

Annex C

Public Opinion Survey

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C Public Opinion Survey

Public Opinion Survey (POS) on municipal SWM in the Study Area was conducted in January and February, 2000.

C.1 Objectives

The survey aimed to determine:

- present waste discharge conditions and manners,
- opinion of the residents and institutions regarding solid waste management services, and
- their needs and demands to the services.

C.2 Number of Samples

420 households and 52 institutions (including both private companies and public institutions) were chosen from all over the Study Area as samples.

a. Households

a.1 Sample Size

The number of samples required to make them represent the current population of 1,948,794 at more than 95% probability is 384. In order to diminish sample errors, 420 households were finally sampled.

a.2 Selection of Samples

In order to distribute samples in the Study Area, maps made by DIGESTYC were used. The maps have 888 segments and each segment comprises of about 300 households. It should be noted that such segments do not consider rural areas and only urban areas are covered. Then the samples were randomly chosen from the segments in order to represent present situations and opinions of households in the Study Area. Table C-1 shows the sample distribution of households.

Table C-1: Distribution of Samples (Household)

Municipality	Sample	
	Nos.	(%)
San Salvador	139	33.1
Mejicanos	43	10.2
Ciudad Delgado	20	4.8
Cuscatancingo	10	2.4
San Marcos	22	5.2
Nueva San Salvador	42	10.0
Antiguo Cuscatlán	12	2.9
Soyapango	70	16.7
Ilopango	21	5.0
San Martín	11	2.6
Apopa	30	7.1
Total	420	100.0

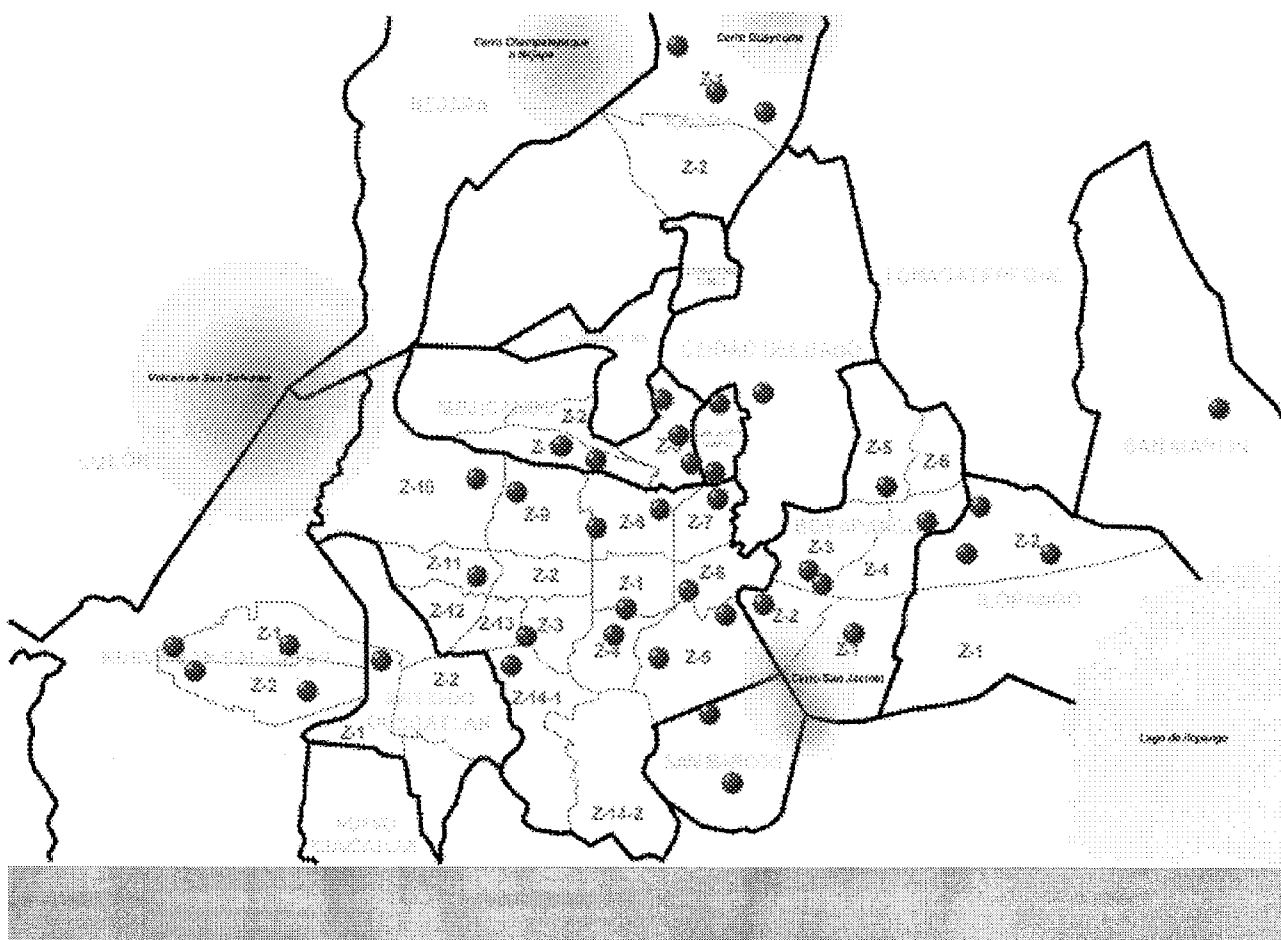


Figure C-1: Distribution of Samples in the Study Area

b. Institutions

52 institutions (including both private companies and public institutions) were sampled by using the DIGESTYC maps in the same way as the households in order that those samples represent the current situations and opinions on SWM of institutions in the Study Area. The sample design also took into account the public sector as well as the private sector.

Table C-2: Distribution of Samples (Institutions) (1)

Municipality	Sample	
	Nos.	%
San Salvador	34	65.4
Mejicanos	3	5.8
Nueva San Salvador	4	7.7
Antiguo Cuscatlán	1	1.9
Soyapango	4	7.7
Ilopango	2	3.8
San Martín	1	1.9
Apopa	3	5.8
Total	52	100.0

Table C-3: Distribution of Samples (Institutions) (2)

Type of Institutions	Sample	
	Nos.	%
Government office	6	11.6
School	2	3.8
Market	3	5.8
Shop	26	50.0
Restaurant	9	17.3
Manufacture	2	3.8
Other	4	7.7
Total	52	100.0

C.3 Formulation of Questionnaire

The Study Team prepared the original questionnaire. Through discussion and consultation with the counterparts and a local contractor which conducted this field survey, the draft questionnaire was modified and finalized to meet the actual conditions of the Study Area.

a. Households

The questionnaire for households consisted of 9 categories (62 questions):

- 1) General questions; gender, frequency of exposure to the mass media, number of residents, income and expenditure, etc.
- 2) Present situation of public services; access to public services (water supply, sewerage, electricity, etc.), demand for improvement of the services
- 3) Discharge of waste; discharge manner, type of container used, animal scavenging, etc.
- 4) Waste collection services; satisfaction with the service, reasons of dissatisfaction, frequency of the service, etc.
- 5) Recycling and waste reduction; willingness to cooperate with separate collection, necessity of recycling in the Study Area, present situation of recycling, etc.
- 6) Financial matters; amount of collection fee, satisfaction/dissatisfaction with the collection fee, etc.
- 7) Collection fee charging system; tariff (based on electricity/water consumption), billing system (with electricity, water supply, etc.), etc.
- 8) Public cooperation and education; knowledge about waste treatment, willingness to cooperate with a campaign on sanitation/environment improvement, etc.
- 9) Problem about SWM; prioritization of problems about SWM

b. Institutions

The questionnaire for private companies and public institutions consisted of 6 categories (39 questions):

- 1) General questions; type of business, number of employees, type of waste generated, etc.,
- 2) Waste storage, discharge, collection and disposal; manner of storage and discharge, frequency of the collection service, direct haulage, etc.
- 3) Recycling and waste reduction; current situation of recycling, type of waste recycled, etc.
- 4) Financial matters; amount of collection fee, satisfaction/dissatisfaction with the collection fee, etc.
- 5) Public cooperation and education; willingness to cooperate with a campaign on sanitation/environment improvement, etc.
- 6) Problem about SWM; prioritization of problems about SWM

C.4 Results of the Survey

The results are presented in the Data Book. The results are composed of two parts. Part 2 shows the results per socio-economic stratification (upper, medium high, medium low, working class and marginal areas) as well as municipality of the Study Area. Part 1 is without these additional information.

