7. PARTICIPATORY MANAGEMENT IN SOLID WASTE MANAGEMENT

7.1 Community Participation - Mobilisation and Community Organization
7.2 Education and Sanitary Environmental Communication
7.3 Informal Sector Workers in the Segregation and Recycling of Materials

8. FUTURE PROSPECTIVES

8.1 Reform and Modernisation
8.2 Reform and Modernisation to Correct Problems and Increase the Effectiveness and Efficiency of Solid Waste Management
8.2.1 Municipal Priorities - Public Education
8.2.2 Municipal Priorities - Human Resources Management
8.3 Alternatives and Suggestions to Increase the Effectiveness of Solid Waste Management Services
8.4 Suggestions for Increased Effectiveness of Solid Waste Management
8.4.1 Incentives/Subsidies
8.4.2 Regulation
8.4.3 Changing Lifestyles, Production and Consumption Patterns
8.4.4 Reuse and Recycling
8.4.5 Financing: Cost Recovery
8.4.6 Financial Estimates - 10 Years

9. MEMBERSHIP OF WORKSHOP GROUPS AND GUIDELINES

10. ACRONYMS

11. WORKING TEAM
At the initiative of PAHO/WHO, Guyana, and with the collaboration of the Guyana Advisory Solid Waste Management Association, a Workshop on the Regional Evaluation of the Municipal Solid Waste Management Services, was convened over December 5 - 6, 2002 to achieve the following objective:

"To compile national information of the principal indicators, such as: total and per capita waste generation, coverage of street sweeping, waste transfer, treatment, and final disposal services, collection frequency, equipment, financial aspects, as well as new approaches in waste management, among others."

1.1 Situational Context

The Workshop was held at a time when consideration was being given to the important issue of "solid waste management for the health of the inhabitants of the countries of Latin America and the Caribbean Region, and its impact on the environment."

Dr. Theodore-Gandi, PAHO’s Country Representative in Guyana noted that "there was a deficiency of reliable information on the state of the art of solid waste management in all countries, especially in Latin America and the Caribbean" and that the current evaluation "would make possible the identification of problems and deficiencies in municipal solid waste management, compare the progress made, redistribute the resources adequately, and disseminate innovative and low-cost solutions that have proven successful in the countries of the Region."

1.2 Participating Entities

The two-day Workshop produced less than desired results from the eleven agencies represented, of whom only three Municipalities (of six) were represented:

- Mayor and City Council (M&CC)
- New Amsterdam Town Council (NATC)
- Linden Town Council (LTC)

The other Agencies were:

- Ministry of Local Government and Regional Administration
- Ministry of Education
- Ministry of Health
- Environmental Protection Agency
- Bureau of Statistics

With the exception of the M&CC the data provided could not be described as totally reliable. These were recorded in Proforma Questionnaires furnished by PAHO.

1.3 Disposition of Local Government and Regional Administration

The Local Government Structure in Guyana is governed by the Ministry of Local Government and Regional Administration.
There are two components of local government however. One consists of the Municipalities established under the Municipal and District Councils Act of 1969, which officially converted the capital Georgetown from a town to a city, and created the new towns of:

- Anna Regina
- Corriverton
- Rose Hall, and
- Linden

New Amsterdam, like Georgetown was already a Town.

The legislation passed in 1980 created the Neighbourhood Democratic Councils. Sixty-five of them are currently operational.

These are spread over ten (10) geo-political areas and are managed by the respective Regional Administrations which are elected along political party lines. See Table 1 below.

### Table 1

<table>
<thead>
<tr>
<th>REGIONS</th>
<th>ADMINISTRATIVE CENTRE</th>
<th>CHAIRMAN</th>
<th>REGIONAL EXECUTIVE OFFICER</th>
<th>POPULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mabaruma</td>
<td>1</td>
<td>1</td>
<td>18,755</td>
</tr>
<tr>
<td>2</td>
<td>Pomeroon-Supernaam</td>
<td>1</td>
<td>1</td>
<td>43,149</td>
</tr>
<tr>
<td>3</td>
<td>Essequibo Islands-West Demerara</td>
<td>1</td>
<td>1</td>
<td>92,139</td>
</tr>
<tr>
<td>4</td>
<td>Demerara-Mahaica</td>
<td>1</td>
<td>1</td>
<td>299,800</td>
</tr>
<tr>
<td>5</td>
<td>Mahaica-West Berbice</td>
<td>1</td>
<td>1</td>
<td>49,937</td>
</tr>
<tr>
<td>6</td>
<td>East Berbice - Corentyne</td>
<td>1</td>
<td>1</td>
<td>144,177</td>
</tr>
<tr>
<td>7</td>
<td>Cuyuni-Mazaruni</td>
<td>1</td>
<td>1</td>
<td>15,478</td>
</tr>
<tr>
<td>8</td>
<td>Potaro-Siparuni</td>
<td>1</td>
<td>1</td>
<td>5,788</td>
</tr>
<tr>
<td>9</td>
<td>Upper Takatu-Upper Essequibo</td>
<td>1</td>
<td>1</td>
<td>15,221</td>
</tr>
<tr>
<td>10</td>
<td>Upper Demerara-Berbice</td>
<td>1</td>
<td>1</td>
<td>39,453</td>
</tr>
</tbody>
</table>

The Municipalities operate independently of the Regional Administrations even though the latter may be sited in their towns. They both however report to the Ministry of Local Government and Regional Administration.

It is to be observed that Georgetown (M&CC) is the only population centre in Guyana in the range of 100,000 to 200,000. All others are within the range 15,000 to 50,000.

The Workshop was the first attempt to collect and collate information about Solid Waste Services provided in the urban areas of Guyana. Essentially it served to sensitize the participants of the need for better management structures and to recommend to the respective Municipalities more defined monitoring of the various components of the solid waste services which they provided.

It was, of course, obvious to the participating representatives that no national policy existed on solid waste management, and there was much more to be investigated and information to be collected in relation to the Neighbourhood Democratic Councils and other areas governed by the Regional Administrative System.

