

資料 6 質問及び回答

OPAMSSへの質問

1 構成市について

- 1-1 COAMSSに所属する市と市長の名前及び所属政党、人口、面積は？
- 1-2 市がCOAMSSに所属することを定める根拠は首都圏地域開発整備法でよいのか？
- 1-3 十数都市に分かれている経緯、または合併しない理由

2 COAMSS、OPAMSSの役割について

- 2-1 COAMSS、OPAMSSの機能の概要は？
- 2-2 COAMSSがごみ処理の広域対応などの調整を行っているのか、他分野でも広域協同事業を行っているのか？
- 2-3 都市計画についても調整機能を持つのか？（首都圏地域開発整備法第11条）土地利用はOPAMSSが管理、土地利用調査、用途指定、建設許可、道路計画、以上を実行するための市の保証の取り付け、工事の受領（意味不明？）とある）

3 開発計画・土地利用計画について

- 3-1 開発計画（国家レベル）は現在「経済社会開発計画（1994～1999年）に依っているのか？
- 3-2 2000年以降の開発計画は発表されたか？
- 3-3 環境政策は「国家環境改善計画（1994年）」に依っているのか？他の新しい計画はあるか？だれが都市計画、土地利用計画を決めるのか？

4 清掃事業の法制度・体制について

- 4-1 清掃事業（廃棄物の収集・運搬・埋立処分）の実施責任は各市町村にあるか？それを規定するのは1986年自治体法で清掃・ごみの収集運搬・最終処分の責任が市町村に付されたという理解でよいのか？
- 4-2 その各市の清掃事業を監督する官庁は厚生省か？
- 4-3 国の清掃法があるか？衛生法LeyCodigo de Salud第10節第74条がそれに相当するのか？他の法律はないのか？
- 4-4 廃棄物の分類に関する法的根拠があれば提供願いたい。（国の法律では一般廃棄物と産

業廃棄物の区分がないようだが、ないのか？市の清掃規定で決めることになっているのか？)

4-5 「産業廃棄物の処理責任は事業者にある」と、どの法に規定、明文化されているか？

4-6 COAMSS所属のすべての市に清掃条例が整備されているか？各市とも清掃の責任範囲をみずからの規定（市制定の条例）で定義しているか？

4-7 MIDESプロジェクトのエル・サルヴァドル国側の担当機関はCOAMSSか？

5 各市の清掃事業の現状について

5-1 各市の発生ごみ量、収集率はどのくらいか、その根拠は？（推定か、バックデータがあるのか？）

5-2 ごみの組成データ（有機物、紙、プラスチック、金属、などの別）あるか？提供願いたい。

5-3 ごみの組成調査をできる機関があれば、その機関名称と連絡先を提供願いたい？

5-4 露天商のごみ収集・処分の現状は？コンテナによるのか？その料金負担はどのようになっているのか？

5-5 家庭系のごみ処理責任は自治体法に定められているが、家庭系以外のごみの処理責任はどの法律に規定されているのか？

5-6 清掃施設整備に国から補助金が出るしくみがあるか？

6 最終処分場について

6-1 どこにあるのか、正式名称はマリオナ処分場、所在地はNejapa市でよいのか？

6-2 どの市のごみを受入れているのか、首都圏以外の市（一説には首都圏12市と圏外11市の計23市）も受入れているのか？

6-3 共同の処分場か、オペレーションはだれが行っているのか？サン・サルヴァドル市か公社があるのか？

7 EIAについて（質問の対象はOPAMSS）

7-1 EIAの法的根拠の有無

7-2 EIAの進め方

7-3 EIAの対象施設とその規模

7-4 EIAの委託先（社名、連絡先、会社の概略説明、概算人件費）

8 地元業者について（質問の対象は各市になると思います）

8-1 ボーリング業者（社名、連絡先、会社の概略説明、概算人件費）

8-2 測量業者（社名、連絡先、会社の概略説明、概算人件費）

8-3 環境測定／分析業者（社名、連絡先、会社の概略説明、概算人件費）

COAMSSに所属する市への質問（OPAMSSがまとめて答える、あるいは、サン・サルヴァドル市以外の各市に回答を依頼することを望む）

1 市の廃棄物管理に係る部局について

- 1-1 市役所の職員数、廃棄物管理に係る部局の正式名称、職員数、ごみ収集作業員の数
- 1-2 市の清掃事業は直営でやっているのか？企業への委託もあるのか？
- 1-3 収集車数、最終処分先、収集量、最終処分量
- 1-4 既存の廃棄物管理（収集・処分等）計画があれば提供願いたいのか？
- 1-5 人員・機材の必要性の評価、調達計画はどのようにしているのか？

2 ごみ収集料金と清掃事業の予算

- 2-1 料金徴収はどのような方式か？どのように配分するのか、適正に配分され、かつ目的に合致して使用されているのか？
- 2-2 首都圏5市（どの市かは特定できていないが）では1999年1月から電気料金とごみ収集料金を同時徴収すると聞いたが実施したか？それまではどのように集めていたか？
- 2-3 上記以外の都市ではどのようにごみ収集料金を徴収しているのか？
- 2-4 市の総予算額と清掃事業費はどのくらいか？
- 2-5 清掃事業には国からの補助金があるのか？

3 排出現況

- 3-1 ごみの種類別排出方法（コンテナ、カーブサイド、収集車がベルを鳴らす等合図をした時排出する等）
- 3-2 不法投棄の状況（場所、量、不法投棄ごみに対する処理の仕方）
- 3-3 ごみの排出量推移（家庭系一般廃棄物、事業系一般廃棄物、産業廃棄物、感染性廃棄物、道路清掃ごみ）
- 3-4 排出量調査の委託先（機関名、連絡先、機関の概略説明、概算人件費）
- 3-5 現在の問題点

4 収集運搬の現況

- 4-1 収集対象地域の人口推移（過去10年～2009年）

- 4-2 収集対象地域の土地利用状況と各人口（住宅地区、商業地区、オフィス地区、農業地区等ごとの人口）
- 4-3 人力収集のタイプ（一輪車、台車、三輪車等）及び台数
- 4-4 収集車輛の概要（メーカー、台数、タイプ、購入日、購入価格、財源、走行距離、走行状態）
- 4-5 収集車のタイムスケジュール（収集開始時間、終了時間、収集回数／週）
- 4-6 収集ルート（ルートの本数、排出地域から最終処分場までの距離と時間）
- 4-7 収集率（都市部、農村部）
- 4-8 収集機材のメンテナンス概要（メンテナンス場所、方法、頻度、従業員数、所有設備）
- 4-9 収集作業員の人数とタイムスケジュール（収集開始時間、終了時間、収集回数／日、収集回数／週）
- 4-10 ごみの種類ごとの単位体積重量
- 4-11 タイムアンドモーション調査の委託先（機関名、連絡先、機関の概略説明、概算人件費）
- 4-12 清掃事業にかかわる人の雇用は、失業対策としての意味もあるか？
- 4-13 同市の清掃事業は、地区の特色（スラム地区、一般住宅地）に応じて管理体制を変えているか？
- 4-14 中継基地の施設数及び位置、施設概要
- 4-15 現在の問題点

5 中間処理の現況

- 5-1 組成（有機ごみ、紙、プラスチック・ゴム、ガラス、金属、木材、布、その他）データあれば提供願いたい。
- 5-2 リサイクルを実施している物（例：ビン、カン、紙）は何？
- 5-3 リサイクル市場の概要（市場規模、安定性、リサイクル品の受入先の有無、リサイクル品の価格、リサイクル品の品質）
- 5-4 廃棄物を原料とするコンポストの製造につき積極的に取り組む意思があるか？これまでに実施例はあるか？
- 5-5 組成分析の委託先（機関名、連絡先、機関の概略説明、概算人件費）
- 5-6 現在の問題点

6 最終処分の現況（新規のものも含め、主な最終処分場につき）

- 6-1 トラックスケールによるごみ搬入量データを提供願いたい
- 6-2 最終処分場の形態（嫌気性、準嫌気性、準好気性、好気性）
- 6-3 最終処分場の環境に対する配慮方法（浸出水の処理、雨水排水処理、ガス処理）
- 6-4 埋め立て方法、特に覆土実践の有無（覆土をしている場合、その方法／していない場合、その理由）
- 6-5 野焼きの有無
- 6-6 スカベンジャーの有無（いる場合、その概算人数）
- 6-7 ハエや野犬等の廃棄物と関連する害獣（虫）の深刻度
- 6-8 ごみの飛散状態
- 6-9 最終処分場周辺の井戸（地下水）汚染の有無（データがあるば提供願いたい）
- 6-10 周辺住民とのトラブル（苦情も含む）の有無（ある場合、その内容）
- 6-11 既存の処分場が選定された経緯
- 6-12 現在の問題点

7 啓蒙・教育

- 7-1 ごみ分別排出に対する住民意識
- 7-2 リサイクル活動に対する住民意識
- 7-3 住民の清掃事業に対する要望
- 7-4 市の啓蒙・教育プログラムの有無（ある場合、その内容）
- 7-5 自治会及び町内会等のような小規模の住民組織の有無（ある場合、その組織形態）
- 7-6 現在の問題点

8 その他

下記の必要資料を、提供願いたい。

- 8-1 地形図（市全体がカバーできるもの、及びAMSSが全域がカバーできるもの）
- 8-2 土地利用図（市全体がカバーできるもの）
- 8-3 行政区域図（市全体がカバーできるもの）
- 8-4 清掃事業関連地図（車輛基地、中継基地、最終処分場の位置を示すもの）
- 8-5 気象データ（過去20年分の平均日降雨量、過去20年分の最大月間降雨量及び過去20年分

の気温)

8-6 ごみ収集区域図(市全体がカバーできるもの)

8-7 最新の国、首都圏及び市レベルの開発計画

8-8 国勢調査(過去20年分)

追加の質問(各市の清掃局技術者の技術レベルを知るための参考質問)

現在、あなたの市が抱えている廃棄物管理に係る問題と、その解決方法につき、箇条書きを用いるなどして、分かりやすく述べて下さい。

サン・サルヴァドル市への質問

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- 2-1 料金徴収はどのような方式か？電気料金とごみ収集料金を同時徴収しているというが、なぜこの2つが一緒なのか？
- 2-2 ごみ料金の設定（tarifa）は公共料金規定（Tarifa de Arbitrios de laMunicipalidad de San Salvador）に定められているのか？課金の根拠は従量制か？
- 2-3 どのように配分するのか、適正に配分され、かつ目的に合致して使用されているのか？
- 2-4 市の総予算額と清掃事業費はどのくらいか？
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4-10 ごみの種類ごとの単位体積重量

4-11 タイムアンドモーション調査の委託先(機関名、連絡先、機関の概略説明、概算人件費)

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- 6-9 最終処分場周辺の井戸（地下水）汚染の有無（データがあるば提供願いたい）
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- 8-5 気象データ（過去20年分の平均日降雨量、過去20年分の最大月間降雨量及び過去20年分

の気温)

8-6 ごみ収集区域図(市全体がカバーできるもの)

8-7 最新の国、首都圏及び市レベルの開発計画

8-8 国勢調査(過去20年分)

9 清掃事業の体制と現状

9-1 市の清掃規定では家庭系ごみの収集・道路清掃・最終処分・公共スペースの清掃とあるが、産業廃棄物の処分責任はないのか? 産業廃棄物を適正に埋め立手処分する責任者は誰か?