C.5 Findings

(1) Households

Basic data of interviewees' background is outlined in e. below.

a. Waste Collection Service

a.1 Collection Coverage

97.6% (410/420) of interviewees are receiving waste collection service. Interviewees (2.4%, 10/420) who are not receiving collection service live in marginal areas in Nueva San Salvador and Soyapango. Within marginal areas, 11.6% of interviewees do not receive collection service.

a.2 Collection Frequency

72.5% (297/410) of interviewees receive waste collection service three times a week or more. 21.0% (86/410) receive it twice a week and 4.9% (20/410) receives it once a week. Therefore, it is observed that 93.5% receive waste collection service more than twice a week in AMSS (excluding rural areas). The result revealed that frequency of collection service becomes higher as income level increases. While municipalities with high frequency of waste collection service (three times a week or more) are Antiguo Cuscatlán, San Martín, Cuscatancingo and Nueva San Salvador, those with low frequency are San Marcos, Apopa and Mejicanos. A further question is asked regarding whether or not waste is collected at fixed time. 64.1% (263/410) responded that their waste is collected at fixed time, whereas 35.4% (145/410) explained that their collection schedule was irregular. Although more detailed examination is given in a.7, it can be concluded that the more frequent the collection service is and the more punctual collection time is, the higher satisfaction level from residents for waste collection service can be attained.

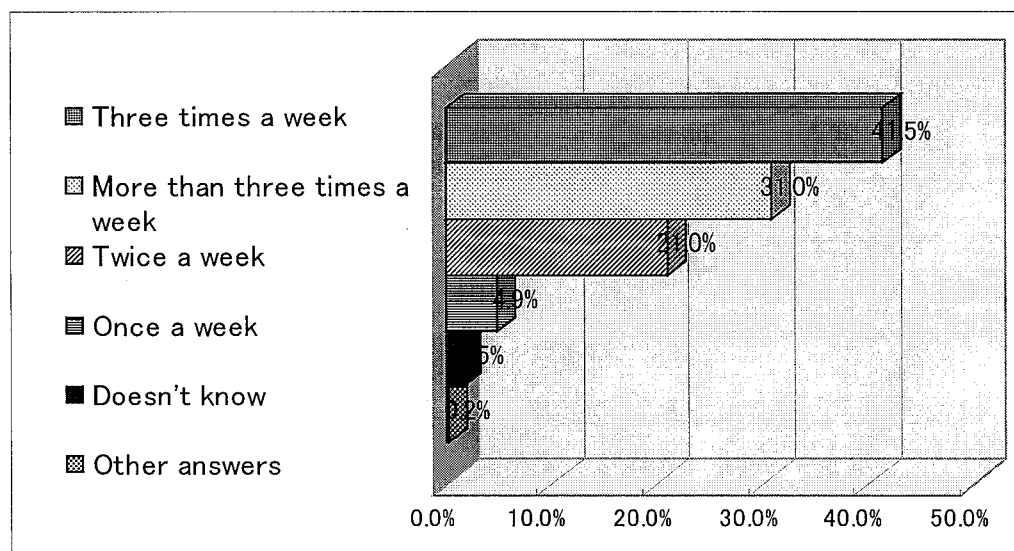


Figure C-2: Waste Collection Frequency

a.3 Waste Discharge Manners

The result shows that almost half of interviewees (48.0%, 197/410) put their waste in front of their houses to be collected. One third of interviewees (32.7%, 134/410) take the waste to a container while 18.0% (74/410) takes the waste directly to the collection truck. In working class residential areas and marginal areas, almost half of the respondents (42.1-46.1%) take the waste to a container while majority (66.7-67.0%) put their waste in front of their houses in middle income areas. In high income areas, as high as 95.7% put their waste in front of their houses. As the income level increases, the ratio of household which put waste in front of the houses increases.

According to the result of POS, problems regarding animal scavenging have a correlation with resident's waste discharge manners rather than type of containers used. The results show that 50% suffer from animal scavenging either frequently (35%) or sometimes (15%). No significant difference in suffering from animal scavenging was observed between plastic bag users (35.6%) and plastic/metal container users (33.3%), however, it is revealed that discharge manners make differences. Residents who 'leave waste in front of house (42.1%)' suffer the most compared with the residents who 'take waste to a collection point (27.6%)' or 'hand it directly to collection service (32.4%)'. Raising public awareness towards proper waste discharge manners shall definitely contribute to keep the cities clean by reducing animal scavenging.

a.4 Waste Collectors

92.4% (379/410) of those who had waste collection service are receiving waste collection service from Municipalities and only 6.1% (25/410) are receiving private collectors' service. 1.2% (5/410) replied that they use collection service of municipality as well as private collectors. It is worth mentioning that private collectors provide collection service in middle low (7.5%), working class (11.8%), and marginal areas (1.3%) and no service is provided in high and middle high income areas by them. The accessibility of the collection vehicles can be considered to be one of the reasons. Low income areas need to depend on the private collectors'

service as some of them live in the areas where municipal waste collection vehicles can not enter.

a.5 Waste Containers

89.0% (374/484) of interviewees use plastic bags as the containers to discharge waste, followed by metal/plastic/wood container users of 20.7% (87/484). The result showed that the higher the socio-economic strata is, the more plastic bags are commonly used (100% for high income area residents, 88.9-92.5% for middle income area residents, 90.4% for working class area residents, and 79.1% for marginal area residents). The reasons for using the type of containers interviewees are currently using are diverse. Easy handling was the most supported reason (47.5%) followed by cleanliness after waste being collected (24.0%) and keeping away animals and flies (12.5%).

a.6 Garden Waste

Two out of five households (41.7%, 175/420) interviewed generate garden waste. This percentage is higher with high income and middle income households compared with working class and marginal area households. The most common way of discharging garden waste is disposing them together with the other waste (73.1%). Only 14.3% interviewed bury or burn it while 5.1% use it for composting.

Garden waste is scarcely utilized in AMSS.

a.7 Satisfaction Level for the Waste Collection Service

75.9% (311/410) expressed that they are satisfied with the current collection service. 100% of the residents interviewed who are living in Antiguo Cuscatlán and Cuscatancingo replied that they are satisfied with the current collection service. Satisfaction level of interviewees living in Mejicanos and Apopa was the lowest at 47.7% and 50.0% respectively.

The reasons for dissatisfaction were further asked. 61.6% (61/99) mentioned that 'frequency of waste collection is too low' and 'frequency of collection is irregular' (18.2%, 18/99) followed. 'Collection time is not appropriate' (4.0%) was also pointed out. 'Collection workers don't collect waste' (8.1%), 'collection fee is expensive' (1.0%) and 'collection point is too far' (3.9%) are also given as the reasons.

Results reveals that level of satisfaction with the collection service has direct and close correlations with frequency of collection or punctuality of collection time since 83.8% of interviewees expressed their dissatisfaction with collection service attributing to these factors.

a.8 Responsibility for the Municipal SWM

Majority of the interviewees (76.7%, 322/420) consider local municipality is the principal entity responsible for the municipal SWM in the municipality. Some view COAMSS (8.3%) or Central Government (7.6%) are responsible for it.

Satisfaction level of SWM of local municipality is high at 74.5% (313/420). 42.6% responded that they are 'very satisfied' with it, followed by 31.9% of 'somehow satisfied'. Generally speaking, in the municipalities where collection service is frequently provided, there is a tendency that satisfaction level for municipalities'

SWM is high as can be observed in the examples of Antigua Cuscatlán and Cuscatancingo.

b. Recycling

b.1 Recyclable/Reusable Materials

The results revealed that recycling activities are not common practice in AMSS yet. Only one every five households (20.7%, 87/420) interviewed replied that someone comes to their houses to collect or buy recyclable/reusable materials. Most frequently collected or sold materials are papers (80.5%) and bottles (66.7%), followed by aluminum cans (18.4%), glass (13.8%), and plastics (8.0%). The materials which are collected or sold less are cardboard (2.3%), metals (2.3%), steel cans (1.1%), textiles or clothes (1.1%). Food waste, garden waste, leather, wood and tires are not collected or sold.