It however provided the preparatory basis for the second Workshop.
2.1 General Characteristics of Guyana

The Republic of Guyana is situated on the Northeast Coast of South America. It is the only English-speaking country in South America, bordered by the Atlantic Ocean in the North, Brazil in the South, Venezuela in the West, and Suriname in the East. It covers an area of 214,470 square kilometers (83,000 square miles).

The population comprises six (6) ethnic groups, namely East Indians, Africans, Amerindians, Portuguese, Chinese and Europeans. About 90% of the population lives on the Coast, whilst about 10% lives in the interior of Guyana.

2.1.1 Physical Characteristics

The Coastland is a low narrow plain, about 25 kilometers wide, adjacent to the Atlantic Ocean, and occupying about 5% of the country's area. The land, in parts, is below sea level, and the 459 kilometers coastline is dissected by the estuaries of sixteen (16) major rivers, scores of smaller creeks, and several canals for drainage and irrigation. The Sand Belt, Highlands and Interior Savannahs make up the rest of the land mass.

The Sand Belt: occupies 25% of the country, and it is about 150 to 250 kilometers wide. The soil supports valuable timber stands and bauxite and gold mines.

2.1.2 Socio-Economic Characteristics

For several reasons Guyana is especially vulnerable to environmental pressures. First, more than 75 percent of the country's land area is covered by forests, many of the ecosystems of which are inherently fragile, and therefore liable to react adversely to interventions which alter their ecological balance. Second, about 90 percent of the country's population live on a narrow coastal belt which is not too small in area for them, but which lies below sea level. As a result the space in which they exist is not only cramped and infelicitous, and therefore prone to a large number of specifically environmental problems, it is continuously threatened by inundations from the Atlantic Ocean and the rivers which bring with them the difficulties caused by flooding, the deposition of silt, erosion and so on. Third, almost the entire economy is dependent upon coastal agriculture, and upon the exploitation of the country's forest wealth and minerals. This means that the ordinary economic activity of the ordinary Guyanese constitutes a continuous threat to the environment. And fourth, Guyana is a poor country. Its citizens might therefore not only find it difficult to resist the temptation to over-exploit its natural resources but also not to repair any which might occur as a result of such over-exploitation. It follows, therefore, that it is imperative that an effective environmental strategy be formulated and implemented as soon as possible.

The most common examples of resource contamination are associated in Guyana with water pollution from mercury, cyanide and other chemical wastes through mining; untreated human and animal wastes; and agricultural and industrial wastes. However, air pollution is also a public health concern, particularly in areas such as Linden, where suspended mineral particulate have been implicated in certain human respiratory disorders.

The environmental problems in the coastal zone in Guyana are intimately linked to activities associated with human settlement and, as has been indicated, with specific effects that are related to population concentration and economic activity. These include waste generation - solid, liquid, gaseous, chemical, heat, etc.; flooding from the increased runoff caused by the replacement of natural vegetation by built structures; and coastal erosion aggravated by various types of engineered structures and by activities such as sand-mining.

1 National Development Strategy - 2001 - 2010
### 2.1.3 Health Characteristics

Compared to other neighboring countries, Guyana ranks poorly in regard to basic health indicators. In 1998, life expectancy at birth was estimated at 66.0 for Guyana; 71.6 for Suriname; 72.9 for Venezuela; 73.8 for Trinidad and Tobago; 74.7 for Jamaica and 76.5 for Barbados. In Guyana, the infant mortality rate in 1998 was 24.2; in Barbados 14.9; in Trinidad and Tobago 16.2; in Venezuela 22; in Jamaica 24.5; and in Suriname 25.1.

In Guyana the leading causes of mortality for children under the age of one are: certain conditions originating in the prenatal period (46.9%); intestinal infectious diseases (15.6%); congenital anomalies (10.4%); diseases of the respiratory system (6.7%); nutritional deficiencies (5.8%); bacterial diseases (4.0%); diseases of the blood and the blood-forming organs (2.0%); endocrine and metabolic disease immunity disorders (1.8%); accidents (1.6%); and diseases of the Nervous System (1.1%).

The leading causes of mortality for all age groups are cerebrovascular diseases (11.6%); ischemic heart disease (9.9%); immunity disorders (7.1%); diseases of the respiratory system (6.8%); diseases of pulmonary circulation and other forms of heart disease (6.6%); endocrine and metabolic diseases (5.5%); diseases of other parts of the Digestive System (5.2%); violence (5.1%); certain condition originating in the prenatal period (4.3%); and hypertensive diseases (3.9%).

The picture with regard to morbidity patterns differ. The ten leading causes of morbidity for all age groups are, in decreasing order: malaria; acute respiratory infections; symptoms, signs and ill defined or unknown conditions; hypertension; accident and injuries; acute diarrhoeal disease; diabetes mellitus; worm infestation; rheumatic arthritis; and mental and nervous disorders.

Poor environmental health is in part responsible for the seriousness of vector borne diseases, including malaria, filaria and dengue fever. Malaria is endemic and represents the major cause of morbidity in Regions 1, 7, 8, which are also among the poorest areas of Guyana. Filaria is endemic along the coastal strips, and dengue fever is prevalent especially also in the coastal area. In general, diseases spread by vectors and those associated with environmental problems show the most rapid rates of increase.

While malaria is mainly responsible for the high rates of morbidity in the hinterland, food accessibility and availability vary across Regions. Moreover, the nature of the most pressing health concerns varies by population group. An analysis of disease patterns and other socio-economic variables has revealed particular groups and areas of vulnerability, namely: women’s health; children’s health; people affected by STDs/AIDS; people affected by mental health problems and drug abuse; disabled people; elderly people; and the Amerindians.²

Tables 2 & 3 respectively present some of socio-economic and health indicators which should be of interest.

### 2.2 Brief Outline of the Evolution of the Solid Waste Management Services in the Last Ten Years

Solid Waste Management as a deliberate policy has been largely limited to the City of Georgetown with a current population of some 180,000 persons, and to a lesser extent New Amsterdam, in Berbice.

**Incineration**

As far back as fifty years ago, the Mayor and City Councilors who managed the City installed a kiln type incinerator, which malfunctions seriously in its now decrepit state. This form of disposal supplemented the motorized vehicles which collect waste for disposal for incineration, and controlled open dumping.