9-2 清掃規定で「市は収集しない」としている品目は、だれがどのように収集、あるいは処分場まで運搬するのか?

9-3 家庭系以外のごみの処理責任はどの法律に規定されているのか?

9-4 (1996年機材整備報告書の図をもって)環境衛生局の組織はこの図のとおりか?

9-5 ごみ収集部は家庭ごみの収集と道路清掃を担当しているのか?

9-6 環境衛生部は何を担当しているのか?

9-7 下水道はどこが担当しているのか?

10 ごみ収集料金について

10-1 サン・サルヴァドル市では電気料金とごみ収集料金を同時徴収しているというが、なぜこの2つが一緒なのか。課金の根拠は従量制か?

10-2 公共料金規定には一般家庭からのごみ収集料金は定められていないようだが、根拠はなにか? 他の上下水道料金などの社会サービス料金と別なのか。

10-3 サン・サルヴァドル市公共料金規定では産業廃棄物、他市の廃棄物、工場および商業施設で使用する目的で市が設置するコンテナ当たりの料金が定められているが、誰がどのように払うのか、徴収の仕組みは? コンテナの運搬は市がしているのではないのか?

厚生省への質問

- 1 清掃施設整備に国が補助金を出す仕組みがあるか？
- 2 厚生省のごみ処理に関する権限は衛生法に定めるように、埋立処分場の設置許可以外にどんなものがあるか？
- 3 PAHOの援助内容で清掃に関連するものがこれまで実施されたか？

環境省への質問

- 1 EIAを決める法律が1998年5月に制定されたと聞いたが、その対象事業、審査者、審査手順はどのようなか？
- 2 環境法が1998年に定められたが、これが上記のEIAも含むのか？
- 3 環境省は廃棄物の総合計画を立案する立場にあるのか？

ISDEMへの質問

- 1 ISDEMの機能と担当する業務はなにか？
- 2 ごみ質データを持っているか？（8月31日付けJICAファクスでは「ISDEMが廃棄物の量・組成の分析・小規模企業を形成し収集体制を構築、ごみ捨て場の場所選定などについての技術的提言を行っている」とある？）。
- 3 ISDEMの廃棄物担当部署を作りつつあるとのことだが、各市の清掃局とどういう連携をとっているか、またとってきたか？

ANSWERS TO QUESTIONNAIRE

OPAMSS

1.1. Municipalities belonging to COAMSS

Table headings: Municipality; Mayor; Political party; Population; Extension

Note: 1 - Population data corresponds to projections made by DIGESTYC and is based on the 1992 census.

1.2. Yes. Article 2 of the Law for Territorial Development and Ordering of the San Salvador Metropolitan Area establishes the member municipalities of the Metropolitan Area of San Salvador (Later, the municipality of Tonacatepeque was incorporated by agreement of COAMSS Act No. 9, of September 21, 1996, and in compliance with Article 4 of the same law).

1.3. The "Ley Unica del Régimen Político" (Single Law of the Political Scheme) establishes the current territorial division of El Salvador in 14 Departments and 261 municipalities. The derogation of this law and the creation of a new one would be a task for Congress, not without political, economical, social and legal consequences for the target municipality.

2. Play roles of COAMSS and OPAMSS

2.1 COAMSS (Council of Mayors of the Metropolitan Area of San Salvador), is a decentralized and self-reliant entity, whose functions are:

- a) Creating policies for the Development and Ordering of the Metropolitan Area of San Salvador.
- b) Approving the Director Scheme of the Metropolitan Area of San Salvador, prior consultation with the Municipal councils that form it.
- c) Coordinating, through OPAMSS, with the Planning and Control offices of the municipalities and Central Government Institutions, so that the creation of the Central Government sector plans, which are part of the Plan for Territorial Development and Ordering of the Metropolitan

Area of San Salvador, is carried out in agreement with the Local Plans approved by the Municipalities of the Metropolitan Area of San Salvador.

- d) Ensuring that the dispositions of the Metropolitan Plan for Territorial Development and Ordering of the Metropolitan Area of San Salvador be in agreement with the Local Plans approved by the Municipalities of the Metropolitan Area of San Salvador.
- e) Approving the technical regulations related to the use of the soil, which require enabling the Metropolitan Plan for Territorial Development and Ordering of the Metropolitan Area of San Salvador.
- f) Collaborating, through OPAMSS, with the Municipalities of the Metropolitan Area of San Salvador, in controlling the Development of their territories, through application of the Law for Territorial Development and Ordering of the Metropolitan Area of San Salvador and the current regulations, the Metropolitan Plan for Development and Ordering of the Metropolitan Area of San Salvador and its regulations, as well as all general technical regulations dictated by the Central Government Institutions and ordinances by the Legislative Department for the Municipal Local Plans.
- g) Resolving matters not discussed within the current regulations, which prove necessary for attaining the goal of the same.

FUNCTIONS OF OPAMSS

OPAMSS is the Technical Advisor Office to the Council of Mayors of the Metropolitan Area of San Salvador. Its functions are:

- a) Collaborating with the COAMSS in carrying out its obligations.
- b) Directing the process of creation and technical evaluation of the Metropolitan Plan for Territorial Development and Ordering of the Metropolitan Area of San Salvador.

- c) Elaborating and proposing, to COAMSS, the specific technical regulations required for the enabling of the Metropolitan Plan for Territorial Development and Ordering of the Metropolitan Area of San Salvador, in agreement with the Policies, Plans and projects of the Metropolitan Area of San Salvador and the Local Projects approved by the corresponding Municipal Councils for each municipality of the Metropolitan Area of San Salvador.
- d) Ensuring that the parceling and construction projects developed in the Metropolitan Area of Salvador comply with the requirements established by the current law.
- e) Taking the necessary legal steps for classifying the soil into allowed, prohibited, or restricted areas; granting of parceling or construction permits; defining road alignments and withdrawal zones; Obtaining permits, from the municipality, for carrying out projects through the process of road system review and zoning; and accepting projects to be developed in the Metropolitan area of San Salvador, which comply with the requirements mentioned in the previous item.

2.2. Management of the final disposal of solid waste in the current landfill has been a responsibility of the Mayor's Office of San Salvador.

Currently COAMSS has promoted the construction of the MIDES project (sanitary landfill), located in the Municipality of Nejapa, for an adequate disposal of solid waste.

2.3. Yes. COAMSS is in charge of coordinating Urban Planning through OPAMSS.

3. Development Plan and use of the soil plan

Because OPAMSS is concerned only with the Metropolitan Area of San Salvador, the requested information is not readily available.

In the case of item 3.3, regarding environmental policy, it is convenient to note that such policy is being elaborated and will be based on the principles established by Article 2 of the Environmental Law.

4. Legal and Structural Frame for the Cleaning Activities

4.1 Cleaning, sweeping the streets, collecting and final disposal of solid waste are responsibilities of the Municipalities as established by the Municipal Code in Article 4 numeral 19.

4.2 Although the Ministry of Health does not systematically supervise the cleaning activities of each Municipality, it is required by law to intervene, when the cleaning activities are not adequate and may cause the proliferation of infectious diseases.

4.3 The Health Code; the Environmental Law

4.4 With the Environmental Law in force since May 1998, the different Regulations have been elaborated and are now being revised. Within these Regulations solid waste is divided into Municipal solid waste and dangerous solid waste.

4.5 Pending.

4.6 No regulations exist.

4.7 Yes. MIDES is a mixed economy partnership formed by COAMSS and CINTEC, which is the construction company for the sanitary landfill. The MIDES project is a Local Government effort.

5. Current situation of the cleaning of each municipality.

6. Place of final disposal

6.1 Yes. Mariona has been up to this date the place of final disposal used by the Municipalities of the Metropolitan Area of San Salvador. Territorially, the landfill of Mariona is within the Municipality of Apopa, but physically it is closer to Nejapa.

6.2 The Municipalities that currently use the landfill of Mariona are: a) all the Municipalities that form the Metropolitan Area of San Salvador, except Tonacatepeque and San Martín. b) the following Municipalities, which do not form the Metropolitan Area of San Salvador:

Quezaltepeque, Colón, Santo Tomás, Santiago Texacuangos, San Juan Opico, Guazapa,
Panchimalco, Tepecoyo, Paisnal, San Pablo Tacachico, Nuevo Cuscatlán

6.3 If it is a joint disposition coordinated by COAMSS, it is operated by the San Salvador
Mayor's Office.

OPAMSS

Oficina de Planificación del Area Metropolitana de San Salvador
(Office for the Planning of the Metropolitan Area of San Salvador)

COAMSS

Concejo de Alcaldes del Area Metropolitana de San Salvador
(Council of Mayors of the Metropolitan Area of San Salvador)

WHAT IS OPAMSS?

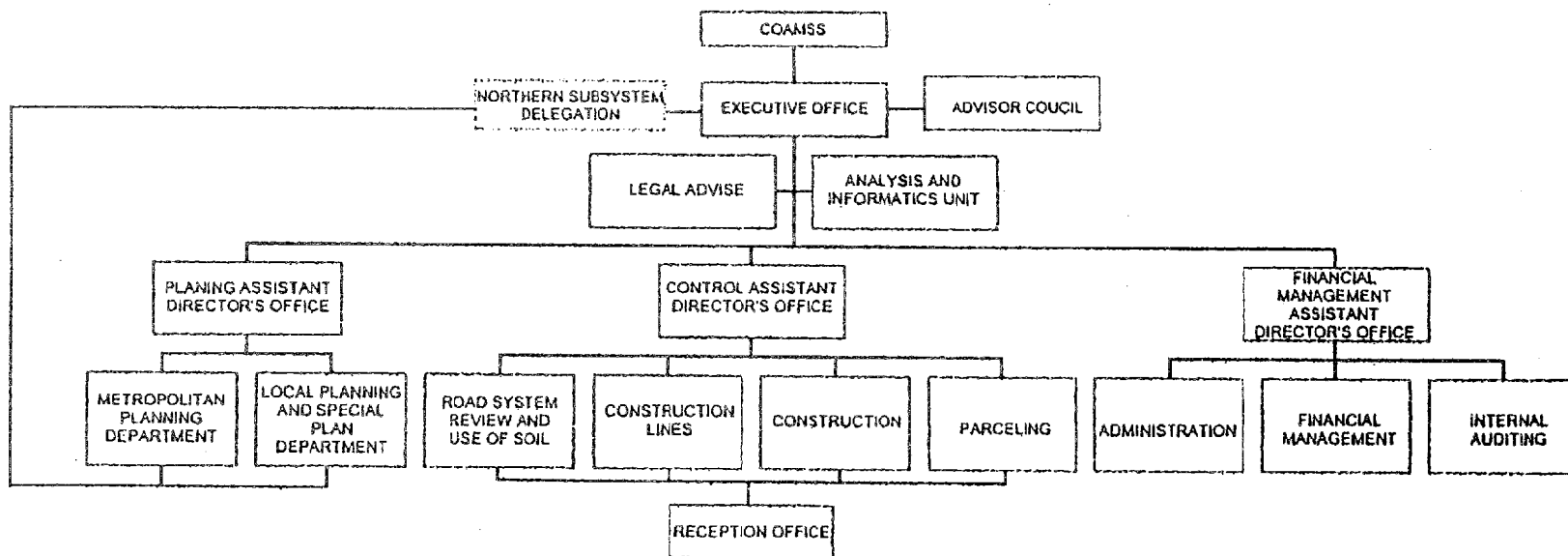
The Office for the Planning of the Metropolitan Area of San Salvador (OPAMSS), is a self-reliant institution, of municipal nature, in charge of planning and controlling urban development and advising the Council of Mayors of the Metropolitan Area of San Salvador (COAMSS) by means of programs and projects. Its creation and functions are established by the Law for Territorial Development and Ordering of the Metropolitan Area of San Salvador and Neighboring Municipalities, in which OPAMSS is appointed as the Technical Executive Office of COAMSS. OPAMSS was created by COAMSS through bylaws, which are published in the Official Gazette, Number 24, Volume 306 of February 3, 1990.

