) on SWM is unclear in many municipalities.

Table 4-65: Trend of Cleansing Department Annual Expenditure

Unit : colones

	San Salvador	Mejicanos	Delgado	Cuscatancingo	Ayutuxtepeque	San Marcos	Nueva San Salvador	Antiguo Cuscatlan	Soyapango	Ilopango	San Martin	Apopa	Nejapa	Tonacatepeque
1997 Real	Total	NA	1,001,102	1,241,434	286,680	NA	NA	NA	3,432,608	NA	NA	NA	190,290	NA
	Personnel expense	NA	763,345	743,217	220,680	NA	NA	NA	2,806,118	NA	NA	NA	143,550	NA
	Service expense	NA	31,470	133,582	41,000	NA	NA	NA	0	NA	NA	NA	5,484	NA
	Material & supply	NA	206,287	364,635	25,000	NA	NA	NA	626,490	NA	NA	NA	41,256	NA
Capital expenditure(B)	NA	NA	0	0	0	NA	NA	NA	0	NA	NA	0	0	NA
Total	NA	NA	1,001,102	1,241,434	286,680	NA	NA	NA	3,432,608	NA	NA	NA	190,290	NA
1998 Real	Total	51,024,000	1,261,567	1,266,038	295,200	NA	NA	NA	4,608,654	NA	NA	NA	229,601	NA
	Personnel expense	21,145,000	976,784	870,439	205,200	NA	NA	NA	3,738,906	NA	NA	NA	157,050	NA
	Service expense	926,000	50,000	65,822	0	NA	NA	NA	0	NA	NA	NA	17,957	NA
	Material & supply	28,953,000	234,783	329,777	90,000	NA	NA	NA	869,748	NA	NA	NA	54,594	NA
Capital expenditure(B)	0	NA	0	0	0	NA	NA	NA	0	NA	NA	0	NA	
Total	51,024,000	NA	1,261,567	1,266,038	295,200	NA	NA	NA	4,608,654	NA	NA	NA	229,601	NA
1999 Budget	Total	54,612,4530	NA	NA	NA	283,320	3,004,000	NA	3,728,459	NA	1,701,836	1,567,294	329,264	599,010
	Personnel expense	20,813,600	2,226,000	NA	NA	199,320	2,305,000	NA	2,721,498	NA	842,204	1,192,294	149,500	299,010
	Service expense	24,554,600	NA	NA	NA	27,000	353,000	NA	135,400	NA	80,000	35,000	94,764	250,000
	Material & supply	9,244,230	NA	NA	NA	57,000	346,000	NA	871,561	NA	779,632	340,000	85,000	50,000
Capital expenditure(B)	0	0	0	0	0	0	NA	0	NA	NA	0	0	417,000	
Total	54,612,430	3,500,000	NA	NA	283,320	3,004,000	NA	NA	3,728,459	NA	NA	1,567,294	329,264	1,016,010
1999 Real	Total	72,240,000	7,501,702	3,630,464	1,741,541	1,363,733	3,017,786	13,525,187	14,515,509	4,860,581	1,159,211	4,841,514	261,952	509,705
	Personnel expense	21,145,000	2,480,300	1,120,841	1,342,744	268,725	1,034,944	4,522,100	4,153,801	1,708,600	737,677	1,310,555	164,550	431,987
	Service expense	47,389,000	4,489,078	2,236,936	42,664	1,038,008	1,608,147	8,052,400	9,346,176	2,730,081	51,716	3,274,438	27,755	25,000
	Material & supply	3,706,000	532,324	272,687	356,133	57,000	374,695	950,687	1,015,532	421,900	369,818	256,521	69,647	52,718
Capital expenditure(B)	1,000	0	35,000	0	0	0	0	0	0	0	0	0	0	
Total	72,241,000	7,501,702	3,665,464	1,741,541	1,363,733	3,017,786	13,525,187	14,515,509	4,860,581	1,159,211	4,841,514	261,952	509,705	

NA: not available

b. Breakdown of Annual Expenditure

Municipal expenditure on SWM works is classified into 6 components (collection, street sweeping, intermediate treatment, final disposal, workshop and administration) and annual expenditure for each component is estimated. The result is shown Table 4-67. This classification is based on the data regarding trends of annual expenditure as explained above, inquiries made by the team to C/P and assumptions (see Annex G).