² National Development Strategy - 2001 - 2010
### Table 2

<table>
<thead>
<tr>
<th>DEMOGRAPHIC</th>
<th>SOCIO ECONOMIC INDICATORS</th>
<th>MORTALITY INDICATORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOT. POP. (’000) 2002</td>
<td>URB. POP. (%)</td>
<td>LITERATE POPULATION (15+ YEARS OLD) % 2002</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TOT.</td>
<td>M</td>
</tr>
<tr>
<td>Antigua &amp; Barbuda</td>
<td>65</td>
<td>37.4</td>
</tr>
<tr>
<td>The Bahamas</td>
<td>312</td>
<td>89.1</td>
</tr>
<tr>
<td>Barbados</td>
<td>269</td>
<td>51.1</td>
</tr>
<tr>
<td>Belize</td>
<td>236</td>
<td>48.3</td>
</tr>
<tr>
<td>Dominica</td>
<td>70</td>
<td>71.7</td>
</tr>
<tr>
<td>Grenada</td>
<td>94</td>
<td>39.0</td>
</tr>
<tr>
<td><strong>Guyana</strong></td>
<td><strong>765</strong></td>
<td><strong>37.2</strong></td>
</tr>
<tr>
<td>Jamaica</td>
<td>2,621</td>
<td>57.1</td>
</tr>
<tr>
<td>St. Kitts &amp; Nevis</td>
<td>38</td>
<td>34.5</td>
</tr>
<tr>
<td>St. Lucia</td>
<td>151</td>
<td>38.3</td>
</tr>
<tr>
<td>St. Vincent &amp; the Grenadines</td>
<td>115</td>
<td>57.0</td>
</tr>
<tr>
<td>Suriname</td>
<td>421</td>
<td>75.3</td>
</tr>
<tr>
<td>T &amp; T</td>
<td>1,306</td>
<td>74.9</td>
</tr>
</tbody>
</table>
### Table 3

**Morbidity Indicators**

<table>
<thead>
<tr>
<th></th>
<th>REG. DEATHS 2001</th>
<th>CONF. CASES 2001</th>
<th>TOTAL</th>
<th>BK+</th>
<th>MEASLES INCIDENCE</th>
<th>TUBERCULOSIS INCIDENCE (100,000 POP)</th>
<th>CHOLERA REPORTED CASES 2001</th>
<th>MALARIA RISK AREAS POP (%)</th>
<th>MALARIA API (1,000 POP)</th>
<th>MALARIA REPORTED CASES</th>
<th>DENGUE CONFIRMED CASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antigua &amp; Barbuda</td>
<td>-</td>
<td>-</td>
<td>6.2</td>
<td>3.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td>The Bahamas</td>
<td>-</td>
<td>-</td>
<td>26.3</td>
<td>17.9</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Barbados</td>
<td>-</td>
<td>-</td>
<td>1.1</td>
<td>1.1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Belize</td>
<td>-</td>
<td>-</td>
<td>44.9</td>
<td>18.6</td>
<td>-</td>
<td>66.2</td>
<td>4.9</td>
<td>759</td>
<td>3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Dominica</td>
<td>-</td>
<td>-</td>
<td>7.0</td>
<td>7.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td>Grenada</td>
<td>-</td>
<td>-</td>
<td>2.2</td>
<td>2.2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>12</td>
</tr>
<tr>
<td><strong>Guyana</strong></td>
<td>-</td>
<td>-</td>
<td>55.2</td>
<td>15.6</td>
<td>-</td>
<td>13.6</td>
<td>260.8</td>
<td>27,122</td>
<td>60</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Jamaica</td>
<td>-</td>
<td>-</td>
<td>4.8</td>
<td>3.4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>39</td>
</tr>
<tr>
<td>St. Kitts &amp; Nevis</td>
<td>-</td>
<td>-</td>
<td>7.7</td>
<td>7.7</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>89</td>
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<td>St. Lucia</td>
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<td>6.0</td>
<td>4.6</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>292</td>
</tr>
<tr>
<td>St. Vincent &amp; the Grenadines</td>
<td>-</td>
<td>-</td>
<td>13.9</td>
<td>7.8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Suriname</td>
<td>-</td>
<td>-</td>
<td>20.9</td>
<td>8.8</td>
<td>-</td>
<td>11.0</td>
<td>370.8</td>
<td>17,056</td>
<td>760</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>T &amp; T</td>
<td>-</td>
<td>-</td>
<td>15.2</td>
<td>8.8</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2,244</td>
</tr>
<tr>
<td>ADMINISTRATIVE REGIONS</td>
<td>CLEANSING SERVICES</td>
<td>CONTROLLED LANDFILL OR OPEN DUMPS</td>
<td>COMMUNITY MEANS OF DISPOSAL</td>
<td>USE OF Pit Latrines Septic tanks</td>
<td>COMPOSTING</td>
<td>STORAGE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
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<td>---------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 - Barima-Waini</td>
<td>Nil</td>
<td>Nil</td>
<td>Burn waste and bury ashes</td>
<td>a) only</td>
<td>Nil</td>
<td>Nil</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 - Pomeroon-Supernaam</td>
<td>Nil</td>
<td>Nil</td>
<td>Burn waste and bury</td>
<td>b) only</td>
<td>Nil</td>
<td>Nil</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 - Essequibo Islands-West Demerara</td>
<td>Nil</td>
<td>Controlled dump site at Uitvlught/Leonora Sugar Estate and Wales Sugar Estate—both in this Region</td>
<td>Burn waste and bury</td>
<td>a) &amp; b)</td>
<td>Nil</td>
<td>Nil</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 - Demerara-Mahaica</td>
<td>M&amp;CC operates Cleansing Section. Contracts out 95% of collection and transportation services</td>
<td>Controlled landfill site managed by M&amp;CC Georgetown. M&amp;CC also operates 60 year old kiln type incinerator to burn medical waste from six hospitals, expired pharmaceuticals, some illicit drugs and abattoir waste. M&amp;CC also operates a Controlled Dump Site.</td>
<td>Persons in rest of Region burn waste and bury</td>
<td>b) used in suburban and peri-urban areas of Region</td>
<td>Pilot project being operated by M&amp;CC</td>
<td>Nil</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 - Mahaica-West Berbice</td>
<td>Solid Waste Service Section operated by Rose Hall Town Council</td>
<td>Town Council operates Open Dump Site. Blairstown Sugar Estate in the Region operates a Controlled Dump Site. Rose Hall Sugar Estate in the Region operates a Controlled Dump Site.</td>
<td>Burn waste and bury</td>
<td>a) &amp; b)</td>
<td>Nil</td>
<td>Nil</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 - East Berbice-Corentyne</td>
<td>Convorten Town Council operates Solid Waste Management Services</td>
<td>Town Council operates Open Dump Site. Albion Sugar Estate in this Region operates a Controlled Dump Site. Skeldon Sugar Estate in this Region operates a Controlled Dump Site.</td>
<td>Hospital wastes are generally burnt, the burnt</td>
<td>b) operated by District Hospital</td>
<td>Mahaica District Hospital operates Septic Tank</td>
<td>Nil</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 - Cuyuni-Mazaruni</td>
<td>Nil</td>
<td>Open Dumping</td>
<td>Burn waste and bury</td>
<td></td>
<td>b) operated by District Hospital</td>
<td>Nil</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 - Potaro-Siparuni</td>
<td>Nil</td>
<td>Nil</td>
<td>Burn waste and bury</td>
<td>a) &amp; b)</td>
<td>District Hospital operate Septic Tank</td>
<td>Nil</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 - Upper Takatu-Upper Essequibo</td>
<td>Nil</td>
<td>Nil</td>
<td>Burn waste and bury</td>
<td>a) &amp; b)</td>
<td>District Hospital operate Septic Tank</td>
<td>Nil</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 - Upper Demerara-Berbice</td>
<td>Linden Town Council operates Solid Waste Section</td>
<td>Unauthorized Dumping only</td>
<td>Burn waste and bury</td>
<td></td>
<td>Nil</td>
<td>Nil</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.2.1 Landfill Sites