The work of OPAMSS is conducted by an Executive Director appointed by COAMSS, and who is backed by a support team formed by three Assistant Directors: Financial Management, Planning, and Control.

AIM AND FUNCTION

- a) Collaborating with COAMSS in carrying out its obligations.
- b) Elaborating and proposing, to COAMSS, the Director Scheme of the Metropolitan Area of San Salvador for approval.

- c) Directing the process of creation and technical evaluation of the Metropolitan Plan for Territorial Development and Ordering of the Metropolitan Area of San Salvador.
- d) Elaborating and proposing, to COAMSS, the specific technical regulations required for enabling the Metropolitan Plan for Territorial Development and Ordering of the Metropolitan Area of San Salvador, in agreement with the Policies, Plans and projects of the Metropolitan Area of San Salvador, discussed with CODEMET, and the Local Policies, Plans and Projects approved by the corresponding Municipal Councils for each Municipality of the Metropolitan Area of San Salvador.
- e) Ensuring that the parceling and construction projects developed in the Metropolitan Area of Salvador comply with the requirements established by the Law for Territorial Development and Ordering.
- f) Taking the necessary legal steps for classifying the soil into allowed, prohibited, or restricted areas; granting of parceling or construction permits; defining road alignments and withdrawal zones; Obtaining permits, from the municipality, for carrying out projects through the process of road system review and zoning; and accepting projects to be developed in the Metropolitan area of San Salvador, which comply with the requirements mentioned in the previous item.



ORGANIZATION CHART OF OPAMSS

QUESTIONNAIRE FOR MUNICIPALITIES WITHIN COAMSS

MUNICIPALITY: SAN SALVADOR

1. SOLID WASTE MANAGEMENT DEPARTMENT

1.1 Number of people working for the municipality:

Full name of the department in charge of solid waste management: Environmental Sanitation Management, Solid Waste Collection Department.

Number of employees working in the administration and number of collection operators: 22 administrative personnel (Manager and Assistant Manager included). 268 permanent collection operators and 59 substitutes, total of 349 people.

1.2 Does the Municipality perform the cleaning by itself or does it hire some companies for it?
Cleaning is done by the Collection and Sweeping Department and the Environmental Sanitation Department in about 90 % of the city; the rest is left for microentrepreneurs, which provide the service in communities or areas where access is difficult for our staff.

1.3 Number of Collection Equipment:

Place of final disposal: Sanitary landfill Apopa-Nejapa-Mariona (currently operating as a transference station).

Volume of collected and deposited waste: 566 metric tons.

1.4 Plans for waste management, if any, such as collection and final disposal.

1.5 How is the need for the allocation of equipment and personnel evaluated and planned?

2. TARIFFS FOR WASTE COLLECTION AND BUDGET FOR CLEANING

2.1 What is the billing system? It seems the waste collection service is being charged together with the electricity bill. Reason for this method of billing:

It allows for better control, ensures that the user will pay the fee, and is a more efficient way for us to collect the payment for the service. 90 % of the population served has accounts with the electricity company thus allowing for a better control.

2.2 Are the fees for waste collection included in the tax tariffs of the Municipality of San Salvador? Do the tariffs change with volume?

Yes. They do not change with the volume of waste generated at each house.

2.3 How are they distributed? Are collected funds being adequately allocated for the pertaining objectives?

2.4 Volume of total budget and cleaning budget for each municipality.

The budget allocated for the management of solid waste (sweeping of streets, waste collection, environmental sanitation) is of about ¢46, 5000, 000.00. For waste collection alone ¢ 27, 000, 000.00.

2.5 Is there any subsidy from the State for the cleaning?

No. The municipality subsidizes part of the cost of the cleaning service in the city, the rest is covered by the cleaning fee.

3. CURRENT SITUATION OF WASTE GENERATION

3.1 Waste delivery mode according to how it is classified: in containers, at the corners, putting it out on the streets upon hearing the bell from the collection units, etc.

All three alternatives you suggest.

In containers: For condominiums or "multifamiliares" (apartment buildings); for companies requesting the "special service" (they pay an additional fee); for the street sweepers and for passenger vehicles (the latest being illegal).

At the streets: either in neighborhood blocks or main streets of the city (Boulevard Venezuela, for example).

Upon hearing the bell from the collection units: Generally, this is done in well organized communities and neighborhoods.

3.2 Current situation of illegal dumping: place, volume, treatment for the illegally dumped waste.

Place: Sidewalks, rivers and creeks, containers.

Volume: Unknown

Treatment for the illegally dumped waste: Waste from containers and streets is collected almost regularly. Waste from rivers and creeks is dealt with by the Vector Control Section of the Sanitation Department every so often.

3.3 Evolution of generated waste: waste generated at family houses, waste generated at the commercial sector, waste generated at the industrial sector, infectious waste, sweeping of the streets.

3.4 Organizations capable of carrying out a survey on waste generation, names, addresses, description, approximate cost of personnel.

CESTA, UNIVERSIDAD LUTERANA (LUTHERAN CHURCH), MINISTRY OF ENVIRONMENT AND NATURAL RESOURCES, SAN SALVADOR MAYOR'S OFFICE/ENVIRONMENTAL SANITATION MANAGEMENT

3.5 Current Problem

4. CURRENT SITUATION OF COLLECTION AND TRANSPORTATION

4.1 Demographic evolution of the collection areas (since 10 years ago and until the year 2009).

See annex 1.

4.2 Current use of the soil in each collection zone and population of at each category:

Residential area, commercial area, offices, agriculture, etc.

4.3 Type of manual collection: wheelbarrow, etc. and amounts

4.4 Description of the collection equipment: make, number, type, date of purchase, price, funds for purchase, distance traveled (km), current condition.

4.5 Working hours for the equipment: starting time and ending time.

| SHIFT | STARTING TIME | ENDING TIME |
|-----------|---------------|-------------|
| MORNING | 6:00 A.M. | 12:30 P.M. |
| AFTERNOON | 1:00 P. M. | 6:30 P.M. |
| NIGHT | 6:00 P.M. | 1:00 P.M. |

Collection frequency: Three times a week: Monday-Wednesday-Friday / Tuesday-Thursday-Saturday.

4.6 Collection route: Number of routes: 50 domiciliary / 20 dispatch (dumpstairs and containers).

Distance and time form collection areas to final disposal place: 19 Km / 1 hr round trip.

4.7 Collection rate in the urban and rural areas:

Collection rate is uniform

4.8 Maintenance of the equipment:

Place: preventive maintenance at collection facility and corrective maintenance at the repair shop of the department.

Method: Preventive and corrective

Frequency:

Personnel: 80

Maintenance facilities:

4.9 Number of operators per equipment per shift: 4 crew and 1 driver. 1 shift per team.

4.10 Weight of volume unit for each type of waste

4.11 Organizations capable of performing a survey of time and movement; direction, description of the movement and estimate of the cost.

4.12 Are cleaning jobs part of unemployment countermeasures?

4.13 Are there different types of cleaning processes in the Municipality according to the area?

i.e.: residential areas or marginal areas

Yes.

4.14 Number, location and description of Transference Stations.

The municipality does not have any Transference Stations; MIDES does.

4.15 Current problem

5. CURRENT SITUATION OF MID-TREATMENT

Composition data if any, organic waste, paper, plastic, glass, metal, wood, clothes, other.

Data from November, 1997: Plastic 10 %, textile and leather 2 %, glass 6 %, Metal 2 %, cardboard and paper 16 %, other 5 %, organic 59 %.

5.2 Materials being recycled: Bottles, cans, paper, other.

All of the above and glass, plastic and metals such as copper.

5.3 Market for recycled materials: scale, stability, existence of final consumers for the recycled materials, prices and quality:

Aluminum ¢1.50/Lb; bronze ¢2.00/Lb; copper ¢3.00/Lb; tin ¢2.00/Lb; newsprint paper ¢1.75/Lb; cardboard ¢348.00/ton; plastic ¢0.70/Lb.

5.4 Willingness to make compost using waste as raw material, or has there been any previous attempts?

Yes

5.5 Organizations capable of performing an analysis of waste composition, names, addresses, description, estimate of cost of personnel.

5.6 Current problem

6. CURRENT SITUATION OF FINAL DISPOSAL: CURRENT SITES INCLUDING THE NEW LANDFILL

6.1 Volume of transported waste, data obtained through weighbridge.

6.2 Final disposal mode: anaerobic, semi-anaerobic, semi-aerobic, aerobic.

Anaerobic

6.3 Attention to the environment at the site of disposal: water treatment, rain, leaching, and biogas.

Not at the current landfill. A little handling of biogases.

6.4 Filling method. Above all, the method for overlay coating with soil, if performed, or reason if not performed.

Mixed method of ditch and...compaction and overlay coating with 15 cm of soil, three times/week

6.5 Outdoor burning of waste

None.

6.6 Existence (approximate number) of “pepenadores” (scavengers), who live off of the waste material.

Yes, 500

6.7 Seriousness of problems caused by harmful insects or animals such as flies, dogs, vagabonds, etc.

All of the above plus “zopes” (vultures).

6.8 Possibility of the spreading of waste

6.9 Possible contamination of water streams or wells close to the final disposal place; please provide us with related data if available.

6.10 Protests from or problems with the people living in the surrounding areas. In such case, what is the problem?

Contamination of wells and air pollution when fires break.

6.11 Background of current final disposal.

6.12 Current problem.

SOYAPANGO'S MAYJOR'S OFFICE

CLEANING DEPARTMENT AND OTHER SERVICE DEPARTMENTS

1. MUNICIPALITY'S WASTE ADMINISTRATION DEPARTMENT

1.1. The Municipality has 360 employees; Cleaning Department and other Service Departments; the Department has 116 workers; 95 work on the collection in a direct and indirect way.