Table 4-66: Summary of Annual Expenditure (1999 Real)

Unit : colon

	Collection	Public cleansing	Intermediate treatment	Final Disposal	Workshop	Administration	Total
San Salvador	14,294,000	5,014,000	445,000	24,335,000	3,901,000	24,252,000	72,241,000
Mejicanos	2,352,122	1,016,187	0	4,133,393	0	0	7,501,702
Delgado	1,059,179	229,137	104,100	2,137,116	56,324	79,608	3,665,464
Cuscatancingo	1,296,022	445,519	0	NA	0	0	1,741,541
Ayutuxtepeque	502,918	41,745	0	759,070	0	60,000	1,363,733
San Marcos	1,297,148	151,900	0	1,519,022	0	49,716	3,017,786
Nueva San Salvador	7,068,121	458,115	0	5,598,730	231,889	168,332	13,525,187
Antiguo Cuscatlan	4,883,532	1,882,400	0	383,523	0	0	7,149,455
Soyapango	4,159,311	743,596	0	9,210,746	127,400	274,456	14,515,509
Ilopango	1,967,843	74,057	0	2,730,081	0	88,600	4,860,581
San Martin	1,018,701	140,510	0	NA	0	0	1,159,211
Apopa	1,209,608	286,801	0	3,269,837	40,757	34,511	4,841,514
Nejapa	223,913	6,789	0	NA	0	31,250	261,952
Tonacatepeque	391,891	117,814	0	NA	0	0	509,705
Total	41,724,309	10,608,570	549,100	54,076,518	4,357,370	25,038,473	136,354,340

NA: not available

Table 4-67: Breakdown of Annual Expenditure

Unit : colon

		Collection	Public cleansing	Intermediate treatment	Final Disposal	Workshop	Administration	Total
San Salvador	Current Expenditure(A)	14,293,000	5,014,000	445,000	24,335,000	3,901,000	24,252,000	72,240,000
	Personnel Expense	10,885,000	5,014,000	445,000	0	3,690,000	1,111,000	21,145,000
	Service Expense	615,000	0	0	24,335,000	26,000	22,413,000	47,389,000
	Material & supply	2,793,000	0	0	0	185,000	728,000	3,706,000
	Capital Expenditure(B)	1,000	0	0	0	0	0	1,000
	Total	14,294,000	5,014,000	445,000	24,335,000	3,901,000	24,252,000	72,241,000
Mejicanos	Current Expenditure(A)	2,352,122	1,016,187	0	4,133,393	0	0	7,501,702
	Personnel Expense	1,464,113	1,016,187	0	0	0	0	2,480,300
	Service Expense	355,685	0	0	4,133,393	0	0	4,489,078
	Material & supply	532,324	0	0	0	0	0	532,324
	Capital Expenditure(B)	0	0	0	0	0	0	0
	Total	2,352,122	1,016,187	0	4,133,393	0	0	7,501,702
Delgado	Current Expenditure(A)	1,024,179	229,137	104,100	2,137,116	56,324	79,608	3,630,464
	Personnel Expense	636,492	229,137	104,100	15,180	56,324	79,608	1,120,841
	Service Expense	115,000	0	0	2,121,936	0	0	2,236,936
	Material & supply	272,687	0	0	0	0	0	272,687
	Capital Expenditure(B)	35,000	0	0	0	0	0	35,000
	Total	1,059,179	229,137	104,100	2,137,116	56,324	79,608	3,665,464
Cuscatancingo	Current Expenditure(A)	1,296,022	445,519	0	0	0	0	1,741,541
	Personnel Expense	952,915	389,829	0	0	0	0	1,342,744
	Service Expense	42,664	0	0	0	0	0	42,664
	Material & supply	300,443	55,690	0	0	0	0	356,133
	Capital Expenditure(B)	0	0	0	0	0	0	0
	Total	1,296,022	445,519	0	0	0	0	1,741,541