The M&CC records show that beginning in 1957 the Council developed some eighty-five dumpsites in different parts of the city, twelve of which were developed in the last ten years. These lasted from periods of one month to as long as twenty-three months. Only nine others lasted a year or more.

A history of solid waste services, however bare, would only have been recorded by the Mayor and City Councilors of Georgetown.

The city expanded from a population of 90,000 in 1970 to nearly 200,000 when it expanded East and South from 2.5 square miles to 15 square miles - over a two-year period. The M&CC therefore had the responsibility for extending its solid waste services to what is now described as Greater Georgetown.

It was clear that problems would have developed due to the number of areas taken in by the City Council with the coming into being of the Greater Georgetown, and the inadequate amount of vehicles available for refuse collection. It meant that the vehicles that operated in the old Georgetown, together with the seven (7) other vehicles from the Village Council had to be deployed into the new areas. This was done at the cost of the old Georgetown areas receiving lower collection frequency. Another problem involved the terrible condition of the roads in the outlying areas and the damage that was done to the vehicles, especially the trucks.

The past decade has seen several efforts - more or less successful - in the use of controlled landfilled sites, the most recent being the Mandela Avenue Site - which is being further developed into a 15 acre operation at the cost of US$1M.

Other Operations

Other Municipalities in the meantime carried out only rudimentary operations. Most citizens in fact continue to make their own arrangements for waste disposal.

However, it should be noted that the Sugar Industry, the Country’s largest employer has always taken care of its own waste. The Bauxite Industry has earned the same reputation. The other large mining operation (gold) - OMAI - has in recent times been under much pressure from environmentalists regarding the efficiency of its waste disposal system and the impact on the surrounding population and environment.

2.2.2 Equipment- Collection and Transportation

By 1990 the M&CC was operating:

- 6 Mercedes Benz compactors
- 2 Isuzu trucks
- 1 KIA tractor
- 3 KIA trucks
- 4 KIA Compactors and
- 6 German tractors with trailers

Most of these vehicles were gifts from the respective donor countries, Korea and Germany. Between 1994 and 1998 there were further donations from the British Government of Dennis Compactors (6) and one Massey Ferguson Tractor. With the gradual deterioration of the vehicles, abetted by indifferent maintenance the M&CC found it increasingly necessary to outsource the collection and transportation services from the early 1900’s. To date 95 % of the services is provided by private contractors.
2.2.3 Representative Sample of Waste Handled by the Mayor and City Council Municipality and Private Collection Contractors

The Table 4 following shows the wastestream information for a four-week period in November 1999 which was handled by the five private collection contractors. Tonnage figures are estimates by the Cleansing Department of the City Council using average tonnage assumptions developed for each vehicle. It is possibly the best record of actual operations even in 2003.

<table>
<thead>
<tr>
<th>Wastestream</th>
<th>Truck loads</th>
<th>Estimated tonnage collected</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Loads</td>
<td>% of Total</td>
</tr>
<tr>
<td>Low and middle-income residential waste</td>
<td>765</td>
<td>64%</td>
</tr>
<tr>
<td>High-income residential waste</td>
<td>90</td>
<td>8%</td>
</tr>
<tr>
<td>Middle-income residential and commercial waste</td>
<td>41</td>
<td>3%</td>
</tr>
<tr>
<td>Commercial waste</td>
<td>80</td>
<td>7%</td>
</tr>
<tr>
<td>Market waste</td>
<td>214</td>
<td>18%</td>
</tr>
<tr>
<td>Total</td>
<td>1,190</td>
<td>100%</td>
</tr>
</tbody>
</table>

2.3 Investment in Solid Waste Management

Apart from the expansion of the Mandela Landfill Site and the proposed development of Eccles Landfill Site to which the IDB has committed $10M national investment in Solid Waste Management has been minimal, reflecting the level of sensitivity of the policy makers.

Several new housing settlements are being created without any basic solid waste infrastructure. One is unaware of any coordinated plan to address this real and potential problem in the immediate future.

The only significant development has been the establishment of the Environmental Protection Agency in 1996, which is empowered to monitor and act in relation to hazardous industrial waste; acute waste chemical; hazardous waste chemical; and at least six other types of waste, in addition to conducting environmental impact assessments.

There are just two identifiable private sector institutions involved in recycling cardboard and plastic waste respectively.