Table C-4: Recyclable/Reusable Materials Being Collected or Sold

Unit: %

Items	Answer	
	No	Yes
Bottles	33.3	66.7
Glass	86.2	13.8
Cardboard	97.7	2.3
Paper	19.5	80.5
Aluminum cans	81.6	18.4
Steel cans	98.9	1.1
Metal	97.7	2.3
Food waste	100.0	0.0
Garden waste	100.0	0.0
Plastics	92.0	8.0
Textiles or clothes	98.9	1.1
Leather	100.0	0.0
Wood	100.0	0.0
Tires	100.0	0.0
Others	98.9	1.1

Furthermore, those interviewed were asked whether they sell those recyclable/reusable materials to the specific collection centers. Only 3.6% (15/420) responded positively and the type of materials sold are shown in Table C-5. Only paper (73.3%), bottles (40.4%), and aluminum cans (20.0%) are sold. People appear to prefer that someone come to their houses to buy recyclable/reusable materials than taking them to collection centers, which requires more physical efforts. Considering 88.8% (373/420) of interviewees perceive recycling is necessary in AMSS and 94.5% (397/420) are willing to cooperate with donating recyclable/reusable materials for promoting beneficial activities for communities, there is a great potential for microenterprises in promoting recycling in AMSS.

Table C-5: Recyclable Materials Sold to the Collection Centers

Items	Answer	
	No	Yes
Bottles	60.0	40.0
Glass	100.0	0.0
Cardboard	100.0	0.0
Paper	26.7	73.3
Aluminum cans	80.0	20.0
Steel cans	100.0	0.0
Metal	100.0	0.0
Food waste	100.0	0.0
Garden waste	100.0	0.0
Plastics	100.0	0.0
Textiles or clothes	100.0	0.0
Leather	100.0	0.0
Wood	100.0	0.0
Tires	100.0	0.0
Others	100.0	0.0

b.2 Composting

Only 13.1% (55/420) of interviewees use food waste or garden waste for composting. The higher the socio-economic strata is, the higher the percentage of persons who are using those waste for composting. This might imply that in high income areas, residents own a garden which can be partially used for composting and, generally speaking, their awareness for promoting composting/recycling seems to be higher than low income areas. 61.0% stated that they throw away waste without recycling or composting, 4.5% burn them and 3.1% bury them. It can be concluded that composting is not common practice nor high market demand in AMSS yet.

b.3 Public Awareness towards Necessity of Separate Collection/Recycling

Willingness to cooperate with the separate collection (into three categories such as biodegradable, recyclable waste and others) was asked when the municipalities introduce the system. As shown in

Figure C-3, 84.0% (353/420) responded that they are willing to cooperate with it. The municipalities which receive support from residents the most are Mejicanos (93.2%), Antigua Cuscatlán (91.7%), and Nueva San Salvador (90.5%).

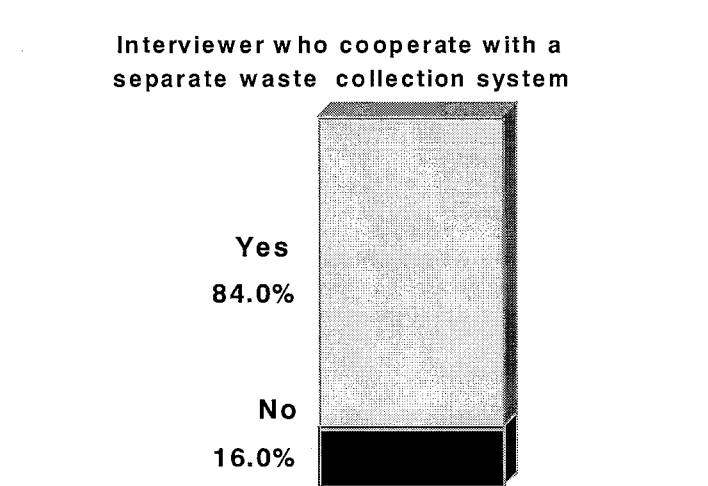


Figure C-3: Willingness to Cooperate with Waste Separate Collection

On the other hand, municipalities with lesser support from the residents are San Martín (72.7%), Apopa (76.7%), and Cuscatancingo (80.0%).

It can be also pointed out that as the socio-economic scale increases, the residents are more cooperative in waste separation. In high income areas, 91.3% of interviewees showed their willingness whereas only 79.1% showed interest in it in marginal areas.

Table C-6 shows the present condition of separate collection and residents' willingness to cooperate with separate collection in AMSS. The result is also shown in a line graph of Figure C-4. It illustrates that where willingness to cooperate is high, recyclable and reusable materials are collected more. When the trend of these curbs are examined in relation to average income per person, it can be said that as the income level gets higher, willingness to cooperate with separate collection gets higher and recyclable and reusable materials are collected more.

Table C-6: Present Situation of Separate Collection in AMSS

Municipality	Present Condition of separate collection		Willingness to cooperate (%)	Average Income (colon/person/year)
	Recyclable/reusable materials being collected (%)	Sell recyclable materials (%)		
Nueva San Salvador	21.4	4.8	90.5	10,006.6
Antiguo Cuscatlán	33.3	0.0	91.7	10,700.9
San Salvador	28.8	6.5	82.0	9,787.5
Mejicanos	15.9	2.3	93.2	8,629.7
Soyapango	15.7	2.9	82.9	7,191.8
Ilopango	20.0	0.0	85.0	6,668.0
Apopa	10.0	3.3	76.7	5,603.4
San Marcos	18.2	0.0	81.8	7,518.3
Cuscatancingo	10.0	0.0	80.0	4,500.9
San Martín	0.0	0.0	72.7	8,846.6
Ciudad Delgado	20.0	0.0	85.0	8,715.4
Total	20.7 (87/420 persons)	3.6 (15/420 persons)	84.0 (353/420 persons)	Average: 8,015.4

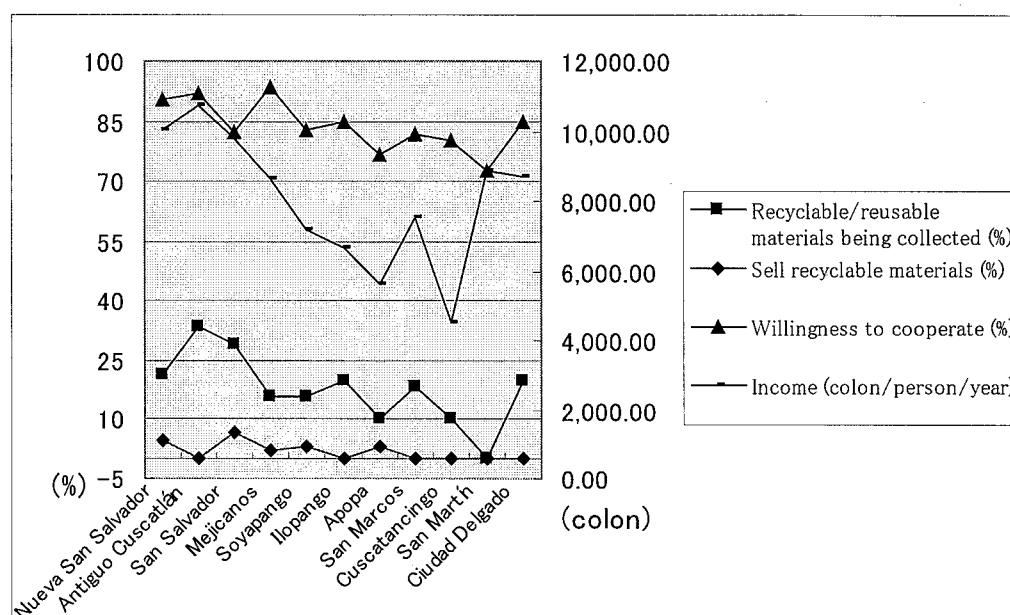


Figure C-4: Present Situation of Separate Collection in AMSS

Reasons for not cooperating with waste separate collection was then asked. 50.7% (34/67) mentioned that 'it requires too much effort for the separation', 29.9% (20/67) stated that 'more containers are necessary', 13.4% (9/67) stated the 'inconvenience' and 6.0% (4/67) pointed out that 'a separate collection system increases the cost for waste collection'.