Unit : colon

		Collection	Public cleansing	Intermediate treatment	Final Disposal	Workshop	Administration	Total
Ayutuxtepeque	Current Expenditure(A)	502,918	41,745	0	759,070	0	60,000	1,363,733
	Personnel Expense	166,980	41,745	0	0	0	60,000	268,725
	Service Expense	278,938	0	0	759,070	0	0	1,038,008
	Material & supply	57,000	0	0	0	0	0	57,000
	Capital Expenditure(B)	0	0	0	0	0	0	0
	Total	502,918	41,745	0	759,070	0	60,000	1,363,733
San Marcos	Current Expenditure(A)	1,297,148	151,900	0	1,519,022	0	49,716	3,017,786
	Personnel Expense	833,328	151,900	0	0	0	49,716	1,034,944
	Service Expense	89,125	0	0	1,519,022	0	0	1,608,147
	Material & supply	374,695	0	0	0	0	0	374,695
	Capital Expenditure(B)	0	0	0	0	0	0	0
	Total	1,297,148	151,900	0	1,519,022	0	49,716	3,017,786
Nueva San Salvador	Current Expenditure(A)	7,068,121	458,115	0	5,598,730	231,889	168,332	13,525,187
	Personnel Expense	3,663,764	458,115	0	0	231,889	168,332	4,522,100
	Service Expense	2,453,670	0	0	5,598,730	0	0	8,052,400
	Material & supply	950,687	0	0	0	0	0	950,687
	Capital Expenditure(B)	0	0	0	0	0	0	0
	Total	7,068,121	458,115	0	5,598,730	231,889	168,332	13,525,187
Antiguo Cuscatlan	Current Expenditure(A)	4,883,532	1,882,400	0	383,523	0	0	7,149,455
	Personnel Expense	3,451,066	1,882,400	0	0	0	0	5,333,466
	Service Expense	235,210	0	0	383,523	0	0	618,733
	Material & supply	1,197,256	0	0	0	0	0	1,197,256
	Capital Expenditure(B)	0	0	0	0	0	0	0
	Total	4,883,532	1,882,400	0	383,523	0	0	7,149,455
Soyapango	Current Expenditure(A)	4,159,311	743,596	0	9,210,746	127,400	274,456	14,515,509
	Personnel Expense	3,038,449	721,296	0	0	127,400	266,656	4,153,801
	Service Expense	135,430	0	0	9,210,746	0	0	9,346,176
	Material & supply	985,432	22,300	0	0	0	7,800	1,015,532
	Capital Expenditure(B)	0	0	0	0	0	0	0
	Total	4,159,311	743,596	0	9,210,746	127,400	274,456	14,515,509
Ilopango	Current Expenditure(A)	1,967,843	74,057	0	2,730,081	0	88,600	4,860,581
	Personnel Expense	1,555,200	64,800	0	0	0	88,600	1,708,600
	Service Expense	0	0	0	2,730,081	0	0	2,730,081
	Material & supply	412,643	9,257	0	0	0	0	421,900
	Capital Expenditure(B)	0	0	0	0	0	0	0
	Total	1,967,843	74,057	0	2,730,081	0	88,600	4,860,581
San Martin	Current Expenditure(A)	1,018,701	140,510	0	0	0	0	1,159,211
	Personnel Expense	614,731	122,946	0	0	0	0	737,677
	Service Expense	51,716	0	0	0	0	0	51,716
	Material & supply	352,254	17,564	0	0	0	0	369,818
	Capital Expenditure(B)	0	0	0	0	0	0	0
	Total	1,018,701	140,510	0	0	0	0	1,159,211
Apopa	Current Expenditure(A)	1,209,608	286,801	0	3,269,837	40,757	34,511	4,841,514
	Personnel Expense	948,486	286,801	0	0	40,757	34,511	1,310,555
	Service Expense	4,601	0	0	3,269,837	0	0	3,274,438
	Material & supply	256,521	0	0	0	0	0	256,521
	Capital Expenditure(B)	0	0	0	0	0	0	0
	Total	1,209,608	286,801	0	3,269,837	40,757	34,511	4,841,514
Nejapa	Current Expenditure(A)	223,913	6,789	0	0	0	31,250	261,952
	Personnel Expense	131,700	1,600	0	0	0	31,250	164,550
	Service Expense	22,566	5,189	0	0	0	0	27,755
	Material & supply	69,647	0	0	0	0	0	69,647
	Capital Expenditure(B)	0	0	0	0	0	0	0
	Total	223,913	6,789	0	0	0	31,250	261,952