There is of course a number of private persons contracted only to collect and transport waste by M&CC, Georgetown and New Amsterdam Town Council.

It has not been possible to quantify the current level of investments.
3.1 Solid Waste Management Services within the Institutional Framework of Guyana

Figure 1 represents the Agencies and Key Players involved in, or related to, the Solid Waste Management Services in Guyana. There is no National Institution which has comprehensive responsibility for directing, advising, controlling, monitoring, educating and sanctioning the citizenry as generators of waste and abusers of the lax control.

At present there is a number of Institutions that have some functional responsibilities for solid waste management. These include:

a) The Municipalities that are responsible for the disposal of solid waste in the city of Georgetown and the Town of New Amsterdam, Corriverton, Rose Hall, Linden and Anna Regina. They are also responsible for the disposal of both domestic and commercial waste.

b) The Local Authorities, which are under the Neighbourhood Democratic Councils, take on the responsibility of the disposal of solid waste. In many parts of the country and in the absence of the Municipalities, the local authorities are supposed to be responsible for the collection and disposal of solid waste.

c) The Ministry of Health provides some technical advice to the above-mentioned bodies regarding waste management. This is done through Environmental Health Personnel who are each given responsibility for a number of public health districts. Their main functions are to provide technical guidance to the municipalities; manufacturers and individual householders, regarding the best method of waste disposal appropriate for their localities and types of waste. The environmental health officers are responsible for approving sanitary facilities (septic tanks and on-site disposal facilities).

d) The Mayor and City Council operates the main sewerage system in Georgetown and is responsible for the cleaning and maintenance of sewerage stations, as well as repairs and maintenance of water mains on the roads.

e) The Environmental Protection Agency has the responsibility for establishing regulatory frameworks for the reduction of litter and the discharge of waste generation; the design construction, operation, maintenance and monitoring of facilities for the control of pollution and the disposal of waste; governing the location and classes of disposal sites; governing and regulating the management of waste and prescribing standards for waste management systems. The Agency is also responsible for public awareness and education programmes and the dissemination of information that can enhance effective waste management practices.

While the above institutions have varying responsibilities with regards to solid waste handling and disposal, most aspects of solid waste management are not adequately covered. In addition, management is too fragmented.

3.2 Policy, Legal and Regulatory Framework for Solid Waste Management

The Environmental Protection Agency (EPA) has been striving to get the attention of the authorities in developing a comprehensive policy on Solid Waste Management to little avail. Apart from the EPA’s National Regulations, what obtains is a variety of Laws and By-Laws administered by differing Municipal Agencies. These are listed in the box following:
AGENCIES INVOLVED IN/RELATED TO THE MANAGEMENT OF SOLID WASTE

Ministry of Housing and Water

Solid Waste Business Operators - Private Sector:
- OMAI
- GUYSUCO
- BANKS/DIH LTD.
- RICE PRODUCERS ASSOCIATION
- NEW DEVELOPERS

MINISTRY OF HEALTH

MINISTRY OF HEALTH

Environmental Protection Agency

Environmental Health Unit

private Contractors

Municipalities

Neighborhood Democratic Councils (N.D.C.’s)

NON-GOVERNMENTAL ORGANISATIONS (N.G.O’S)

CLEANSING SECTIONS/UNITS

Drainage and Irrigation Board
SEA DEFENCE BOARD
The fact is that at the most critical levels there is insufficient evidence of appreciation of solid waste management as a sector of economic activity. Nor, as a health issue, has solid waste management attracted the urgent attention it deserves.

This attitude raises growing concern particularly in light of the increasing expansion and development of new housing communities without basic sewerage disposal infrastructure. Public awareness is at a disappointingly indifferent level.

### 3.3 Organisational Modalities of Solid Waste Management Services

All the Municipalities report an inadequacy of funds. Each experiences below expected tax collections. Budgets must therefore be supplemented by subventions from the central government. With the possible exception of the M&CC, salaries of municipal workers are generally too low to attract and retain qualified and experienced staff.

Low productivity of operatives has to be continually addressed, but by inadequately trained supervisors and managers. None of the Municipalities applies any special taxation to be utilised for solid waste services. There is currently no legal provision for this. A general property tax is applied throughout the country, and varying administrative decisions are made as to what proportion of revenue can be allocated to solid waste disposal services, dependent always on expected revenues. To note Georgetown and New Amsterdam utilise private contractors to collect 95% and 30% respectively, of their waste.

Apart from the City of Georgetown and Rose Hall Town who operate daily collections, all other Municipalities provide a Weekly Collection Service.

### 3.4 Technology Development

#### 3.4.1 Technology Development

Having regard to the foregoing it will be understood that technological development so far is limited; except possibly for the Mandela Landfill Site in Georgetown. The five acres extension of the current ten acres site being funded by the IDB will feature:
- Cell construction
- Leachate control
- Protection of Ground Water

In addition to such current features as:
- Correcting slope
- Gas management
- Post closure activities

In the planning stage is a modern landfill site to be located at Eccles, just outside the southern boundary of Greater Georgetown, on the East Bank of the Demerara River. The proposed operation will occupy sixty acres. Its development is expected to cost some US$ 10 M.

3.4.2 Research and Human Resources Education

A Pre-Investment Study for Georgetown Solid Waste Management Programme was conducted during 1999-2000 by Brown, Vence and Associates (BVA) in pursuance of technical assistance being provided by the Inter-American Development Bank (IDB) to the Mayor and City Council, with the agreement of the Ministry of Local Government. The objectives of the IDB technical assistance programme were to:

i) Analyse the existing Solid Waste System

ii) Assess alternative management solutions

iii) Select and implement an integrated waste management plan which would provide a minimum of 20 years of disposal capacity through landfiling, incineration, composting and for recycling.

The information presented by BVA was intended "to provide interested private companies with the necessary background information to design and develop an integrated waste management system". The eventual outcome of the study was the decision to develop the Eccles Landfill Site.

The Federation of Canadian Municipalities, a Consultant Group, is reported to have included a solid waste management component in their current five year Project for the development of Municipal Governance and Management in Guyana. The relevant documentation however is not available to this report.

There is no planned programme for educating the public about solid waste management. Formal coverage in the school curriculum is quite limited. The University of Guyana does conduct a programme in Environmental Studies.