However, as was stated in b.1 above, since 88.8% of respondents consider that recycling is necessary for the AMSS, cooperation can be gained if residents are persuaded of the importance through public education.

In order to determine the attitude of people towards environmentally friendly goods, the question whether or not they buy such kind of goods was asked. The results are shown in Table C-7. 34.2% of those interviewed showed interests in buying them. 24.2% (12.1% each) stated that they will buy if they are cheaper or the same price with the ones currently being sold, however, 10.0% replied that they will buy even the prices go up. 34.3% responded that they will not buy it while 31.4% did not answer or did not know. It can be said that people do not have fixed opinions about environmentally friendly goods yet so that there will be a high potential that peoples' consciousness can be raised if the merits of those goods to the environment are informed to them through formal, non-formal or informal environmental education. It can be also pointed out that market principle applies to the recycling activities so that unless the products are cheaper or same prices as they are now, they are not saleable.

Table C-7: Purchase of Environmentally Friendly Goods

	Answer				
	Doesn't buy	Yes, if it is cheaper than one currently sold	Yes, if it is the same price as the one currently sold	Yes, even if it is more expensive than the currently sold	Doesn't know, doesn't answer
%	34.3	12.1	12.1	10.0	31.4
No.	144	51	51	42	132

c. Financial Matters

c.1 Waste Collection fee Payment

The average monthly fee payment resulted in 47.58 colons/month in AMSS as shown in Table C-8.

85.9% of interviewees stated that they paid waste collection fee and 14.1% did not. The municipalities where greater proportion of those interviewed do not pay collection fee are Antiguo Cuscatlán (58.3%) and Cuscatancingo (30%). On the contrary, payment rate in San Martín, San Marcos and Apopa resulted in high at 100%, 100%, and 96.7% respectively. However, these figures need to be interpreted very carefully as, in some municipalities, waste collection fee is collected jointly with electricity bill so that waste fee collection rate gets higher.

Table C-8: Average Monthly Fee Payment for Waste Collection Service

Municipality	Payment	
San Salvador	¢76.19	US\$ 8.74
Soyapango	¢23.85	US\$ 2.74
Mejicanos	¢30.54	US\$ 3.50
Nueva San Salvador	¢20.82	US\$ 2.38
Apopa	¢23.79	US\$ 2.73
San Marcos	¢105.33	US\$ 12.08
Ilopango	¢13.94	US\$ 1.60
Ciudad Delgado	¢21.10	US\$ 2.42
Antiguo Cuscatlán	No data	No data
San Martín	¢35.17	US\$ 4.03
Cuscatancingo	¢25.00	US\$ 2.87
Average monthly fee	¢47.58	US\$ 5.46

Average monthly fee payment for waste collection service by socio-economic strata is shown in Table C-9. Supposing that the strata is categorized into four, 'upper', 'middle', 'working class', and 'marginal', the fee almost doubles regularly as the strata increases.

Table C-9: Average Monthly Fee Payment for Waste Collection Service per Socio-economic Strata

Strata	Payment	
Upper	¢155.44	US\$ 17.83
Medium high	¢76.75	US\$ 8.80
Medium low	¢72.59	US\$ 8.32
Working class	¢35.73	US\$ 4.10
Marginal	¢18.02	US\$ 2.07

36.9% of interviewees consider that the fee they pay is appropriate rate, while 34.4% expressed that it is too expensive. Only 5.8% consider that it is cheap. In high and middle income strata, more people consider rate to be 'appropriate (38.1-44.0%)', than 'expensive (23.8-33.0%)', however, in the working class and marginal areas,

more people consider the rate to be 'expensive (35.2-39.7%)' than 'appropriate (34.0-34.5%)'.

c.2 Willingness to Pay (WTP)

The result of willingness to pay (WTP) of interviewees for waste collection service is shown in Table C-10. One third (35.7%, 150/420) views 10 to 20 colons (US\$1.15 to 2.29)/month to be reasonable while 23.6% (99/420) stated less than 10 colons/month would be fair. 28.8% (121/420) consider it is fair to pay more than 20 colons/month. 5.2% (22/420) of those interviewed replied that they can not pay.

Table C-10: Willingness to Pay for Waste Collection Service

	Amount (per month)							
	Can not pay	Less than 10 colons	10 to 20 colons	20 to 30 colons	30 to 40 colons	40 to 50 colons	More than 50 colons	Does not know
%	5.2	23.6	35.7	15.5	4.5	5.0	3.8	6.7
No.	22	99	150	65	19	21	16	28
Municipality								
Nueva San Salvador	16.7	23.8	26.2	11.9	0.0	4.8	0.0	16.7
Antiguo Cuscatlán	0.0	0.0	41.7	41.7	8.3	8.3	0.0	0.0
San Salvador	4.3	17.3	29.5	16.5	6.5	9.4	7.2	9.4
Mejicanos	4.5	22.7	34.1	13.6	6.8	6.8	2.3	9.1
Soyapango	2.9	32.9	47.1	14.3	1.4	0.0	1.4	0.0
Ilopango	5.0	40.0	30.0	15.0	5.0	0.0	0.0	5.0
Apopa	0.0	36.7	43.3	6.7	3.3	0.0	6.7	3.3
San Marcos	0.0	9.1	50.0	27.3	0.0	4.5	0.0	9.1
Cuscatancingo	30.0	10.0	30.0	20.0	10.0	0.0	0.0	0.0
San Martín	0.0	18.2	54.5	9.1	18.2	0.0	0.0	0.0
Ciudad Delgado	5.0	40.0	30.0	10.0	0.0	5.0	10.0	0.0

Based on these data, average amount of WTP for Municipal SWM fees is calculated to be 44.2 colons/person/year as shown in the Table below. Since the current average amount of waste fee paid by residents is 75.8 colons/person/year according to POS, the residents are paying SWM fees far beyond the amount they are willing to pay. Therefore, it could be concluded that in case SWM fee was to be increased, well thought out plans need to be considered.

Table C-11: Current Municipal SWM Fees and Willingness to Pay

Municipality	Current Municipal SWM fee paid by resident (colon/person/year)	Willingness to pay (colon/person/year)
San Salvador	89.6	50.7
Mejicanos	87.9	47.7
Delgado	78.0	35.7
Cuscatancingo	76.5	40.5
Ayutuxtepeque	-	-
San Marcos	98.3	48.3
Nueva San Salvador	51.0	33.5
Antiguo Cuscatlan	-	65.0

Municipality	Current Municipal SWM fee paid by resident (colon/person/year)	Willingness to pay (colon/person/year)
Soyapango	80.2	38.0
Ilopango	33.9	33.3
San Martin	98.6	57.7
Apopa	64.3	35.4
Nejapa	-	-
Tonacatepeque	-	-
Average	75.8	44.2

c.3 Preference for the Waste Collection Fee Charging System

Those interviewed were further asked the basis on which they prefer the waste collection fee should be charged.

Table C-12 and Figure C-5 illustrate that charging collection fee based on the amount of waste discharged is preferred among five alternatives with 53.5% supporters. The second preference is given to 'land area of property' but only 20.5% are supporting it. High and middle income strata prefer to be charged based on the amount of waste discharged at 65.2% and 52.0-59.3% respectively. It is important to note that 93.1% of interviewees oppose being charged based on the electricity they consumed. As this charging method is currently used in some municipalities, they appear to have complaints against current fee charging system.