1.2. The Municipality performs cleaning, although some communities pay private collectors on their own. Some industrial or commercial enterprises transport waste to the final disposal site on their own means.

1.3. We have 16 collecting equipments; the final disposal site is Mariona's dump, though the final site will soon be the sanitary filling presently under construction. Everyday the Municipality collects about 200 tons, which are deposited onto the dump.

1.4. At the present, there is only one collection method, which is organized according to area and route.

1.5. According to the growth and appearance of new communities and/or the expansion of the collection service.

2. GARBAGE COLLECTION RATES AND CLEANING BUDGET

2.1 At present, tariffs are being charged based upon the area (m²) of the real estates. Soyapango is not yet collecting this service together with the electricity service, though we are working in this regard, for then we would be able to count on a secure collection that would allow us to work with a steady flow of cash.

2.2 Yes, they are, and they do not change depending on volume.

- 2.3 At present, there is not a separation according to income source and funds are assigned depending on need.
- 2.4 The Municipal Budget, for 1998, was approximately ¢32 million colones. According to a study carried out by FUNDE the department spent ¢4,294,746 from October 96 to September 97, and it only received an income of ¢2,168,546.
- 2.5 The contribution given by the State is general, and not specifically for garbage collection.

3 PRESENT SITUATION OF GENERATED GARBAGE

- 3.1 There is no garbage classification and the delivery method is very diverse.
- 3.2 It is thrown onto a dumping ground in the open (Mariona), which is legal; 200 tons are deposited there, on a daily basis, and treatment consists practically of soil compressing and soil coating.
- 3.3 We do not have any data regarding the evolution of the garbage that is produced

4 COLLECTION AND TRANSPORTATION PRESENT SITUATION

- 4.1 Service is given to approximately 70% of the population; it is only in areas hard to reach that service is not rendered. We would hope that for the year 2009, collection service would cover all communities in the municipality.
- 4.2 There does not exist a study on specific soil use, however, in order to have an organized collection service, the municipality has been divided into north and south areas, each with their respective routes.
- 4.3 Municipal collection is strictly manual.
- 4.4 1 compacting truck 25 yards in length, 9 trucks 18 yards long and 3 trucks 11 yards long. All of them are 1996 model, international brand, type 4900 x 2; their

- mileage is about 70,000 Km. And they are in a fairly good working condition.-
- 3 compacting trucks 14 yards long, 1987 model, international brand, type 4700, and they are in a poor working condition.
- 4.5 Collection begins at 5:00 A.M. and ends around 12: 00 P.M.- Frequency is three times a week.
 - 4.6 There are 5 collecting routes: average distance to the dump is approximately 20 Km (40 Km back and forth). - The time it takes to get to the dump is about an hour, due to traffic jam.
 - 4.7 There is a collecting fare of $\text{¢}0.05/\text{m}^2$ for residential areas and of $\text{¢}0.08/\text{m}^2$ for commercial or industrial companies.
 - 4.8 There is a small area assigned to perform mechanic works within the department; manual methods are used to work; periodical inspections take place; there are other activities, such as oil change and lubrication, that are performed every 4,000 Km or every 2 months, whatever happens the first.
 - 4.9 There are 5 workers per team and there is only one shift
 - 4.10 No data available
 - 4.11 No data available
 - 4.12 Two microenterprises have been developed to collect unemployed people, however, wages are paid by the communities where they render service
 - 4.13 There does not exist a differentiated way for handling garbage, with the exception of the market's garbage which is collected by a single team
 - 4.14 There are no transference stations.

MIDDLE TREATMENT PRESENT SITUATION

5 Information may be taken from the data given by San Salvador

6 FINAL DISPOSAL PRESENT SITUATION

6.2 TO 6.11 Data given by San Salvador

7 POPULATION'S CONSCIOUSNESS RAISING AND EDUCATION

7.1-7.2 In this sense, there is not a heightening of awareness in the population.

7.3 When cleaning campaigns are organized the services of a collecting truck are requested

7.4 There does not exist an organized educational system. Nevertheless there exists a set of regulations on cleanliness and garbage collection, which has been passed on to the population through a popular version (graphic dialogs); besides, booklets and bulletins on the topic of cleanliness and garbage collection in the municipality, are sent to be printed.

7.5 Committees exist at a community level, however their organization is, many times, at a political level.

8.VARIOUS

8.4 Due to a lack of staff, only downtown's commercial area is swept, see the plan.

8.5 There are two areas: the north and south areas; each one has 12 routes which are served three times a week in an alternate way. - In addition, there are three daily routes, which serve the markets, shopping centers, supermarkets, and industrial companies.

SUMMARY OF CURRENT SET OF PROBLEMS

1. Soyapango has a series of problems that are highly interrelated, as for example:
 - There is a lack of compacting equipment 18 yards long or more, which would allow rationalizing human and material resources.
 - There is a lack of a massive program on consciousness raising, education, and training on the handling of solid waste.
 - High traffic jam, which does not allow the collection and transportation of waste, to the final disposal site, to be fluent.
 - Workers are organized in labor unions, most of the times with political goals and not with strictly labor objectives, thus affecting workers' efficiency.
 - Lack of Municipality's funds for investment in programs and/or projects on sanitary and solid waste handling.

2. How must these problems be solved?

Due to lack of Municipal funds and to the high cost of equipment for collection, we must seek aid from countries that have aid programs towards restoring the environment. Aid should include the design and execution of intensive and massive programs on consciousness raising and training so that waste separation and recycling may be performed at the source of its origin. We would start with an integral program that would change habits and cultural and consuming patterns,

which would allow, in the future, to use less human resources per collecting equipment.

On the other hand, the building of transference stations will allow a more efficient use of human, economical, material and time resources. –Municipality's taxable fees must also be restructured so that services rendered become self- financing.

Likewise, it is important to generate a metropolitan and/or regional policy that would allow and impel municipalities to handle waste in an integral way, from a technical and not a political point of view. In addition, its objective should be to decrease waste production and the volumes for final disposal.

MEJICANOS MAYOR'S OFFICE

- 1-1 Health Sanitation Department; 91 workers (garbage collection convoy; sweeping and pruning crews; garbage collecting in green areas, parks, main channels, rivers and gorges.
- 1-2 Yes, the Municipality performs garbage collecting, however there also exist three associations and one cooperative society that collect garbage privately; transference centers have been assigned to them where garbage is collected by the trucks of the Mayor's office.
- 1-3 9 compacting trucks, which at the present transport garbage to Apopa's dump; the amount they collect weighs approximately from 68 to 74 tons.
- 1-4 There is a plan for collection and transportation; in addition, other aspects have also been contemplated in the same plan such as sweeping, pruning, clearing of rivers and gorges.
- 1-5 It has been planned and evaluated according to fulfillment of goals and needs; that is how the assignation of new personnel is carried out.
- 2-1 At present, the system of charging fares is straightforward: Mayor's Office-taxpayer. In the future, it is our intention to charge the final destination service through CAESS; and later, we intend to find the way of incorporating the charging of the other services to the system.
- 2-2 Fares are stable. Currently the fare is ¢0.06 per m²; we are projecting to modify these fares.

- 2-3 To a good extent, yes, because funds are being used to pay workers; it has to be taken in consideration that from the totality of subscribers only approximately 46% pay this service on time.
- 2-4 For 1999, the budget for the Municipality of Mejicanos is esteemed 9,594,163.96.
- Also included in this budget are small projects for the sealing of infectious focuses.
- 2-5 No
- 3-1 There is a plan of collection routes structured according to the classification of the areas; routes may be planned to be covered every other day, every two days or everyday. The truck beeps the horn to let people know that it is collecting garbage.
- 3-2 We had 49 illegal dumps in Mejicanos, 22 of which were eliminated. The 27 dumps that exist at the present receive daily attention in the morning and in the evening. Besides, we are trying to implement the law.
- 3-3 Organic 58%; paper 19%; plastics 11%; glass 2%; metals 2%; other 8%. This information was esteemed according to a probing carried out by the department.
- 3-4 The "Redes" Company offered their services to our Major's Office. Contact Mr. Guillermo, tele vip number 289-4700 unit 7110526. We ignore the costs.
- 3-5 The current main set of problems refers to the final site; it is urgent to begin working in the sanitary landfill.
- 4-1 We currently lack a study on demographical evolution, not to say one that would be based upon a reliable instrument.

- 4-2 Service is not rendered according to soil use; moreover, it is performed in the entire municipality, in a generalized way
- 4-3 Besides manual collection towards the collecting truck, garbage is also carried from container to truck and small carts.
- 4-4 WE have 9 collecting equipments, all of which are compacting. International brand. 5 trucks weigh 8 tons each and 4 trucks weigh 6 tons each. We ignore the costs. Of the 9 trucks, the two white trucks are in poor condition and the 7 red ones are in good condition.
- 4-5 Time schedules: First shift: from 6:00 A.M. to 1:00 P.M. The second shift: from 1:00 P.M. to 8:00 P.M. Areas are classified as follows: A, B, C and D.
- A) Every day, in the morning and in the afternoon.
 - B) Every day, once a day
 - C) Three times a week
 - D) Two times a week
- 4-6 Collection areas are divided into collection routes; therefore, some trucks have up to four collection routes. The farthest distance is approximately 15 kilometers.
- 4-7 N/A
- 4-8 The Municipality's machine shop is located in Colonia Santa Lucia. It has three workers. Frequency is based upon the amount of kilometers traveled and upon the abnormalities reported in each equipment.
- 4-9 They are organized in accordance to the type and extension of the area, and to the amount of generated garbage. Some teams have one driver and three aides; others have one driver and two aides.

- 4-10 We have not yet established rigorously the different types of garbage, not to mention the exact weight.
- 4-11 N/A
- 4-12 In a way, yes. In Mejicanos, we have a cooperative society and three associations that collect and recycle. Whenever it is necessary, they work in the Health Sanitation Department.
- 4-13 NO; only in the cases where there are areas of commercial concentration.
- 4-14 In our case, transfer centers are those places that were assigned to the associations and cooperative societies that work in garbage collection. We have 12 centers, in the Municipality. They should be located in less populated areas and the societies as well as the associations should agree to this.
- 4-15 The problems most affecting our Municipality are: the problems we have with the collecting equipment and the sweeping personnel; and specially the fact that we do not have dump trucks.
- 5-1 It has already been answered
- 5-2 In Mejicanos, there is an association dedicated to recycling paper, bottles, and mainly aluminum. Besides, the Major's Office and the communities are conducting a project on the compost.
- 5-3 There is a problem with commercializing compost and all recyclable products; however, we have improved lately in opening new markets, though we have problems with transportation.