It is recognised that there is need for training of inspectors, enforcers, contractors municipal and other operatives; relevant media personnel, teachers, students, NGO’s in the appreciation, techniques and benefits of effective solid waste management.

---

5 BVA Draft Final Report May 2000
Table 5 following shows all the entities involved in the various activities listed.

### Table 5

<table>
<thead>
<tr>
<th>CATEGORIES</th>
<th>COLLECTION</th>
<th>SWEEPING</th>
<th>CLEANING</th>
<th>RECYCLING</th>
<th>SEGREGATION</th>
<th>DISPOSAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Municipalities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(M&amp;CC) Georgetown</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>Nil</td>
<td>Nil</td>
<td>x</td>
</tr>
<tr>
<td>New Amsterdam</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>Nil</td>
<td>Nil</td>
<td>x</td>
</tr>
<tr>
<td>Rose Hall</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>Nil</td>
<td>Nil</td>
<td>x</td>
</tr>
<tr>
<td>Corriverton</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>Nil</td>
<td>Nil</td>
<td>x</td>
</tr>
<tr>
<td>Linden</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>Nil</td>
<td>Nil</td>
<td>x</td>
</tr>
<tr>
<td>Anna Regina</td>
<td>x</td>
<td>Nil</td>
<td>-</td>
<td>Nil</td>
<td>Nil</td>
<td>x</td>
</tr>
<tr>
<td>B. Private Sector -</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guysuco</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Caribbean Container Inc.</td>
<td>x</td>
<td>Nil</td>
<td>Nil</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

### 3.5 Financing of the Sector: Collection Systems

Of the six Municipalities and one Neighbourhood Democratic Council, five operate a Solid Waste Management Section, although six of them provide Annual Budgets for their Programmes. Expenditure is reported as follows:

### Table 6

<table>
<thead>
<tr>
<th>EXPENDITURE</th>
<th>CORRIVERTON</th>
<th>GEORGETOWN</th>
<th>LINDEN</th>
<th>NEW AMSTERDAM</th>
<th>ROSE HALL</th>
<th>BV/ TRIUMPH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries (US$)</td>
<td>16,700</td>
<td>286,500</td>
<td>19,300</td>
<td>10,400</td>
<td>9,900</td>
<td>23,000</td>
</tr>
<tr>
<td>Equipment (US$)</td>
<td>850</td>
<td>13,600</td>
<td>2,100</td>
<td>-</td>
<td>156</td>
<td>4,200</td>
</tr>
<tr>
<td>Protection Clothing (US$)</td>
<td>-</td>
<td>9,200</td>
<td>1,600</td>
<td>52</td>
<td>156</td>
<td>520</td>
</tr>
<tr>
<td>Total (US$)</td>
<td>17,550</td>
<td>309,300</td>
<td>23,000</td>
<td>10,452</td>
<td>10,212</td>
<td>27,720</td>
</tr>
<tr>
<td>Total no. of employees in section</td>
<td>9</td>
<td>58</td>
<td>26</td>
<td>5</td>
<td>10</td>
<td>7</td>
</tr>
</tbody>
</table>

It should be noted that while the above Agencies operate centrally, the M&CC (Georgetown) contract out 95% of collection and transportation of the city’s waste.

As stated earlier there is no coordinated national Policy regarding the management of solid waste. With the exception of the Environmental protection Agency (EPA) the Agencies involved are (if at all) implementing outdated laws and regulations. The need for an overarching regulatory body is palpable, as there is no effective coordination amongst the participatory Agencies. Because of archaic Laws enforcement is minimal.

In any case except for the Mandela Avenue Landfill there are no generally authorised disposal sites.

The Georgetown Public Hospital Corporation (GPHC) is the only Public Sector institution of its type from which similar information could be gleaned. It employs eleven (11) persons in its solid waste unit.

Its annual budget consist of:

- **Salaries:** US $ 26,041
- **Equipment:** US $ 391
- **Protective Clothing:** US $ 1,302
- **Total:** US $ 27,734
75% of GPHC’s waste is handled by private contractor, while the hazardous waste is collected for disposal by the M&CC.

Except for the M&CC who collect and dispose just 5% of waste generated, Municipalities operate basic equipment. See Table 7 following:

Table 7

<table>
<thead>
<tr>
<th>COLLECTION</th>
<th>ANNA</th>
<th>CORRIVERTON</th>
<th>GEORGETOWN</th>
<th>LINDEN REGINA</th>
<th>NEW</th>
<th>ROSE HALL AMSTERDAM</th>
<th>BV. / TRIUMPH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment/ Machines used</td>
<td>Back Hoe</td>
<td>Back Hoe</td>
<td>Bull Dozers, Excavators</td>
<td>Tractors/ Trailers and Dump trucks</td>
<td>Bull Dozer</td>
<td>Tractors/ Trailers</td>
<td>Tractors/ Trailers</td>
</tr>
<tr>
<td>No. of persons</td>
<td>5</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Percentage Coverage</td>
<td>20</td>
<td>80</td>
<td>5</td>
<td>82</td>
<td>70</td>
<td>62</td>
<td>80</td>
</tr>
</tbody>
</table>

3.6 Other Operational Modalities of the Service

Private sector participation in solid waste management services consist of:

i) a number of persons contracted by the M&CC of Georgetown to collect and transport 95% of waste generated

ii) a private company which recycles old corrugated cardboard only

iii) a private company which recycles plastic drinking containers

iv) private persons contracted by the Rose Hall Town Council to collect and transport 30% of waste generated in the community.

There are no other types of arrangements.

3.7 National and Local Plans

There is no enunciated national strategy. Indeed it is hoped that the current studies being undertaken will contribute to the formulation of a national strategy and operational plan that would include the establishment of an authoritative national agency, adequately funded and self-sustainable. This will require the drafting of necessary legislation to supplement and/or replace the limited regulatory framework which exists.

At the local level Municipal Administrations and community initiatives are constrained by the absence of relevant laws, or even a policy declaration at the national level.
### 4.1 Analysis of Delivery of Municipal Solid Waste Management

Table 8 sets out information gleaned on the generation, collection and final disposal of solid wastes.