Table C-12: The Basis on which Waste Collection Fee is Charged

Basis	No		Yes	
	No.	%	No.	%
Land area of property	321	79.5	83	20.5
Income	337	83.4	67	16.6
Water supply consumed	373	92.3	31	7.7
Electricity consumed	376	93.1	28	6.9
Discharged amount of waste	188	46.5	216	53.5

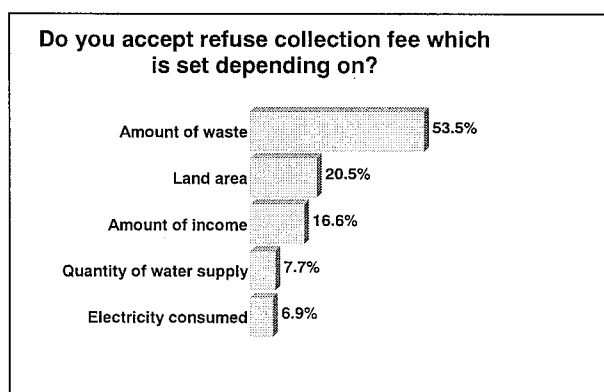


Figure C-5: The Basis on which Waste Collection Fee is Charged

The most preferred billing method is separate or independent direct billing at 46.4%. 23.8% prefer together with electricity bill, 19.0% as a part of municipal tax, and 6.0% with water bill.

With regard to the frequency of billing, 81.3% of interviewees responded monthly payment is preferable as is collected now, followed by 9.8% for every three months, 1.9% for every six months and 7.0% for once a year.

d. Public Cooperation

d.1 Education

The result revealed that only 13.6% (57/420) of interviewees have been taught the methods on appropriate handling of waste while 86.4% (363/420) have never been taught them. School was the principal institution providing waste education at 36.8%, followed by Health Clinic (12.3%), municipality (10.5%), NGOs (8.8%), family (8.8%), news media (7.0%), and central government (1.8%). Taking into account the result that all the interviewees agreed the importance of teaching environmental conservation at school, school is considered to be an effective place to teach proper handling of waste.

d.2 Campaign

99.5% consider that campaign for maintaining the city and environment clean is necessary and 91.6% are willing to participate in it. Responsible entity to promote the campaign is considered to be municipality (39.5%). Central government (21.3%), community (15.1%), and family members (4.5%) follow it.

The result showed that the higher the level of exposure to the news media, the more positive the attitude is in participating in the campaign. It can be considered that TV programs and newspapers regarding environmental conservation is contributing to raising awareness on environmental issues of the people.

d.3 Cleaning Practices

71.0% (298/420) of interviewees clean road shoulder or adjacent public areas in front of their houses almost everyday and furthermore 25.2% (106/420) responded that they sometimes clean those areas. As was examined in d.2, with 91.6% of people who are willing to participate in the campaign, clean-up operation type of campaign is not unfamiliar practice for the residents and would be effective in AMSS.

d.4 Problems Related with SWM

Interviewees pointed out three principal problems in SWM in AMSS. 'Increase of rats' ranked top at 29.0%, followed by 'smoke caused by burning waste in the areas nearby (19.5%)', and 'strong odors (14.5%)'. 'Unreliable waste collection ranked forth (11.7%)'.

e. Basic Data of Interviewees' Background

e.1 Gender Ratio of Interviewees

The gender ratio of the interviewees are 303 females and 117 males accounting for 72.1% and 27.9% respectively. In each case, the persons with more than 18 years old were chosen as the interviewees.

e.2 Exposure to the Mass Media (Radio, Newspapers, TV)

The mass media are considered to play important roles in forming opinions of the public in recent years. In this regard, the perceptions people have regarding reducing, recycling and SWM are also considered to be influenced by the mass

media. TV is most utilized form of access to the mass media in AMSS, followed by radio and newspapers. Results show that more than three out of four people (77.1%) watch TV everyday, while 38.1% listen to the radio for obtaining information and 35.5% read newspaper every day. In order to facilitate the analysis of the results, three ranges of exposure were set up to media exposure, namely, high, middle, low for each questions. In this way, it is possible to check how media exposure influences the opinions of the public.

e.3 Number of Persons Living in the House

Average number of persons living in the house are 4.83 per household. 26.4 % replied that 4 persons live in their houses, while 26.1% responded 5 persons live in their houses. 6 or more persons live in 27.3 % of households interviewed. When comparing the number of the residents in the house and socio-economic strata, high income (52.2%) and marginal areas (30.6%) have largest number of residents in their households. In case of high income areas, maids are included while in marginal areas, the size of the family are big without including maids.

e.4 Category of House

Two out of every five persons (40.5%) interviewed live in independent houses while 35.5% live in housing project houses. 18.3% live in marginal communities while the rest (5.2%) are divided into blocks of apartment complexes or meson. Socio-economic strata presents differences for the type of the houses. High income level owns independent houses while middle income levels spread into independent houses and housing project houses. Working class level is also divided into independent house, housing project houses and apartment complexes. Marginal strata are either living in slums or marginal communities.

e.5 Size of Garden

54.3% have less than 10m² garden while 4.5% have more than 10m² garden. The remaining 39.5% do not have garden and 1.7% do not know or do not answer.

e.6 Monthly Family Income

58.3% replied that they earn 3,000 colons or less and majority of the people in this range are working class or marginal community residents. Middle income level receives between 3,001-10,000 colons accounting for 29.6%. 3.1% of middle to high income level receive 10,001-15,000 colons. 12.9% earn less than 1,000 colons while 2.1% earn more than 15,000 colons.

e.7 Monthly Family Expense

More than one third replied that their expenses ranges 1,001 to 2,000 colons followed by 18.6% of 2,001 to 3,000 colons. 22.8% spend 3,001 to 6,000 colons. Only 7.1% exceeds the expenses over 6,001 colons especially in middle to high income areas. 5.5% did not answer the questions.

e.8 Number of Years of Living in the Municipality

39.5% stated that they lived in the same municipality for 20 years or more while 24.0% lived between 13-19 years. 29% live between 4 and 12 years and only 7.4% live in the municipality for less than 4 years.

e.9 Change of the Residence

33.6% stated that they have moved at least once since they moved to AMSS. High, middle-high and marginal area residents have a tendency towards internal move, accounting for 52.2%, 48.1%, 47.7% respectively.

e.10 Present Situation of Public Services (Water Supply, Toilet Facility, Electricity, Access of Collection Truck, and Type of Pavement Road)

93.8% have water supply in their houses. In marginal areas, working class residential areas, and middle low income areas, water service is not completely provided at 79.1%, 96.1% and 99.1% respectively while in high and middle high income areas, water is supplied 100%.

In high and middle-high income areas, 100% of the households have flush toilets connected to sewage pipes. In the middle low income and working class areas, this drops to 93.4% and 94.9% respectively, and in the marginal area the figure is down to 74.4%.

99.5% (418/420) receive electricity. One in marginal area and one in middle low income household do not have electricity in their houses.

Only 68.6% have access roads for the waste collection vehicles. In high income areas, 100% of the roads have gravel/cement/brick, asphalt, or cobblestone paving, but all residential buildings have access roads. In the middle income areas, 90.6-96.3% have access roads and 90% of roads are gravel/cement/brick or asphalt roads. In working class areas, 62.4% have access roads and 60% are gravel/cement/brick roads. In marginal areas, only 37.2% have access roads and 61.6% of them are made from gravel/cement/brick.

e.11 Priorities for Improving Daily Life

In order to determine what kind of problems people desire to improve in their daily lives, nine alternatives were given and interviewees put priorities among them. The results of first through third mentioned problems are shown in figures below. The alternatives were, namely, waste collection, water supply, storm water drainage, wastewater collection, access road to the house, electricity supply, sewer pipe network, others and no problem.

The first mentioned priority was waste collection service at 27.4%. 26.0% replied that drinking water supply is the major problem that the urgent solution needs to be thought out. Storm water drainage followed accounting for 14.3%.

As for the second priority, waste collection also ranked top accounting for 14.3% and wastewater collection came next accounting for 11.9%. Water supply placed third with 11.7% supporters.

Although almost half (47.9%) replied that there is no problem that they can mention anymore for the third mentioned problem, 10.0% pointed out storm water drainage is a problem followed by waste collection at 8.3%. It can be concluded that 'waste collection' is the biggest problem people desire to improve in AMSS followed by 'water supply' and 'stormwater drainage'.