- 5-4 We are making a joint effort with communities, cooperative societies, associations, schools, and some people at a residential level.
- 5-5 N/A
- 5-6 Several problems: number one, we do not have a full-time promoter that may follow up on the effort that is being done; second, we do not have a terrain for treating the compost; we do not have a garbage collection center and we still have problems with the commercialization.
- 6-1 We do not have the current datum: San Salvador has it.
- 6-2 San Salvador is in charge of everything related to final disposition
- 6-3 N/A
- 6-4 N/A
- 6-5 It is not our intention to burn the garbage, but the dump frequently catches fire.
- 6-6 Yes, there are. The average known, according to public information, is 500 scavengers.
- 6-7 In Apopa's dump, this problem is certainly serious.
- 6-8 This problem is existent in the dump and in all municipalities.
- 6-9 N/A
- 6-10 N/A
- 6-11 Everyone is aware of the problems that were generated among the population by the very announcement of the final disposition; and it was further aggravated by the introduction of the political element by interested parties.
- 6-12 N/A

- 7-1 There is none; but it is important to mention that significant efforts have been done in this respect.
- 7-2 There is not a general awareness; however, there is awareness from some groups organized in small associations. In this sense we need more promotion and to stimulate the processes.
- 7-3 What the population demands above all, is garbage collecting and street sweeping; in addition, clearing of rivers, main channels and green areas is also demanded.
- 7-4 WE held a program in this regard during 1998 and we are planning to continue this year. This project was developed with the help of the Canadian Municipalities Federation and the SAGDEI.
- 7-5 In this Municipality, we have the support of the inter-communal organizations; they are found in each sector of the Municipality; we also have the support of the other communal organizations.
- 7-6 We are lacking a promoter that would direct and carry out the educational program, in addition to giving continuity to the compost and recycling program; other problems are the lack of economical capacity to develop this type of projects.

8. VARIOUS

- 8.6 We have a diagram that reflects all the collection routes.

SUMMARY OF CURRENT PROBLEMS

With the purpose of elaborating a summary of the main problems, first I am going to mention the more general ones, where not only the municipalities play a part but where also the Central Government plays a part through its different departments and institutions.

1) State's Participation

- a) Law Implementation on the Environment
- b) Creation and implementation of special laws that would regulate the generation and treatment of garbage according to its classification.
- c) Policies on Environmental Education and heightening of public awareness through a formal education.

2) Participation

- a) There is not a policy or an entity that would gather all scattered endeavors that are being carried out by different public, communal and private entities. (NGOs, Major's Offices, private companies, Environment Department, communities, social means of communication and so on).

3) Little Education and Heightening of Public Awareness among the Population at a General Level

- a) There are no important programs addressed to environmental education, among the population.
- b) There is not awareness among the population living in the metropolitan area, on the problem of the environment at a general level.

- c) There is not awareness among the population about the harms caused by the fact of not treating garbage in an adequate form.

4) Institutional Weakness

- a) There is not a coordination mechanism for mutual support among national and municipal authorities and for the implementation and execution of municipal and national laws regarding the Environment.
- b) Municipal law regarding the Environment is not applied in its entirety
- c) Law statutes are not complete in their content, and they lack clarity in their mechanisms and their application processes.

5) Means for the execution of garbage collection tasks

- a) Faulty collection equipment; the fact that we do not have one truck per area forces to overload the units; these limitations make units to deteriorate faster, for they work double shift everyday, due to the fact that we usually have two trucks in repair, on average.
- b) Difficulties with the street, park and market sweeping crews due to the lack of carts to transport garbage to the collection centers.
- c) Difficulties with the crew's performance of tasks related to the clearance of green areas, small channels, rivers, and gorges. This is because we do not have the adequate equipment and tools, especially for rivers, gorges, and small channels.
- d) Garbage collecting problems in the transference centers and sites authorized to have containers; garbage scattering problem exists because there are not enough containers to collect all generated garbage.

POSSIBLE SOLUTIONS

- Problem #1 Let the Environment, Health, Education, Agriculture and Farming Departments join efforts among themselves and with the municipalities for impelling integral plans for the general population, at the same time that they promote initiatives that call the attention of the population and stimulate it.
- Problem #2 To define mechanisms of participation, coordination, and support, among the related institutions of the different municipalities, in the implementation of possible actions through one or more related institutions.
- Problem #3 Development of formal and informal educational programs, taking advantage of all possible means. It is important that all municipalities introduce this type of activities relying on social promoter. It is equally important that NGOs contribute in this regard by incorporating productive projects as means of education and production.
- Problem #4 It is necessary that we may be willing to help each other in a reciprocal way and this includes the authorities of the Civil National Police (PNC), and especially of the Environment, Traffic, and Public National Safety Departments. Coordination among all Major's Offices or other pertaining institutions is also necessary, in order to make effective the application of regulatory laws in this field.

It is important that a single set of laws may be approved in the whole metropolitan area, so that corresponding measures may be applied based upon common criteria.

Problem #5 In order to have the real capacity need to acquire the following equipment:

- 3 compacting collection trucks
- 1 dump truck to collect debris and garbage
- 25 small carts for sweeping streets, parks and markets
- 2 garbage collecting equipments for the crew in charge of clearing small channels, rivers and gorges.

MAJOR'S OFFICE OF APOPA

- 1.1 Solid Waste Department: 1 head, 38 operators
- 1.2 YES
- 1.3 6 in good conditions, and 1 in poor conditions
- 1.4 YES
- 2.1 Apopa's Major Office does not have any method to charge taxpayers that have been in arrears less than 5 years.

The Arrears Recovery Department is dealing with taxpayers that have been in arrears for more than 5 years.

Recovery method: direct notice; a document containing the balance sheet is elaborated, and a payment plan having different options is annexed.
- 2.2 No, they are valid
- 2.3 YES
- 2.4
- 2.5 NO
- 3 Residential, Commercial and Industrial
- 3.1 In containers, in street corners; people take garbage out when they hear the beep of the truck
- 3.2 Mariona's Dump
- 3.3 Regarding generated waste, the answer is already in the question
- 3.4 No organization exists
- 3.5 Lack of resources in every aspect

- 4.1 We are working on this; there are no additional resources
- 4.2 It is generalized
- 4.3 A small cart containing 8 barrels and 1 tricycle.
- 4.4 -2 international compacting trucks; date of acquisition and cost: 1992, €350,000.⁰⁰; one of them is working, the other is in poor conditions;
- 5 compacting international trucks: 1995 (C 32929-1-29119-8-25879-9-22879-2-19019). Japan's Government donated the latter trucks.
- 4.5 Teams work from 6: A.M. to 1:00 P.M. ; there is another team that works an additional shift, from 1:00 P.M. to 8:00 P.M.; 5 times a week, 4 times a week, three times a week and twice a week
- 4.6 Amount of routes: there are 7, with distances of 3 Km., 5 Km, 8 Km and 12 Km.
- 4.7 7 cents/m² residential areas and 9 cents /m² commercial areas
- 4.8
- 4.9 4 operators per shift; only one team works an additional shift
- 4.10 It does not exist
- 4.11 I am not answering this question
- 4.12 No, it does not form part of it
- 4.13 Yes, it takes place in a generalized way
- 4.14 They do not exist
- 4.15 Lack of resources

- 5.1 NO
- 5.2 NO

- 5.3 NO
- 5.4 Yes, they are willing
- 5.5
- 5.6 Lack of citizen participation
- 6.1 70 tons
- 6.2
- 6.3 At Mariona's Dump, there was none; in Nejapa, treatment will certainly be applied
- 6.4 In Mariona the ditch method was used
- 6.5 Burning practice is about 10%
- 6.6 Approximately 200
- 6.7 Yes, this type of problem exists
- 6.8
- 6.9 In Mariona there are contaminated wells
- 6.10 Sues exist against the Environmental Sanitation Department because of water and air contamination, skin diseases.
- 6.11 Yes, selection preliminary steps were taken in the case of Nejapa's Sanitary landfill.
- 7.1 Contacts are being established with communal leaders
- 7.2 Yes, but no one wants to work in this
- 7.3
- 7.4 We are working on this
- 7.5

7.6 Heighten public awareness and educate citizens

8.1 They do exist

8.2 They do no exist

8.3 They do exist

8.4 They do no exist

8.5 They do no exist

8.6 They do exist

8.7 They do exist

8.8 They do no exist

SUMMARY OF CURRENT SET OF PROBLEMS

The set of problems is related to this municipality population's growth, for it has grown 30% in a 5-year period; the larger the number of inhabitants, the greater the amount of garbage. This means that with current resources we are not able to evacuate waste in a 100%.

1. GENERAL FRAMEWORK

In the framework of local development, driven by the municipality of Apopa, it is widely recognized that residues and its poor handling cause risks to the environment.

The Municipality of Apopa has a territorial extension of 51.8 Km² and a population of about 350,000 inhabitants, distributed in the following way, urban area 65%, and rural area 35%.

Solid waste collection service offered by this Municipality, covers, at best, only 60% of the total demand, which means that 40% of the total garbage production in this municipality gets to accumulate in streets, public and private places, rivers and

gorges. All this becomes an imminent danger for the environment and above all for the population's health.

SOLUTIONS TO SOLVE THE PROBLEM

- Although we have the basic equipment, Municipal capacity to solve the problem is very limited, due to the high cost of the conventional system that is used to collect solid waste.
- Lack of equipment (compacting trucks) to evacuate solid waste out of this municipality.
- Search an adequate mechanism for handling residential solid waste, through the creation of an educational plan that would be developed in private and national schools.

Having short-term, intermediate and long term-goals, would be a measure that would reduce municipal costs and would offer a good service to communities.

Mr. Luis Alberto Romero

Solid Waste Department

8.9

8.10

NUEVA SAN SALVADOR'S MAYOR'S OFFICE

1.1 Garbage Collection Department

- | | | |
|----|----------------------------|----|
| a. | Head of department | 1 |
| b. | Units' crews | 80 |
| c. | Street and avenue sweepers | 69 |
| d. | Supervisors | 4 |
| e. | Warehousemen | 2 |
| f. | Mechanics | 7 |

1.2 The Municipal Major's Office renders service to an 85% of the city of Nueva San Salvador; two private companies that cover the area of Ciudad Merliot cover the other 15%.

1.3 16 trucks

- Nejapa's dump: next week final disposal will be performed onto Nejapa's sanitary landfill
- The amount of collected garbage fluctuates between 70 and 80 tons per day

1.4 Concerning this question, the Garbage Collection Department has a work plan that contemplates the different areas that are served, the units that are assigned and their respective crews, as well as the different persons that sweep streets and avenues.

1.5 Evaluation is done according to the extension each area and based upon the number of squares of houses that each area has; and it is from this information that

the respective evaluations are performed so that the number of workers and crews, together with their respective units, may be assigned.