Unit : colon

		Collection	Public cleansing	Intermediate treatment	Final Disposal	Workshop	Administration	Total
Tonacatepeque	Current Expenditure(A)	391,891	117,814	0	0	0	0	509,705
	Personnel Expense	314,173	117,814	0	0	0	0	431,987
	Service Expense	25,000	0	0	0	0	0	25,000
	Material & supply	52,718	0	0	0	0	0	52,718
	Capital Expenditure(B)	0	0	0	0	0	0	0
	Total	391,891	117,814	0	0	0	0	509,705

4.5.3.5 Unit Cost

Table 4-68 illustrates unit cost for SWM by respective municipalities based on the analysis above on annual expenditure. The result shows that the unit cost of SWM in AMSS ranges from US\$ 9.4 to 53.9/ton and the average unit cost in AMSS is calculated as US\$ 43.2/ton.

Table 4-68: Unit Cost of SWM

City	Item	Service projected population (1998)	Colones			US \$				
			Per person	Per ton		Per person	Per ton		Overall cost (US\$/ton)	
				Overall cost (c/person)	Collection and transport (c/ton)		Disposal (c/ton)	Overall cost (c/ton)		Overall cost (US\$/person)
San Salvador		467,006	154.7	87.7	147.7	443.4	17.7	10.0	16.9	50.7
Mejicanos		180,775	41.5	97.1	169.0	309.8	4.7	11.1	19.3	35.4
Delgado		145,189	25.2	100.1	202.1	346.6	2.9	11.4	23.1	39.6
Cuscatancingo		85,825	20.3	144.1	NA	193.6	2.3	16.5	NA	22.1
Ayutuxepeque		26,216	52.0	142.4	214.9	386.1	5.9	16.3	24.6	44.1
San Marcos		68,685	43.9	120.0	140.4	279.1	5.0	13.7	16.0	31.9
Nueva San Salvador		133,461	101.3	265.0	188.6	507.1	11.6	30.3	21.6	58.0
Antiguo Cuscatlan		40,515	176.5	337.5	25.3	494.1	20.2	38.6	2.9	56.5
Soyapango		282,066	51.5	96.2	192.1	335.7	5.9	11.0	22.0	38.4
Ilopango		122,309	39.7	132.5	180.2	327.2	4.5	15.1	20.6	37.4
San Martin		66,861	17.3	121.3	NA	138.1	2.0	13.9	NA	15.8
Apopa		155,588	31.1	76.4	206.2	305.8	3.6	8.7	23.6	35.0
Nejapa		14,464	18.1	135.5	NA	158.5	2.1	15.5	NA	18.1
Tonacatepeque		27,640	18.4	53.7	NA	69.8	2.1	6.1	NA	8.1
Total		1,816,600	75.1	128.0	NA	385.8	8.6	13.5	NA	44.1

NA: not available

Table 4-69 shows typical cost of municipal SWM in Latin American countries.⁸

⁸ Diagnosis of Municipal Solid Waste Management in Latin America and the Caribbean, Second edition, PAHO, 1998

Table 4-69: Typical Cost of Municipal SWM

Item	Portion (%)	Unit cost (US\$/ton)
Collection	43 to 45	15 to 40
Transfer	0 to 15	0 to 10
Final disposal	0 to 10	0 to 10
Total (without sweeping)	100	35 to 70

The unit cost in the AMSS that are estimated through the above analysis could be ranked in the middle value of typical municipal SWM cost in Latin American countries.