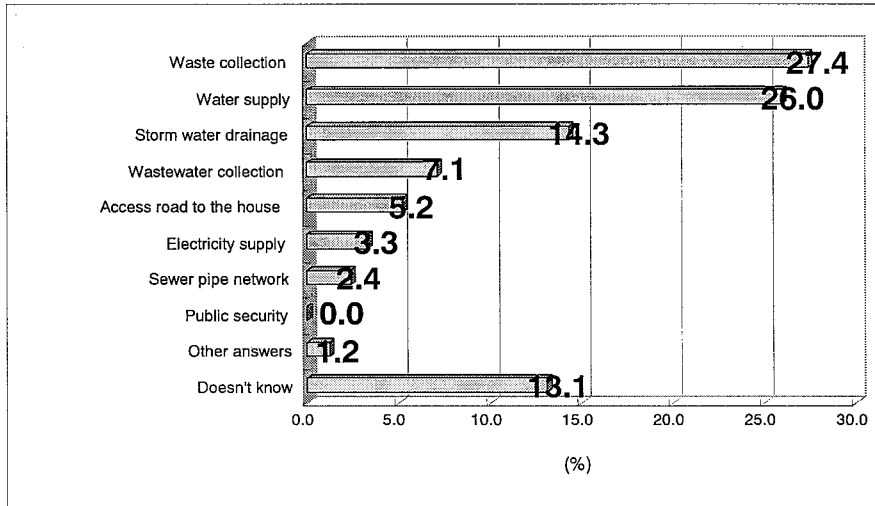


Figure C-6: Priorities for Improving Daily Life (First Priority)

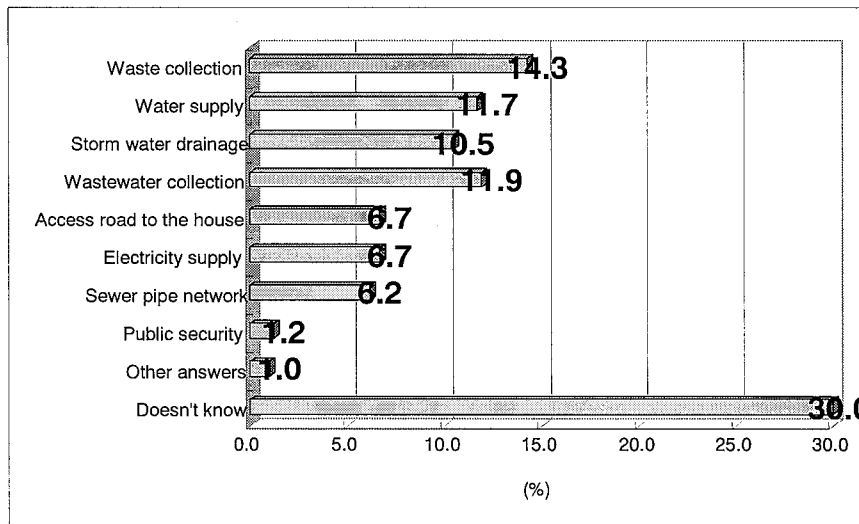


Figure C-7: Priorities for Improving Daily Life (Second Priority)

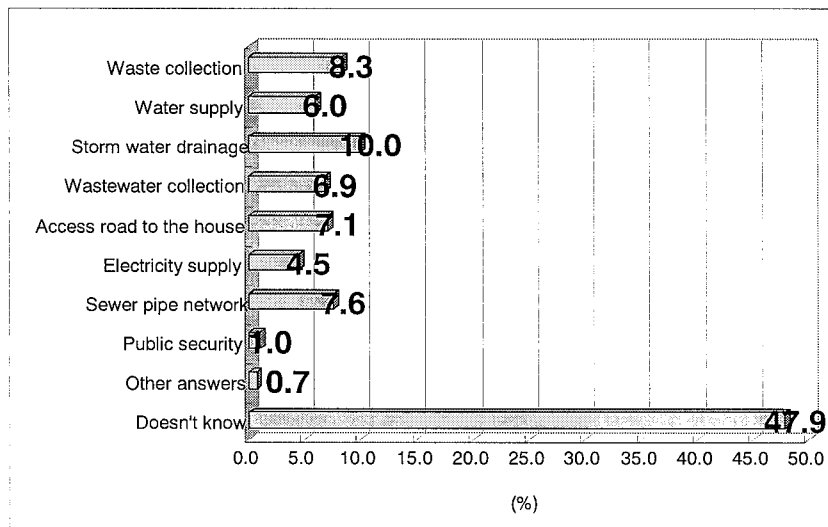


Figure C-8: Priorities for Improving Daily Life (Third Priority)

(2) Institutions (private companies and public institutions)

Basic data of institutions is outlined in below.

a. Waste Generation

a.1 Type of Waste Generated

Type of waste generated in the institutions are shown in Table C-13 (plural answers were given). Papers are most commonly generated waste from the institutions, especially from shops/stores, and educational centers/offices. Cardboard ranked second with 28 institutions with shops/stores being the major generation source. Generation of plastics and food waste were also large with 24 and 21 institutions respectively.

Table C-13: Type of Waste Generated by Institutions

Type of waste	Institution					Total
	Educational centers and Offices	Shops/stores	Marketplaces and slaughter house	Factories	Restaurants and hotels	
Paper	9	23	2	1	4	39
Cardboard	5	17	2	1	3	28
Wood	0	1	1	0	0	2
Textiles	1	1	0	1	0	3
Garden wastes	2	2	0	0	0	4
Food wastes	5	12	1	0	3	21
Plastic	2	18	1	1	2	24
Rubber	0	0	0	0	0	0
Glass	0	2	1	0	1	4
Steel	0	0	0	0	0	0
Aluminium	0	0	0	0	1	1
Other metals	0	0	1	0	0	1
Leather	1	1	0	0	0	2
Dust, ashes	0	3	1	0	0	4
Other waste	0	7	1	0	1	9

a.2 Amount of Waste Generated

Almost half of the institutions interviewed (42.3%, 22/52) generate 1 to 5 m³/week of waste. 18 institutions (34.6%) generate less than 1 m³/week of waste.

Table C-14: Amount of Waste Generated by Institutions

Type of waste	Institution					Total
	Educational centers and Offices	Shops/stores	Marketplaces and slaughter house	Factories	Restaurants and hotels	
Less than 1m ³	0	17	0	0	1	18
Between 1 m ³ and 5 m ³	5	17	0	0	0	22
Between 5 m ³ and 10 m ³	2	0	1	1	1	5
More than 10 m ³	2	1	2	0	2	7

a.3 Waste Containers

Most commonly used waste container is plastic bags with 25 institutions (40.3%, 19 shops/stores, 5 educational centers/offices and 1 restaurant/hotel). 19 institutions (30.6%) use metallic containers and they are used in these institutions as well as market places/slaughter house. Carton boxes are used only in 11 shops/stores (17.7%) being ranked third.

42 (80.8%) out of 52 institutions store their waste in their premises.

b. Waste Collection Service

b.1 Collection Frequency

18 institutions (40.9%, 18/44) receive waste collection service more than three times a week, followed by 17 institutions (38.6%, 17/44) with three times a week. Therefore, almost 80% receive waste collection service three times a week or more in AMSS. Institutions of which waste is collected less frequently are 3 shops/stores with once a week, 5 shops/stores and 1 factory with twice a week. About 72.7% (32/44) of institutions stated that waste is collected at fixed time of the day.

b.2 Waste Collectors

63.5% (33/55) of institutions receive municipal waste collection service while only 7.7% (4/55) receive private collector's collection service. There are also institutions which receive both municipal and private waste collection service (7.7%). 15.3% (8/55) of institutions take the waste to a specific place by their own means. The reasons why they take their waste directly to a specific place were asked. 8 institutions stated that it is mainly because 'municipal collection service is not provided' (4 institutions) or 'municipal collection service does not satisfy demands' (1 institution). It can be said that municipal waste collection service is the major collection service for institutions and private collectors are not generally used in AMSS.

b.3 Waste Discharge Methods

Placing the waste in front of the establishment is the most commonly used method employed by 54.5% (24/44) of institutions. 22.7% (10/44) of institutions replied that collection workers come and fetch waste from their establishment. Others stated that 'they carry refuse to a specific collection point' (13.6%) and 'they directly carry waste to collection truck' (9%).