- 2.1 Up to the present, each taxpayer has been coming to the Municipal Major's Office to pay the fares for the garbage collection and the public lighting services. However, as from May the charge for public lighting service and the charge for the garbage final disposition service will appear in the electricity bill, emitted by the distributing company "Del Sur". To repeat, collection will be done through the "Del Sur", and only the final disposition service will be charged; this agreement has been reached upon between the Municipal Major's Office and MIDES. The final disposition charge will be based upon kilowatts per hour consumption.

| | | | | |
|-----|------------|--------------------------|------------------------|--------------|
| 2.2 | Yes. Up to | 100 m ² | | ¢ 0.11 cents |
| | | 100 m ² | to 200 m ² | ¢ 0.13 cents |
| | | 200 m ² | to 300 m ² | ¢ 0.14 cents |
| | | 300 m ² | to 500 m ² | ¢ 0.16 cents |
| | | 500 m ² | to 1000 m ² | ¢ 0.18 cents |
| | | 1000 m ² | | ¢ 0.19 cents |
| | | Over 1000 m ² | | ¢ 0.24 cents |

- 2.5 There is not any subvention on the Government's side.

- 3 One should note that as from March this year, garbage volumes have increased due to unscrupulous persons who come from bordering municipalities to Santa Tecla to throw garbage. People are throwing such garbage in the Lion's Club's collection centers and on "14 Avenida Norte" (14th North Avenue).

- 3.1 In this municipality, garbage collection is done in all the forms stated in the question. Garbage is collected from the 35 containers distributed all throughout the urban area, having as priority those sectors where more garbage is produced. In addition, collection centers have been assigned to the different neighborhoods; municipal sweepers make use of them. On the other hand, garbage collection truck service is done on a daily basis, throughout the whole city; when citizens hear the collecting truck beep the horn, they get out of their houses to deposit their bags of garbage.
- 3.2 This Municipality has no problem regarding illegal throwing since, for the most part, citizens cooperate by throwing garbage in the places that have been assigned by this administration. However, there are some people that have recently been coming to deposit a certain amount of garbage, which is saturating collection centers; everything appears to indicate that this garbage is coming from another municipality close to Santa Tecla.
- 3.3 The type of garbage collected by units as well by street and avenue sweepers is of the domestic type. It must be noted that what is collected from San Rafael Hospital, could be classified as infectious waste. Besides, there exist the offal, such as cows' and pigs' viscera collected from the Municipal Slaughterhouse; and on the other hand, we have the industrial wastes that are collected from the assembly zone.
- 3.4 N/A

3.5 The current situation of garbage is a serious problem, and it forces us all to search feasible and objective alternatives, with the participation of citizens, and where we may all contribute towards improving the health of the environment. This should all form part of an educational program, which would promote and influence a culture of city garbage collection.

4.3 Collection is performed by the use of small carts, which is carried out by street and avenue sweepers.

4.4 International

- 16 units
- 11 compacting trucks
- 5 dump trucks
- 6 white compacting trucks, which became part of the equipment on August, 1992
- 3 blue dump trucks, entered on March 22nd, 1994
- 2 white dump trucks, entered on October, 1994
- 5 red compacting trucks, entered on April 10th, 1996
- Average amount of kilometers traveled per unit is, up to the present, 1800 Km.
- All trucks have been donated.
- Trucks' service life as determined by manufactures is 5 years; therefore 5 international red trucks, donated by Japan's Government, are the only ones that are still within their service life time.

- Units' present condition: 11 units have periodically been repaired for they are the oldest; this has caused considerable expenses to our administration. Such expenses include, from motor adjustments to repairs of the compacting system; in the case of the 5 international trucks donated by Japan's Government, repairs have been minimal, consisting in general maintenance.

- 4.5 3 compacting units begin collecting garbage from containers at 6:00 A.M.; afterwards they follow the area's assigned route until it is 1:00 P. M. The other units work from 7:30 A.M. to 2:30 P.M. A second shift starts at 2:30 P.M. and is the one responsible for collecting the garbage coming from the San Rafael Hospital and the viscera coming from the Municipal Slaughterhouse. A special night shift in the city's downtown area goes from 6:00 P.M. to 10 P.M.
- 4.6 There are 16 units, which means there are 16 assigned areas. Trip time per route is 2½ hours, and the time they take to go back and forth to the final disposal site is approximately 1 hour and 50 minutes.
- 4.7 It should be noted that garbage is not collected in the rural area, therefore citizens in this area are not charged for the service. As to the urban area, charge is based upon the data given on point 2,2.
- 4.8 The units are repaired in the establishment where the garbage-collecting department is located.

Method used to repair the units: team of mechanics has been divided into two teams; one team is in charge of checking the even numbered units and the other group is in charge of checking the odd-numbered equipments.

Unit maintenance regarding motor and washer oil change is carried out every three months.

The mechanics team is made up of 8 persons.

- 4.9 Each unit's crew is composed of a driver and four workers.

There are three shifts, of which two are carried out by 75% of the garbage collection staff; a special group, from 6:00 P.M. TO 11:00 P.M carries out the third shift.

- 4.10 The weight of the garbage collected by the units represent an average of 3.5 tons per trip.

- 5.1 96% of collected garbage are organic wastes; 1% is paper; 3% rags

- 6.1 The amount of garbage that the 16 units transport daily is about 70 to 80 tons.

NUEVA SAN SALVADOR'S MAJOR'S OFFICE

1. General summary of garbage problem, in Nueva San Salvador.

Garbage problem situation in Santa Tecla's urban sector: due to the increasing levels of garbage production, through the previous years and specifically during the '90's, the situation has increasingly been seen with great concern. This whole situation becomes more serious due to the population's growth in the Municipality of Nueva San Salvador, which, according to statistical data and the census of 1992, has increased from 113, 000 inhabitants to 152,000 inhabitants, according to recent data. This increase in population has caused a greater production of garbage, and therefore this administration has had to double its endeavor in dealing with the personnel, as for example when repairing the collecting units, for there are not enough collecting units.

This whole situation has caused greater expenses for the municipal administration while trying to face this problem; nevertheless, in spite of all the actions that have been taken, we have not been able to serve the entire city. At the present, we are only serving 85% of the city; the other 15%, which corresponds to the northeastern area, better known as Ciudad Merliot, is not being served. It should be noted that according to the technical sheet, provided by suppliers, or better said, by the truck construction companies, the service life of the existing units has already expired. This is because most units are 1991 model, and only 5 units were provided by Japan's Government, who was so kind to donate them to the Municipality in 1995. The company has established in its technical sheet that the length of the trucks' service life is 5 years. For this reason, the present administration has had to repair each of the trucks in order to lengthen the trucks' lives and thus to be able to collect garbage and continue to render such service to Santa Tecla's community.

2. Alternatives to solve the problem of collecting garbage in Nueva San Salvador.

The present administration has outlined two fundamental aspects:

- a) Promoting an educational campaign in the different educational centers of Santa Tecla
- b) Taking steps to approach the international cooperation to request the donation of 4 garbage-collecting units.

Note: Due to the bad economical situation, resulting from the previous administration, the present administration does not have the economic capacity to buy another unit; it has had to assume all the responsibilities acquired by the previous Town Council.

MAYOR'S OFFICE OF ILOPANGO

- 1.1 1400 to 1599; Public Services Department. 83 people work in the administration department; 48 are garbage collectors.
- 1.2 The Municipality itself performs the city's garbage collection
- 1.3 5; authorized dump; no data on volume of collected garbage.
- 1.4 There is none
- 1.5 There are 4 persons assigned per crew (1 driver and 3 assistants)
- 2.1 Charging system is by appointment or the user comes in himself. (It is projected to charge rates via the electricity bill).
- 2.2 They do not vary according to volume. Companies and real estate properties are charged. Industrial companies and factories: ¢0.30; commercial houses ¢0.25; residential houses ¢0.7; vacant land ¢0.05
- 2.3 Companies, businesses, residences, and vacant land; YES
- 2.4 General total: ¢2,286,224.55; wages ¢1,506,224.55; tires ¢80,000; Rep. ¢200,000; vehicles 150,000; combined ¢350,000.
- 2.5 There is none
- 3.1 Containers and buckets
- 3.2 20 tons per day, approximately
- 3.3 Domestic, commercial, industrial; there are no toxic wastes
- 3.4 R T I, A B A
- 3.5 Economical problems due to a lack of resources to buy spare parts and the necessary technical maintenance of the units.

- Lack of awareness, scarcity of personnel, lack of cooperation from the personnel when they abide by discipline, lack of collecting equipment.
- Lack of education of the population on garbage handling
- Indiscipline

4.3 Small carts

4.4 It is pending

4.5 At the present 6 AM to 1 PM, and from 1 to 7 PM

4.6 6 routes in the morning and 6 in the afternoon ; trip time 1½ during the day; 1 hour during the night

4.7 urban area ¢0.07; rural (rustic) ¢0.05

4.8 two auto mechanics

4.9 4 per team

4.10 NO

4.11 R T I and A B A

4.12 YES

4.13 No, way of handling is equal

4.14 There are none

4.15 NO

5.1 Organic waste; compost project in ex-dumping station; FUNDACION ABA: green and dry vegetables, compost.

5.2 Market waste: green and dry coming from the market in Colonia Santa Lucía and Ilopango.

6.1 86.55 volume

- 6.2 aerobic (in the open)
- 6.3 We work in Nejapa's dump following all the regulations
- 6.4 In the old days, land was covered with soil, and the same process is used today. In the new dump, all regulations, techniques will be followed
- 6.5 Part of garbage is incinerated
- 6.6 N/A
- 6.7 Flies, dogs, others
- 6.8 NO
- 6.9 NO
- 6.10 None
- 6.11 None
- 7.1 Not awareness
- 7.2 Educate inhabitants
- 7.3 A greater citizen participation in garbage handling.

LEONARDO HIDALGO HERNANDEZ

Chief of the Public Service Department

CURRENT SET OF PROBLEMS

- The population is neither aware nor educated in order to give garbage and adequate treatment.
- Ilopango's Municipality is overpopulated
 - Lack of economic resources to obtain heavy equipment: loader and dump trucks

SOLUTIONS OR ALTERNATIVES

- 1) Education and heightening awareness campaigns so that the population learns to handle solid waste
- 2) Educate parents on the waste correct handling so that they can transmit their knowledge and experience to their children and others of their generations.
- 3) Ask for financial aid or for the machinery itself through the International Community

MUNICIPAL MAYOR'S OFFICE OF DELGADO

- 1.1 General Services Department; Social Promotion (MIDES)
- 1.2 It is carried out by The municipality's Administration
- 1.3 5 collecting units; Nejapa; 80 tons per day
- 1.4 No
- 1.5 By areas or by routes
- 2.1 Collection of funds
- 2.2 They are variable
- 2.3 Yes, for example by extending the service coverings
- 2.4 ¢30,000 per month
- 2.5 No
- 3.1 In containers and bell-shaped containers
- 3.2 No
- 3.3 Domestic and commercial type
- 3.5 Lack of equipment, containers, and technical counseling
- 4 Current situation is deficient cause of lack of resources (collecting equipment)
- 4.1 There are areas that have not been covered (144,000 inhabitants)
- 4.2 Residential and commercial collecting, on a daily basis
- 4.3 By small carts, street sweeping
- 4.4 Donated by Japan (International brand, red color)
- 4.5 Starting Time 5:00 AM to 3:00 PM, Monday through Saturday

- 4.6 5 routes; 30 KM each
- 4.7 Rural 150 meters ₱12.00 ----- 100 meters ₱6.00
- 4.8 Municipal machine shop
- 4.9 Five per team (a driver and four workers)
- 4.10 We do not have it
- 4.13 Yes, there are
- 6.1 Garbage volume 8 tons per unit
- 6.8 No, it only happens when trucks leak water on the street.