#### Table 8

**ANALYSIS OF SOLID WASTE MANAGEMENT SERVICES**

<table>
<thead>
<tr>
<th>Questions</th>
<th>Anna Regina Town Council</th>
<th>Corriverton Town Council</th>
<th>Georgetown City Council</th>
<th>Linden Town Council</th>
<th>New Amsterdam Town Council</th>
<th>Rose Hall Town Council</th>
<th>BV. / Triumph NDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Tons of waste generated weekly</td>
<td>9</td>
<td>140</td>
<td>1734</td>
<td>72</td>
<td>120</td>
<td>100</td>
<td>37</td>
</tr>
<tr>
<td>2) Tons of Waste collected weekly</td>
<td>9.0</td>
<td>117</td>
<td>1500</td>
<td>60</td>
<td>117</td>
<td>62</td>
<td>35</td>
</tr>
<tr>
<td>3) % collection by: Municipality</td>
<td>20</td>
<td>80-100</td>
<td>5</td>
<td>82</td>
<td>70</td>
<td>62</td>
<td>90-100</td>
</tr>
<tr>
<td>: Private Contractor</td>
<td>Nil</td>
<td>Nil</td>
<td>95</td>
<td>Nil</td>
<td>30</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>5) Final Disposal: Sanitary landfill</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>Controlled landfill</td>
<td>Nil</td>
<td>Nil</td>
<td>Yes</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>Controlled dumping</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>Open dumping</td>
<td>Yes</td>
<td>Yes</td>
<td>Nil</td>
<td>Yes</td>
<td>Nil</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Incineration</td>
<td>Nil</td>
<td>Nil</td>
<td>Yes</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
</tbody>
</table>

Regarding the quality of service, this is reflected in Table 9 following:

#### Table 9

**QUALITY in TERMS of EFFICIENCY, EFFECTIVENESS AND SUSTAINABILITY**

<table>
<thead>
<tr>
<th>Population Centers (Towns) areas</th>
<th>QUALITY OF SERVICE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Collection</td>
</tr>
<tr>
<td>Georgetown</td>
<td>7</td>
</tr>
<tr>
<td>Anna Regina</td>
<td>3</td>
</tr>
<tr>
<td>Linden</td>
<td>6</td>
</tr>
<tr>
<td>New Amsterdam</td>
<td>3</td>
</tr>
<tr>
<td>Rose Hall</td>
<td>NR</td>
</tr>
<tr>
<td>Corriverton</td>
<td>NR</td>
</tr>
</tbody>
</table>

Rating: Good (9-7); Satisfactory (6-4); Poor (3-1)
NR - No Rating
4.2 Cost Analysis and Rates for Delivery of the Service

Georgetown alone of the Municipalities was in a position to identify the respective rates per ton of the activities shown below:

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>US$ PER TON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collection/Transportation</td>
<td>10.82</td>
</tr>
<tr>
<td>Disposal</td>
<td>2.51</td>
</tr>
<tr>
<td>Administration</td>
<td>1.32</td>
</tr>
<tr>
<td>TOTAL</td>
<td>14.65</td>
</tr>
</tbody>
</table>

None of the existing Agencies applies a specific rate for solid waste services. The Municipalities basically conform to the statutes which provide only for a general property tax which funds each of their 'integrated' budgets.

In the case of the Mayor and City Council however, there is a differential in the application of the property tax, i.e.

- Residential - 50% of assessed value of the property
- Commercial/Industrial - 250% of assessed value of the property

4.3 Municipal Development and its Relation to Solid Waste Management

Solid Waste Management has been identified as a key concern for municipal governments in Guyana. In Georgetown, garbage disposal is a major problem and collection systems require improvements. Garbage collection service, if provided at all, is done sporadically in some parts of the city. This forces people to use alternatives such as burning their own garbage.

Georgetown lacks an incinerator to deal with hospital wastes. Currently hospital wastes are partially incinerated in an old incinerator that doesn’t have the capacity to finalize the burning operations. As a result, garbage is removed from the incinerator and burned in the open air, sometimes less than one meter from water sources. The lack of public awareness of environmental issues linked to waste management is another aspect of the problem. People litter throughout the city - they dump garbage in the water canals - which provides for the spread of contamination and various diseases. The UDP Program is launching a Public Awareness Campaign to address this problem.

In the other municipalities the situation is virtually the same. The volume of garbage is slightly smaller and the situation is not so dramatic in relation to the availability and condition of the disposal sites, but they also lack collection systems. Burning garbage and littering are also common practices. None of the municipalities have capacity within their staff to deal with the current situation, let alone plan for the future needs through the development of Solid Waste Management Plans. Even though the UDP program on public awareness is designed to reach all of the six municipalities, the IDB indicated that FCM's work in improving solid waste management in the five municipalities outside Georgetown would complement their work and create desirable synergies.

The Guyana Advisory Solid Waste Management Association was established in February 2001, with representatives from several Guyanese municipalities, hospitals and the private sector. The Association is currently looking at developing a Strategic Plan for Solid Waste Management for Guyana that would provide integrated solutions to problems.

The Mayor and City Council (M&CC) of Georgetown, of all the Municipalities, is fairly organized to deal with the problem of solid waste disposal.

---

*Guyana Municipal Governance and Management Project.*
Amongst the actions it has taken are to:

(a) outsource the collection and transportation of 95% of its solid waste to four (4) private contractors -
the best estimates that can be provided are shown at Table 10.

(b) maintain the only controlled landfill of fifteen (15) acres

(c) institute a pilot programme of training primary school students and other community youths in the
technique of composting, since 49% of its waste is bio-degradable

(d) begin the development of a thirty (30) acre landfill site at Eccles 4 KM south of Georgetown, on the
East Bank of Demerara.