However, it is necessary to analyze and evaluate the unit cost in view of ability to pay by municipalities and citizens, in order to realize a sustainable municipal SWM.

Attentions should be paid that the 13 municipalities in AMSS (i.e., except for San Salvador municipality) did not bear the burden of capital expenditure for renewing the collection vehicles since the Japanese government donated such vehicles in 1996.

4.5.3.6 Balance of Municipal SWM

Table 4-70 shows the balance of Municipal SWM. Municipal revenue is fees collected from users and expenses comprise of cost on cleansing services activities by municipal cleansing departments, and landfill fee paid to MIDES and commission paid to electric power companies.

Table 4-70: Balance of Municipal SWM (1999)

Unit : 1,000 colon

	Revenue	Expense	Balance
San Salvador	96,839	72,241	24,598
Mejicanos	7,152	7,502	-350
Delgado	3,906	3,665	241
Cuscatancingo	2,100	1,742	358
Ayutuxtepeque	1,321	1,364	-43
San Marcos	2,394	3,018	-624
Nueva San Salvador	16,110	13,525	2,585
Antiguo Cuscatlan	3,191	7,149	-3,958
Soyapango	13,194	14,516	-1,322
Ilopango	5,357	4,861	496
San Martin	1,553	1,159	394
Apopa	3,981	4,842	-861
Nejapa	250	262	-12
Tonacatepeque	276	510	-234

The expense shown in the table above only refers to direct expenses of municipalities (i.e., indirect expenses are not added up), however, only 6 out of 14 municipalities have positive balance.

Municipalities that can not secure such revenue at present to at least cover the direct expenses should either

- re-structure the fee collection system, or
- cut down the expenses drastically,

in order to realize a sustainable municipal SWM.

4.6 Sanitary Education and Public participation

4.6.1 Sanitary Education System

A new attitude in solid waste management requires the use of formal, non-formal and informal education on the environment issues. Formal education is provided in the educational centers; the community or non-governmental organizations give non-formal education, and informal education is given through the mass media.

Concerning present education in El Salvador, hygiene and environmental education is given by a number of institutions, organizations and agencies. In formal education, starting from pre-school age, environmental subjects are introduced to children and youth. In higher education, programs directly or indirectly related to environment are offered in many universities. In non-formal education programs, several NGO's are carrying out lectures and training courses on environmental issues all over the country. School educational programs have included environmental and waste issues. Some schools have been carrying out clean-up activities and collection of paper and plastic for recycling. However, most of these activities are not sustainable.

There are diverse and extensive educational programs on environmental and hygienic issues. However, these information do not fully accommodate the necessities of the different target groups.

Society as a whole can barely grasp on the surface of the magnitude of the solid waste problems, as a result, participation from the population in SWM activities is limited and modest public awareness has been observed. However, it should be noted that citizen participation does not happen spontaneously. For participation beyond rhetoric, mechanism should be established, space should be created, and some basic input should be financed.

4.6.2 Public Participation System

a. Community Participation

Generally the role of the community was to deliver the wastes to the municipal collection system, and to protest against the poor level of services.

After the civil war, local initiatives of community participation have increased through different mechanisms, especially the open town councils, where the community presents their demands, including requests for better services. The environmental problem of wastes is still secondary among high profile problems due to the lack of the inhabitant's awareness. It is necessary, therefore, to strengthen environmental education with an emphasis on the appropriate SWM.

b. Programs of Community Environmental Education by Several Organizations

The project "*Recycling Hopes*" began in 1998 through a cooperation agreement between the Olof Palme Foundation and the Communal Project Association of El Salvador (PROCOMES). Initially the project supported eight scavenger girls and boys of Mariona dumpsite to collect paper, glass, and aluminum cans for commercial purposes, later focusing this effort on the formation of a micro-enterprise.