SUMMARY OF MUNICIPALITY'S PRESENT SET OF PROBLEMS

There does not exist a technical guidance that would be adequate to treat solid waste; therefore, the necessary treatment has not been performed. We only have the collection process that is done via the collection units and crews. We may say these are the priority problems in the municipality,

A) Garbage burning

B) Dumps in the open air

C) Lack of containers

D) Lack of education on behalf of the population to treat garbage.

< The implementation of an educational process on garbage adequate treatment.

< The possession of more equipment and resources to give a better service to the community.

< The implementation of garbage collection campaigns all throughout the municipality, in coordination with the communities of the municipality.

< The prioritization of the approval of the environment's regulations.

MAYOR'S OFFICE OF SAN MARTIN

Attention: Ing. Ronald Wilfredo Ruíz

- 1.1 Name of Department that carries out collection activity: Environment's Health Department (Departamento de Saneamiento Ambiental)
- Amount of members that form part of the municipality:
- 1 Municipal Mayor
 - 1 Municipal Syndic
 - 10 Proprietary councilors
 - 4 Substitute councilors
- 1.2 The Municipality's Mayor's Office is the one in charge of collecting garbage, hiring the necessary staff and providing them with the equipment needed to carry out their functions.
- 1.3 In this jurisdiction, there are five collecting units that transport garbage to the sanitary landfill; they collect 80 tons of garbage per day.
- 1.4 Each collecting crew has been assigned an area to cover on a daily basis; and the users themselves object to the inefficiency of the service.
- 1.5 The user informs the Municipality of the areas where service is not delivered or that are not served in their totality. It is then that additional staff is hired and that depending on the terms of payment, additional equipment is acquired.
- 2.1 The charging method used is the traditional one, where payment is made on a monthly basis and by m². This municipality has not incorporated itself to the bill emitted by CAESS due to a lack of technicality.

- 2.2 We have the general table of the Municipality's rates, which vary depending on the size of the real estate property and not on the volume of garbage found on it.
- Residential area ¢0.10/m²
- Vacant land ¢0.07/m²
- Industrial area and factories ¢0.20/m²
- 2.3 Collection of funds for the service delivered is not enough to cover labor and maintenance of garbage collecting equipments; therefore it is necessary to update the fares
- 2.4 Year 1999 total amount ¢6,743,468.65; year 1999 budget for cleaning ¢747,204.
- 2.5 Yes, we have indirect State's financial aid, 20% with FODES
- 3 City is controlled in the way that garbage promontories have already been collected.
- 3.1 There does not exist a waste classification system (organic and recyclable); several containers have been placed in the most critical places, where there are garbage promontories, so that when the users hear the collecting truck sound the horn, they take their garbage out.
- 3.2 The Municipality has set itself the goal of making garbage promontories disappear, which is being achieved.
- 3.4 We have not received any offers from any institution or enterprise that engages in the technical treating of garbage.
- 3.5 There does not exist a technical treatment to apply to the sanitary landfill.

4. Demographical evaluation of collection areas, from 1988 up to 2009. The potential population that uses the garbage collecting service has grown enormously. And we further have to take into account the fact that during the war, the inhabitants of rural areas chose to seek the urban area for they felt safer; it was a matter of survival, therefore it is a relative.
- 4.1 It is obvious that users' demand for this service has increased. Ten years ago, we had a collecting equipment that was not able to handle the amount of garbage, and therefore it was a very dirty city. At the present, we have five units that cover the entire city.
- 4.2 There does not exist a classification system and in indirect way we could say:
Residential area 60%; commercial area 15%; offices area 10%; agriculture area 5%; industrial area 10%.
- 4.3 Only one form of collecting garbage exists, which consists in using trucks and workers who collect garbage bags left by users out of their houses. It is only in the market area that garbage collection service is performed, using small carts.
- 4.4 A Toyota truck type "Dyna" 250, chassis # BU 83,0005869, it weighs 5 tons, motor #1295308, license plates C-78319, color white and blue, Diesel, model 1993 \$187,000.00, in fair condition. Three trucks 1990, International Dump Truck \$35,000.00 and a truck model 1991, International Truck \$20,000.00. They are in good conditions.
- 4.5 From 6:00 A.M. to 2:00 P.M., Monday through Friday; Saturdays 4 hours.
- 4.6 5 collection routes go all the way to the final disposal place. There are a total of 5 collection routes for the five crews. Distance covered daily while carrying out their

work has not been calculated, nor the time to do it has been calculated either. The sole responsibility is to complete two trips per day.

4.7 Twice a month, oil is changed, greasing done and the motor washed.

4.8 Three workers, one driver and five crews.

4.13 There are 4 types of classifying garbage, where rates vary: residential, commercial and financial area, industrial and factory area.

7.3 People that live near the sanitary landfill are aware that there is a need to have the erosion of the property of neighboring properties for it is a high-risk area.

FOR: ING. CELINA CRUZ MARTINEZ

COORDINATOR OF ENVIRONMENT'S UNIT OPAMSS

FROM: MARIO EDGARDO AGUILAR

MUNICIPALITY'S SYNDIC, MAYOR'S OFFICE OF CUSCATANCINGO

- 1.1 15 workers
- 1.2 Yes
- 1.3 6 garbage collection teams; Nejapa is the final disposition site
- 1.4 There is none
- 1.5 It is evaluated and planned as the suburban communities grow
- 2.1 CAESS's bill (subscribers to CAESS system). Before fares were charged the traditional way, through current billing accounts.
- 2.2 ¢0.12 cents of colones per m2.
- 2.5 No
- 3.1 Containers and delivery to the garbage collection teams.
- 3.2 Very little
- 3.3 In the most part, generation of waste is generally of the domestic type; generation is very high
- 3.4 No
- 4.1 There has been an increase of 30%
- 4.2 Residential
- 4.3 Via small carts
- 4.4 Year '94; international donation
- 4.5 8 hours

- 4.6 6 routes
- 4.7 ¢0.12 cents of colones
- 4.8 A weekly check is performed in the Mayor's Office mechanic shop (a mechanic and an assistant).
- 4.9 6 workers
- 4.10 It has not been established
- 4.11 NA
- 4.12 Yes
- 4.13 No
- 4.14 They do not exist
- 5.1 70% organic waste, 30% others
- 5.2 30%
- 5.3 NA
- 5.4 NO
- 6.1 40 tons
- 6.2 NA
- 6.3 NA
- 6.4 NA
- 6.5 No
- 6.6 No
- 6.7 No
- 6.8 Yes
- 6.9 No

MUNICIPAL MAYOR'S OFFICE OF DELGADO

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- 2.2 They are variable
- 2.3 Yes, for example by extending the service coverings
- 2.4 c30,000 per month
- 2.5 No
- 3.1 In containers and bell-shaped containers
- 3.2 No
- 3.3 Domestic and commercial type
- 3.5 Lack of equipment, containers, and technical counseling
- 4 Current situation is deficient cause of lack of resources (collecting equipment)
- 4.1 There are areas that have not been covered (144,000 inhabitants)
- 4.2 Residential and commercial collecting, on a daily basis
- 4.3 By small carts, street sweeping
- 4.4 Donated by Japan (International brand, red color)
- 4.5 Starting Time 5:00 AM to 3:00 PM, Monday through Saturday
- 4.6 5 routes; 30 KM each
- 4.7 Rural 150 meters ¢12.00 ----- 100 meters ¢6.00

- 4.8 Municipal machine shop
- 4.9 Five per team (a driver and four workers)
- 4.10 We do not have it
- 4.13 Yes, there are
- 6.1 Garbage volume 8 tons per unit
- 6.8 No, it only happens when trucks leak water on the street.

SUMMARY OF MUNICIPALITY'S PRESENT SET OF PROBLEMS

There does not exist a technical guidance that would be adequate to treat solid waste; therefore, the necessary treatment has not been performed. We only have the collection process that is done via the collection units and crews. We may say these are the priority problems in the municipality,

A) Garbage burning

B) Dumps in the open air

C) Lack of containers

D) Lack of education on behalf of the population to treat garbage.

- The implementation of an educational process on garbage adequate treatment.
- The possession of more equipment and resources to give a better service to the community.
- The implementation of garbage collection campaigns all throughout the municipality, in coordination with the communities of the municipality.
- The prioritization of the approval of the environment's regulations.

MUNICIPALITY OF SAN MARCOS

- 1.1 40 PERSONS
- 1.2 YES
- 1.3 8 pieces of equipment; Nejapa; 40 tons per day
- 1.4 The municipality has 7 areas which are evaluated according to whatever equipment we have available.
- 2.1 We will, at some point in the future, start collecting garbage fares along with electricity ones, since it is more practical and more straightforward.
- 2.2 YES
- 2.3 YES
- 2.4 N/A
- 2.5 YES
- 3.1 In containers and when the crews call on the houses
- 3.2 There are many ravines in the municipality where it is easy for people to throw garbage; approximately 20 tons are thrown in such places and the municipality is constantly cleaning them.
- 3.5 Citizens do not agree on the way garbage is handled. Sometimes the garbage they produce, ends up in ravines; in addition we have the political problem, since there exist political parties who are not part of government, and who, in order to harm the municipality's image, throw garbage in inadequate places.
- 4.1 Ten years ago, the municipality's population was 50,000 inhabitants. In 1995 and 1996, six trucks came to form part of the equipment, six of which were

donated by the Japanese Government. It is esteemed that for the year 2009, the population will be around 160,000 inhabitants; therefore, additional collection equipment will be necessary.

4.2 N/A

4.3 In the municipality, collection is carried out via small carts in areas such as: the municipal market, and in other places where containers are necessary for the prompt deposit of garbage, for garbage may not remain in street corners because of illnesses.

4.4 Red trucks, INTERNATIONAL brand donated in 1996 by Japan, and four trucks INTERNATIONAL brand, which were donated by the Central Government in 1985.

Total Number of Kilometers Traveled by the Red Trucks:

Truck #1 0832727 kilometers

Truck #2 063974 kilometers

Truck #3 063905 kilometers

Current situation: problematic, because of constant movement, the amount of years they have been working, and the type of waste they transport.