46.2% (24/52) of the institutions interviewed did not know where their waste is disposed of while 40.4% (21/52) knew they will be brought into landfill site.

b.4 Satisfaction Level for the Waste Collection Service

The level of satisfaction expressed by institutions was high and favorable. 59.1% (26/44) stated that they were 'very satisfied' with the present collection service and 22.7% (10/44) felt that they were 'somehow satisfied'. That illustrates 81.8% feel that present collection service reaches a satisfactory level. Only 3 institutions felt 'unsatisfied' and 5 institutions felt 'poorly satisfied'.

A further question was asked to 18 institutions regarding the reasons why they are not completely satisfied with the service. The main reasons given were related with the 'frequency of collection service is too low' (6 institutions) or 'frequency of collection

service is irregular' (2 institutions). 'Inappropriateness of collection time' was also pointed out by 3 institutions.

b.5 Responsible Entities for Waste Collection Service in 10 Years

48.1% (25/52) of institutions consider that municipalities should continue to provide the waste collection service while 42.3% (22/52) think collection service should be privatized.

c. Financial Matters

c.1 Waste Collection Fee Payment

Average monthly payment of waste collection fee is ¢401.14 (US\$46.01). Table C-15 shows the average monthly payments per type of business.

Table C-15: Average Monthly Payment for the Waste Collection Service per Type of Business

Type of business	Payment	
Factories and garages	¢2,100.00	US\$ 240.83
Restaurants and hotels	¢1,450.00	US\$ 166.28
Offices	¢568.40	US\$ 65.18
Stores and locals	¢259.26	US\$ 29.73
Markets and slaughter house	¢0.00	US\$ 0.00
Average Monthly Payment	¢401.14	US\$ 46.01

83.9% (26/31) of institutions pay waste collection fee to the municipality while 9.7% (3/31) of institutions pay it to the private collectors.

58.1% (18/31) consider present collection fee is too expensive. Institutions which feel the fee rate is either appropriate (35.5%, 11/31) or cheap (6.4%, 2/31) account for 41.9%.

c.2 Willingness to Pay (WTP)

Table C-16 shows average WTP for the collection service on monthly basis if the collection service improves. Even though 58.1% of institutions consider that present fee they are paying is expensive as examined in c.1, WTP increases by ¢24.99 (US\$2.86) on the condition that the service improves. Therefore, it can be said that institutions can still afford to pay additional cost. The institutions whose WTP is higher than current payment amount are offices (by ¢463.60) and markets and slaughter house (by ¢30.00).

Table C-16: Average Monthly Payment for the Collection Service if the Collection Service Improves

Type of business	Payment	
Factories and garages	¢2,100.00	US\$ 240.83
Restaurants and hotels	¢1,125.00	US\$ 129.01
Offices	¢1,032.00	US\$ 118.35
Stores and locals	¢163.07	US\$ 18.70
Markets and slaughter house	¢30.00	US\$ 3.44
Average Monthly Payment	¢426.13	US\$ 48.87

c.3 Preference for the Waste Collection Fee Charging System

Majority of institutions (59.3%) prefer waste collection fee to be charged in proportion to the amount of waste they generate. 8 institutions (14.8%) prefer to be charged on the basis of total floor area of their institutions. Other institutions prefer to be charged based on annual sales, number of employees, and electricity consumption etc.

As for the frequency of billing, 92.3% (48 institutions) prefer to be charged the fee on a monthly basis. Besides, 3 institutions replied that they prefer to pay once every 3 months and once every six months for 1 institution.

d. Recycling

d.1 Waste Separation

The results show that the waste separation is not commonly practiced at the institutions interviewed. 78.8% (41/52) replied that they do not separate waste for recycling while 13.5% (7/52) always do and 7.7% (4/52) sometimes do.

The reasons why waste separation is not practiced are 'there is no reason to do it' (61.0%, 25/41) and 'it is troublesome to do it' (19.5%, 8/41). Others commented that it is because 'waste collectors separate the waste' (9.8%, 4/41) or 'it increases the cost' (4.9%, 2/41). On the other hand, the reasons for separating waste are 'for selling them to local peddlers' (9.8%, 4/41), 'for selling them to manufacturers' (7.3%, 3/41), or 'for reducing waste volume and minimize adverse impact on environment' (7.3%, 3/41).

In conclusion, it can be said that recycling system is not familiar with institutions in AMSS yet as the system itself is not completely established to accommodate the needs so that institutions are not convinced with the importance of the recycling.

d.2 Type of Materials Recycled

Papers are most commonly separated materials for recycling which were mentioned by 6 institutions. Cardboard, plastics, steel, PET and other metals are also separated which are mentioned by 3 to 4 institutions each.

Table C-17: Type of Waste Separated by Institutions

Type of waste	Institution				Total
	Educational centers/offices	Shops/stores	Factories	Restaurants and Hotels	
Paper	2	2	1	1	6
Cardboard	1	1	1	1	4
Wood	1	0	0	0	1
Plastic bottles	1	0	1	1	3
Plastic	0	3	1	0	4
Textiles	0	1	0	0	1
Glass bottles	0	0	1	1	2
Other glass	0	1	0	0	1
Kitchen waste	0	1	0	1	2
Steel	0	2	1	0	3
Aluminium	0	1	1	0	2

Type of waste	Institution				Total
	Educational centers/offices	Shops/stores	Factories	Restaurants and Hotels	
Other metals	0	2	1	0	3
Leather	0	1	0	0	1
Tires	1	0	0	0	1
Toxic waste	0	0	1	0	1
Other types of waste	0	1	0	0	1

d.3 Amount of Waste Recycled

The amount of waste recycled per week by institutions are shown in Table C-18. The amount of waste recycled for most of the institutions ranges from 0.5m³ to 5m³ per week as shown below.

Table C-18: Amount of Waste Recycled

Cubic meters	Educational centers/offices	Shops/stores	Factories	Restaurants and Hotels	Total
Less than 0.5m ³	0	3	0	0	3
Between 0.5m ³ and 1m ³	0	0	1	1	2
Between 1 m ³ and 5 m ³	2	1	0	0	3
More than 10m ³	0	1	0	0	1
Doesn't answer	0	2	0	0	2

d.4 Awareness of Institutions on Recycling

In order to determine how institutions perceive the necessity of recycling, whether or not they think recycling is necessary for AMSS was asked.

92.2% (47/51) stated that it was necessary immediately while only 7.8% (4/51) replied it was not necessary. Although 78.8% responded that they did not separate waste and the reasons for not separating waste were 'there is no reasons for doing it' or 'it is troublesome', it became clear that people felt the necessity of recycling.

Although institutions are favorable for promoting recycling, they are reluctant to the collection fee increase. 57.7% (30/52) stated that fee should not increase. 36.5% (19/52) see it is fair to increase it up to 10% more while only 5.8% (3/52) agree with the increase up to 50% more. Considering the high percentage of institutions are supporting recycling, but fee increase cannot gain support from them, recycling activities/business is feasible only if appropriate recycling system is introduced and recycling market expands.

e. Public Campaign

92.3% (48/52) of institutions clean the road shoulder or adjacent public area in front of their establishment.

All the institutions consider a campaign to raise awareness of the people for maintaining the city and environment clearer is indispensable. Regarding the question to determine institutions' willingness to participate in a campaign for

maintaining a cleaner city and the environment, 90.4% (47/52) responded that they were willing to participate in it.

As for responsible entity for the campaign, 28.8% (15/52) stated that local municipalities should take initiatives while 13.5% (7/52) considered it was central government which was responsible for such activities. Others commented that COAMSS, community, private companies, schools, family member were responsible, however, 13 institutions (25%) stated that all the entities should be involved and take such actions together.