MINED and MARN through "*Recycling Plastics with Community Participation*" coordinates the collection of plastics with Industrias Cristal (private company) and San Salvador Municipality with the participation of twenty educational centers of the municipality of San Salvador.

The Project of Productive Management of Solid Waste with community participation in the municipalities of Tepecoyo, Jayaque, and Sacacoyo (*PROTEJAS*) has been an initiative with the participation of professors, students, community leaders, municipal authorities, health inspectors, and the community of the involved municipalities. The project includes promotion topics, technical assistance, training, organization, basic sanitation, micro-enterprises, and final waste disposal. Youths have been trained in the recycling of paper and aluminum through a complementary project for youth development. The activities include clean-up campaigns, education for separate collection, and construction of storing centers for later commercialization. Also, it was carried out a small experience for compost production.

CESTA has developed experiences in the management of the organic wastes of Poptlan market in the Municipality of Apopa. Also, it designs and produces bicycles from used products. A plan was carried out with the support of the Danish Association for International Cooperation in 1995 and in 1996 in the barrio La Cruz of the Municipality of Suchitoto in the Department of Cuscatlan. This plan served as a basis for the preparation of a master plan for SWM. The project involved 104 families in separate collection and composting production activities, with the participation of 68% of the objective population.

In the country there are some successful experiences of community participation organized by NGOs; this is supported by international organizations to reinforce their efforts and to increase awareness on SWM issues.

4.7 Relevant Studies

The table below shows studies related with SWM that were carried out in El Salvador in recent years.

Table 4-71: Relevant Studies

Date	Name of Study	Remarks
1992	Feasibility assessment for the implementation of a solid waste transfer station for the zone.	Ing. Jorge Sánchez, ISDEM
1992	Final consulting report on waste collection designing in the city of San Salvador	Ing. Francisco Gálvez Von Collas
1994	Current situation of solid wastes and guidelines proposal for the creation of policies and strategies to integrate the sector	Executive Secretariat of the Environment (SEMA), Ing. Juan Guillermo Umaña
1995	Project on Solid Waste Management Improvement of the Metropolitan Region, Phase-1: Diagnosis	Canada International Development Agency (CIDA), San Salvador municipality ADS Groupe-Conseil Inc., Doble G
1995	Project on Solid Waste Management Improvement of the Metropolitan Region, Phase-2: Execution program	CIDA, San Salvador municipality ADS Groupe-Conseil Inc., Doble G
1996-97	Metropolitan plans for the cities of Santa Ana, Sonsonate, San Miguel and San Salvador Metropolitan Area	
1997	Support to the Environmental Sanitation Program of El Salvador, Environmental Policy for Solid Waste Management	Executive Secretariat of the Environment (SEMA) SM Group International Inc.
1997-1999	Design and feasibility study of the Decontamination of critical areas, El Salvador (ES-0074). <ul style="list-style-type: none"> • Diagnosis– Current situation of Municipal Solid Waste • Report of alternatives– Municipal Solid Waste Management • Diagnosis– Current situation of Hazardous Medical Waste • Report of alternatives– Hazardous Medical Waste Management • etc. 	BID, ARCADIS-EuroConsult, Eurolatina
1998	Preliminary mission in the Solid Waste Management field	BID/San Salvador municipality Sandra Cointreau Levine
August 1998	Sector Analysis of Solid Wastes in El Salvador	MSPAS, PAHO
1998	Solid waste pollution in San Salvador Metropolitan Area. Work paper	MARN, USAID, PRISMA, Gilberto García
September 1998	“Regional Medical Solid Waste Management Program, Assessment study of possible alternatives in Medical Solid Waste treatment, in terms of typology and location, and Environmental Impact Assessment of the recommendable solution”	ALA 91/33 agreement, ECO Ingenieros

a. Findings

Many of the above relevant studies on SWM deal with the San Salvador metropolitan area. A few studies such as “BID ES-0074” are extended for cities other than AMSS.

The above SWM studies entail municipal SWM as well as medical SWM. An in-depth study on industrial SWM has not been carried out for the country to date. Hence, it is expected that such an industrial SWM study be carried out in the future.