4.5 From 7:30 to 1:30 p.m.

4.6 There are 3 routes per crew; each route covers approximately 7 neighborhoods daily and provides collecting service three times per week

4.7 According to the area of the real estate property

4.8 We have a private mechanic

4.9 There are 4 workers per crew and one shift, from 7:30 to 1:30 p.m.

- 4.12 YES
- 4.13 NO
- 6.1 40 tons per day; 1,400 tons per month
- 6.4 Covered with soil
- 7 In order to heighten the awareness of the public and educate the population, we have one agent giving information and lectures on garbage education and other related issues. According to the working plan we have, we hold meetings with board directors and general assemblies with the community, the industrial, the educational, and the transportation sectors.
- 7.1 At the present, we are teaching them to collect garbage. Later, we are intending to teach all inhabitants how to classify it.
- 7.2 Yes, we have to make people aware of the importance of classifying garbage, through the use of proper methods, like educational posters, and videos where we can show them what type of materials must be used to classify garbage, so that they can put it into practice.
- 7.3 Make population participate in garbage collecting campaigns, so that they become aware that they must not throw garbage on the ground, but in the appropriate containers in order to keep the city clean.
- 7.4 N/A
- 7.5 Yes, there exist committees on the environment in the different communities, who are in charge of keeping the community clean; each community has its own organization.

7.6 We have to greatly increase the awareness of the population in order to solve the garbage problem.

8.8 Growth of the population in the Municipality of San Marcos. Census 1971—1992.

CURRENT SET OF PROBLEMS

There is a lack of the adequate equipment, waste collecting machinery, economic, and human resources, since the municipality has a large population and new human settlements.

SOLUTION TO THE PROBLEM

Provide what is needed, be it equipment, machinery, human resources (specialized crews) for high risk health tasks, promote education on solid waste handling, separation of organic and inorganic waste, and give out information on how to minimize the production of garbage.

| 1971 | 1992 | Absolute growth | Growth rate % |
|--------|--------|-----------------|---------------|
| 28,451 | 59,913 | 31,462 | 3.57% |
| | | | |

MAJOR'S OFFICE OF TONACATEPEQUE

In attention to the note you sent us today, I would like to present you a questionnaire about the problems related to the Municipality's solid wastes:

1 Municipality's Waste Administration Department

1-1 Municipality's payroll is formed of 8 persons and 2 collecting operators;

1-2 Real estate owners deposit waste in plastic bags or in sacks which are later returned to them.

1-3 The Major's Office only has two collecting trucks and waste is deposited in a piece of land in the outskirts of the city at a distance of 1 1/2 km.

2 The fare as from past March is 10 cents per m², with a personal budget of ¢160,800.00.

2-1 Collection is carried out administratively and jointly with other non-tributary and tributary taxes for they are conformed by the card system, according to the recommendations made by the Closing of Accounts Department

2-3 At the end of the month the income obtained is divided according to the different services, for which purpose an accounting account is kept;

2-4 Total volume is as high as ¢260,800 including fuel and other maintenance costs

2-5 The Major's Office does not receive any subvention from the State;

3 Current Situation of Generated Garbage

3-1 Waste is delivered to the convoy of sweeping trucks when they go past the houses; one community has its own collectors; Col. San Jose de las Flores;

- 3-2 Present situation is carried out on a piece of land which belongs to the Major's Office and which is located at a kilometer and a half away from the city, with a daily volume of thirty tons which do not receive any treatment.
- 3-3 Evolution of generated garbage; domestic type, street sweeping
- 3-4 An NGO. Studies are needed.
- 3-5 There is a lack of collecting trucks to cover the different sections of the municipality;
- 4 Collecting and Transportation Present Situation: the only two collecting trucks we have, are in poor conditions
- 4-1 It has significantly increased taking in consideration the settlements and suburban communities; and it keeps growing on a daily basis;
- 4-2 Since we only have one piece of land or collection area in the municipality's rural area;
- 4-3 Collection is carried out house by house, and it is performed, in part, using small manual carts, three in total;
- 4-4 An international truck since 1975 and a Hino, 1993; the first was acquired through a loan, and the second one through a subsidy granted by the Central Government through the FIS;
- 4-5 Two routes; one is local and the other a semi-rural; they last from 8 to 12 hours and from 13 to 14 hours respectively; Saturdays from 8 to 12 hours; 40 hours per week;
- 4-6 Routes, local and semi-urban, with trips of 5 and 8 km. that last from one to two hours, from the collection area to the site destined for garbage deposit (dump);

- 4-7 Twenty tons are collected in the urban area and ten tons in the rural area; other communities are not serviced by the Major's Office, but are serviced instead by trucks contracted by the communities;
- 4-8 The Major' Office does not have machine shops to repair equipment, and repairing is done in private machine shops;
- 4-9 Operators; four per team and each team covers two shifts;
- 4-10 -10 and 5 tons per team;
- 4-11 NGOs; we would have to find out the addresses;
- 4-11 Yes;
- 4-13 No;
- 4-14 We have no statistics available;
- 4-15 Waste has no treatment.

5 Present Situation of Intermediate Treatment

- 5-1 Organic waste, papers, rags, and others;
- 5-2 There is no recycling;
- 5-3 There is no recycling market;
- 5-4 We are intending to resort to NGOs.
- 5-5 Once we resort to the NGOs, we will have to make the analysis of garbage composition, and cost estimation will be performed;
- 5-6 Studies related to the problem do not exist.

6 Present situation of final disposal regarding the main places, including the new one.

- 6-1 Since waste is collected house by house and taken to the Municipality's piece of land,
platform scale weighing has not been performed
- 6-2 There is not a final disposal mode
- 6-3 There is no treatment
- 6-4 Ground covering;
- 6-5 Garbage is also burned;
- 6-6 There are no scavengers;
- 6-7 This problem exists, however there are no houses in the place where garbage is
deposited; uninhabited place;
- 6-8 Due to the wind;
- 6-9 There is a possibility of contamination; there are no wells nearby, however at the
bottom there is a ravine that gets filled with water during the rainy season.
- 6-10 Since the area is uninhabited there are no complaints;
- 6-11 The garbage dump has existed at the most two years;
- 6-12 Trucks from other municipalities come at night and there is no vigilance service
- 7 Conscious raising and education of the population
- 7-3 Notification to neighbors through campaigns carried out jointly with the Local
Health Unit
- 7-4 They are carried out by the Major's Office and the Health Unit;
- 7-5 No organized committees exist in the Municipality
- 7-6 Since it is a small community there are no major problems
- 8 Various
- 8-2 Map of soil use

8-3 Plans of administrative zoning

8-6 Plans of collection zones

CURRENT SET OF PROBLEMS IN RELATION TO GARBAGE HANDLING IN THE MUNICIPALITY OF TONACATEPEQUE

- 1- Lack of economic resources that would propitiate an adequate treatment of solid waste.
- 2- Lack of human and material equipment for collection, handling and final disposal.
- 3- Population has none or almost no education in relation to the recycling process.
- 4- Population is lacking in knowledge in regards to the enormous ecological repercussions

resulting from the disproportionate generation of waste.

- 5- There are no environmental programs that would propitiate the ecological education of the population.

- 6- Ecological groups do not exist in the site

ALTERNATE SOLUTIONS

- 1- The creation of ecological Committees in each school in order to educate people, if necessary, house by house, and thus to attain a substantial and intelligent production of garbage.
- 2- The creation of a Municipal Committee that would take steps to the local and exterior acquisition of equipment and technology.
- 3- The elaboration of an effective plan addressed to educating the population on the basics of garbage production, its recycling and handling, as well as the diffusion of the ecological impact.

- 4- A greater impulse to heightening school children's awareness within the program of the school subject "Science and Environment".

NEJAPA'S MAJOR'S OFFICE

- 1.1 40; Municipal Services Department; 9 and 6
- 1.2 Yes, the Municipality does it
- 1.3 2; Mariona's dump; 4.5 tons
- 1.4 No
- 1.5 It is not evaluated
- 2.1 Monthly collection; the Municipality is no yet charging via CAESS
- 2.2 YES. NO.
- 2.3 NO.
- 2.4 No data available
- 2.5 NO.
- 3.1 Garbage is not classified; in some areas, it is collected from containers in the corners, when the collecting truck goes past by, letting people know of its presence
- 3.2 Not under control
- 3.3 Data not available
- 4.1 About 80%, for the urban and suburban areas; there does not exist a projection for the future
- 4.2 No data available
- 4.3 Small carts
- 4.4 Trademark: INTER; 2 are: COMPACT. 1996; no equipment has been donated; KM 1) 30064; 2) 24693, which is in good conditions

- 4.5 Street sweeping: from 5 to 6 a.m. (Monday through Saturday); Collection: from 6 a.m. to 1 p.m. (Monday through Saturday)
- 4.6. 2 routes; there are no distances; there is no control of time.
- 4.7 Vacant land; ¢16.00 monthly, per residential unit
- Houses: ¢16 per month
- Commercial: ¢30 per month
- Businesses: ¢70 per month
- Only in urban suburban areas
- 4.8 There does not exist a maintenance program
- 4.9 2 workers per team; only one shift
- 4.10 No data available
- 4.12 YES
- 4.13 NO
- 4.14 They do not exist

CURRENT SET OF PROBLEMS REGARDING SOLID WASTE HANDLING

Currently the garbage problem is a question that has no favorable solution, and we are not the exception to this problem, since our Municipality also contributes to garbage production. And it is for this reason that we have divided the problems into two parts: **Contamination problems and Delay problems regarding a practical solution to this issue.**

Contamination Problems

- There does not exist an adequate control on Mariona's current landfill
- Contamination of 60 artisan wells that have methane gas and other components, etc.
- Contamination of the Chacalapa or Tomayate Rivers.
- Health problems in bordering communities, which are 11 in total, and which belong to Mercedes village.
- Little importance given to this problem by these Departments in charge of the health field: they are the Health and Environment Departments.
- Contamination caused by fires that take place in Mariona's dump; this affects Nejapa's population.

Delay Problems Regarding A Practical Solution to This Issue

- The agreement made among the Mayor's Office, the general population and Cintec Company has not been kept
- There are no proper road signs nor signs for pedestrian traffic; there are neither road bumps nor proper lightning in the street intersections which are also used by

pedestrians; besides, the road is not yet qualified to be used by trucks carrying a heavy load.

- The solid waste transfer station has not been built yet; and therefore while trying to carry out a proper recycling, an additional problem has been created within the enterprise and the scavengers
- Land for building such facilities has not yet been bought, which continues to be a delay.
- We do not have the proper containers to transport garbage to the above-mentioned landfill.
- Cells have not been built for dangerous waste.

Until the moment, none of the municipalities has been able to find a specific solution to the problems generated by garbage. As a municipality, we produce 7 tons of garbage daily, which in reality is not such a serious problem when compared to other municipalities, where there are industries. Theirs is a different problem, for their garbage contains toxic and inorganic components, whereas the garbage we produce in our municipality is organic. We are currently working on a practical solution, which is the creation of a project:

- A project that would be safe to the environment and our population; this project is contemplated to be good for a period of twenty years.
- We also face the problem of people getting adapted to the new system, due to a lack of education in regards to this issue.

- Another problem is garbage classification within the homes, so that the above mentioned components can be separated, and not have too many problems when delivering garbage.
- In the meantime, we believe that it is important and necessary to promote a campaign to educate the general population, in order to achieve the objective desired in this project.
- Another problem that makes us delay this project is the fact we do not have the economical resources to perform this program.
- Another option is to seek the help of companies that are interested in the fulfillment of this project.