It can be concluded that institutions are fully aware of the importance of protecting environment and feel that they have to contribute to it. In this regard, cooperation from institution can be expected in promoting public awareness campaign on waste issues in AMSS.

f. Problems related with SWM

Institutions stated the three main problems related with SWM. Figure C-9 to Figure C-11 show the biggest problems on SWM mentioned by institutions. 'Smoke caused by burning of waste in the areas nearby' is pointed out as the biggest problem by 11 institutions (21.2%) followed by problems such as 'unreliable waste collection' (10 institutions/19.2%) and 'dirty water, smoke, and offensive odor generated by disposal site' (10 institutions/19.2%). These three problems account for 60% of the total. 'Increase of mice and rats' (13.5%) and 'offensive odor caused by illegal dumping' (11.5%) are ranked forth and fifth. The remaining problems were 'Blockage of drainage' (7.7%) and 'looks dirty' (7.7%).

Regarding the second mentioned problem, 'offensive odor caused by illegal dumping' was ranked top at 32.7%. 'Blockage of drainage (17.3%)' and 'dirty water, smoke, offensive odor generated by disposal site (13.5%)' followed.

As for the third mentioned problems, 'looks dirty' came top at 30.8% followed by 'blockage of drainage' at 21.2%. 'Dirty water, smoke, and offensive odor generated by disposal site' ranked third at 13.5%.

From the results above, it can be summarized that institutions strongly show concerns on the environmental pollution which directly affect their environment and furthermore their health. However, unreliable waste collection ranked second in the problems mentioned in the first place. This shows waste collection service is a big concern to the institutions.

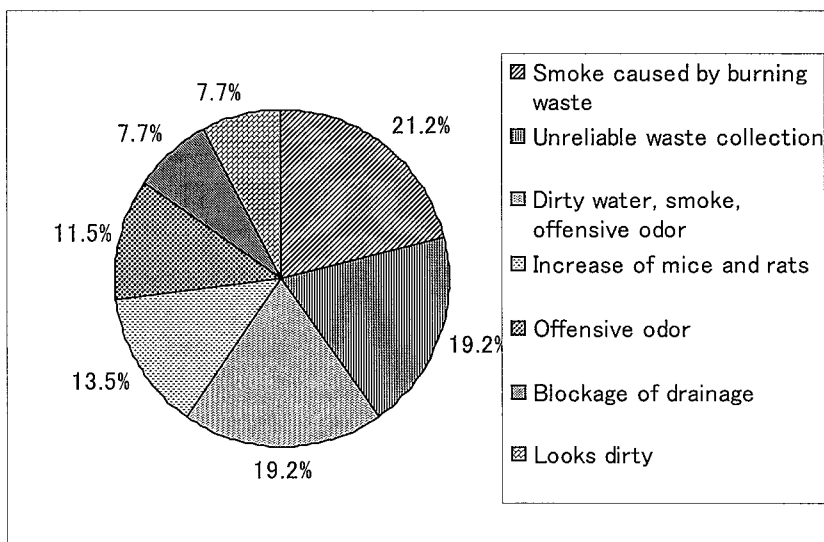


Figure C-9: Main Problems Related with SWM by Institutions (1st mentioned)

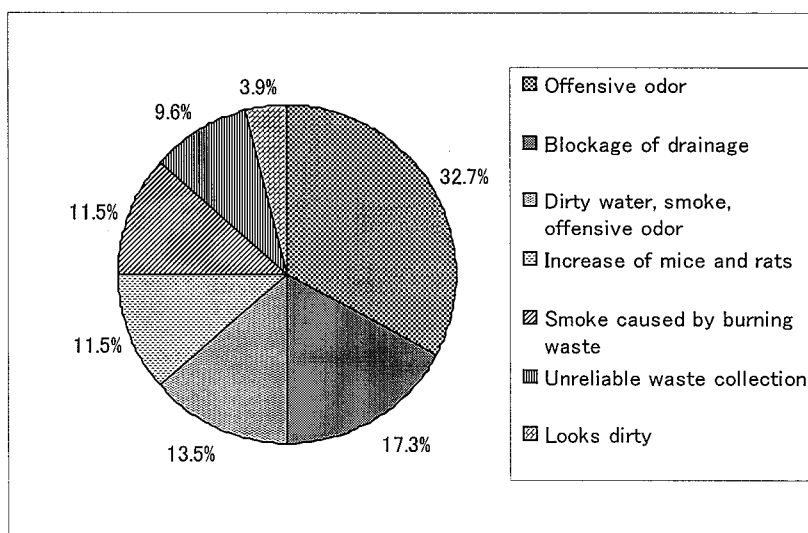


Figure C-10: Main Problems Related with SWM by Institutions (2nd mentioned)

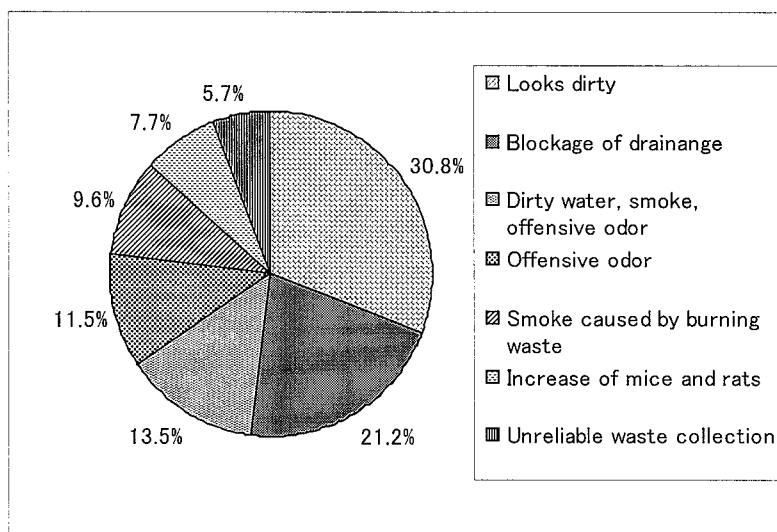


Figure C-11: Main Problems Related with SWM by Institutions (3rd mentioned)

g. Basic data of Institutions' Background

In order to understand the background of opinions surveyed better, questions regarding basic data of the institutions were asked.

g.1 Type of Business

The type of the business surveyed are 9 educational centers/offices, 35 shops/stores, 3 market places/slaughter house, 1 factory and 4 restaurants/hotels.

g.2 Number of Employees

57.7% (30/52) stated that they had less than 10 employees in their establishment, followed by 10 institutions who stated that they have 100 or more employees. 6 institutions employ between 20 and 49 persons, while 5 institutions explained that they have between 10 and 19.

g.3 Annual Sales

Annual sales of 31.2% (15/48) of institutions amount to less than 50,000 colons. 10.4% replied their annual sales are between 50,000 and 100,000 colons, 16.7% are between 100,001 and 500,000 colons, 6.3% are between 500,001 and 1,000,000 colons, and only 2.1% are between 1,000,001 and 5,000,000 colons. 16.7% reached its annual sales more than 5,000,000 colons or more.

g.4 Total Business Floor Area

Total floor areas of each institution vary. 14 institutions possess areas less than 50m² and another 14 institutions have between 50m² to 99m². There are 14 institutions which possess areas between 100m² and 999m² while 6 institutions have more than 1000m² or more.

g.5 Years of Running Business

32.7% (17/52) of the institutions have been running their business less than 5 years, while 30.8% (16/52) have been running their business more than 20 years. 8 institutions have been running their business between 5 and 9 years and 11 institutions between 10 to 19 years.

g.6 Payment for Public Services and Income Tax

The amount of monthly payment institutions pay for the public services vary depending on the types of the business. As for electricity, 30.8% pay between 200 and 500 colons, 23.1% pay between 500 and 5,000 colons, 17.3% pay between 25 and 200 colons and 15.4% pay more than 5,000 colons. 13.4% either did not know or could not answer the question.

Regarding payment for the water supply, 17.3% pay between 25 and 50 colons and another 17.3% pay between 50 and 100 colons. Institutions which pay between 1,000 and 3,000 colons follow at 13.4%, and 11.5% pay between 200 and 500 colons. Only 5.8% pay more than 5,000 colons.

Almost half of the institutions (44.2%) did not know or could not answer the amount of the income tax they pay. 13.5% pay less than 25 colons (including 3.9% who do not pay) and 11.5% pay between 100 and 200 colons. 9.6% pay between 25 and 50 colons and another 9.6% pay between 200 and 3,000 colons. While 5.8% pay between 50 and 100 colons, another 5.8% pay more than 3,000 colons.