<table>
<thead>
<tr>
<th>Year 1999</th>
<th>Mayor and City Council</th>
<th>Private Collection Contractors Area Deliveries</th>
<th>Private Collection Contractors Area Deliveries</th>
<th>Private Collection Contractors Area Deliveries</th>
<th>City Engineering Construction</th>
<th>Other Deliveries</th>
<th>Incinerator Deliveries</th>
<th>Total Deliveries</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>537</td>
<td>760</td>
<td>1,189</td>
<td>1,408</td>
<td>120</td>
<td>1,709</td>
<td>70</td>
<td>5,793</td>
</tr>
<tr>
<td>February</td>
<td>492</td>
<td>731</td>
<td>1,046</td>
<td>1,368</td>
<td>230</td>
<td>1,654</td>
<td>69</td>
<td>5,590</td>
</tr>
<tr>
<td>March</td>
<td>315</td>
<td>723</td>
<td>1,700</td>
<td>1,376</td>
<td>278</td>
<td>1,862</td>
<td>78</td>
<td>5,802</td>
</tr>
<tr>
<td>April</td>
<td>274</td>
<td>867</td>
<td>565</td>
<td>1,260</td>
<td>280</td>
<td>1,867</td>
<td>77</td>
<td>5,279</td>
</tr>
<tr>
<td>May</td>
<td>266</td>
<td>873</td>
<td>668</td>
<td>1,099</td>
<td>302</td>
<td>1,967</td>
<td>125</td>
<td>5,300</td>
</tr>
<tr>
<td>June</td>
<td>276</td>
<td>921</td>
<td>693</td>
<td>1,047</td>
<td>368</td>
<td>2,820</td>
<td>136</td>
<td>6,261</td>
</tr>
<tr>
<td>August</td>
<td>252</td>
<td>827</td>
<td>652</td>
<td>1,102</td>
<td>340</td>
<td>2,265</td>
<td>110</td>
<td>5,548</td>
</tr>
<tr>
<td>September</td>
<td>496</td>
<td>794</td>
<td>708</td>
<td>1,098</td>
<td>330</td>
<td>2,600</td>
<td>138</td>
<td>6,164</td>
</tr>
<tr>
<td>October</td>
<td>445</td>
<td>750</td>
<td>596</td>
<td>975</td>
<td>210</td>
<td>1,487</td>
<td>179</td>
<td>4,642</td>
</tr>
<tr>
<td>November</td>
<td>485</td>
<td>970</td>
<td>752</td>
<td>1,068</td>
<td>420</td>
<td>2,601</td>
<td>186</td>
<td>6,482</td>
</tr>
<tr>
<td>10 month total</td>
<td>3,838</td>
<td>8,216</td>
<td>8,128</td>
<td>11,801</td>
<td>2,878</td>
<td>20,832</td>
<td>1,168</td>
<td>56,861</td>
</tr>
<tr>
<td>12-month projection</td>
<td>4,606</td>
<td>9,859</td>
<td>9,754</td>
<td>14,161</td>
<td>3,454</td>
<td>24,998</td>
<td>1,402</td>
<td>68,223</td>
</tr>
<tr>
<td>Average monthly tonnage</td>
<td>384</td>
<td>822</td>
<td>813</td>
<td>1,180</td>
<td>288</td>
<td>2,083</td>
<td>117</td>
<td>5,686</td>
</tr>
<tr>
<td>% of total wastestream</td>
<td>6.7%</td>
<td>14.4%</td>
<td>14.3%</td>
<td>20.8%</td>
<td>5.1%</td>
<td>36.6%</td>
<td>2.1%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

M&CC is currently negotiating with small entrepreneurs to invest in the recycling of plastics

It is generally hoped that the Eccles landfill with its state-of-the-art technology, when developed at a cost of
US$10M, will be a model for other sites across Guyana. Notably there has been no announcement of a landfill
site being identified for development anywhere else in Guyana.

*BVA Final Draft Report, May 2000*
In the meantime it is anticipated that the Neighbourhood Democratic Councils listed in the Table 11 following will be required to collect and transport their solid waste to the Eccles landfill, when it comes on stream in 2006.

Table 11

<table>
<thead>
<tr>
<th>N.D.C. BUDGET</th>
<th>2003 COLLECTION</th>
<th>MODE OF COLLECTED RATES &amp; TAXES ALLOCATED FOR WASTE DISPOSAL 2002 2003</th>
<th>% OF PER DAY^</th>
<th>TONNAGE</th>
<th>PRESENT SITE AGENT</th>
<th>COLLECTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better Hope</td>
<td>15,755</td>
<td>Tractor &amp; Trailer</td>
<td>8.4</td>
<td>9</td>
<td>7.5</td>
<td>L.B.I. N.D.C.</td>
</tr>
<tr>
<td>Triumph</td>
<td>4,297</td>
<td>Tractor &amp; Trailer</td>
<td>21.4</td>
<td>20</td>
<td>2</td>
<td>Pump Station N.D.C.</td>
</tr>
<tr>
<td>Mon Repos</td>
<td>16,667</td>
<td>Tractor &amp; Trailer</td>
<td>19.5</td>
<td>24</td>
<td>7</td>
<td>Mon Repos N.D.C.</td>
</tr>
<tr>
<td>Buxton</td>
<td>20,120</td>
<td>Private Disposal</td>
<td>Nil</td>
<td>5.4</td>
<td>2.8</td>
<td>Nil Collection started in 2003</td>
</tr>
<tr>
<td>Enmore</td>
<td>4,010</td>
<td>Tractor &amp; Trailer</td>
<td>31.8</td>
<td>23</td>
<td>Estate Factory^</td>
<td>N.D.C.</td>
</tr>
<tr>
<td>Haslington</td>
<td>Nil</td>
<td>Private Disposal</td>
<td>Nil</td>
<td>Nil</td>
<td>1</td>
<td>Nil No Collection</td>
</tr>
<tr>
<td>Malgre Tout</td>
<td>Nil</td>
<td>Private Disposal</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil No Collection</td>
</tr>
<tr>
<td>La Grange</td>
<td>Nil</td>
<td>Private Disposal</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil No Collection</td>
</tr>
<tr>
<td>Soesdyke</td>
<td>26,042</td>
<td>Private Disposal</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil No Collection</td>
</tr>
<tr>
<td>Caledonia</td>
<td>Nil</td>
<td>Private Disposal</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil No Collection</td>
</tr>
<tr>
<td>Herstelling</td>
<td>31,406</td>
<td>Tractor &amp; Trailer</td>
<td>5.2</td>
<td>10</td>
<td>1.4</td>
<td>Samantha Point N.D.C.</td>
</tr>
<tr>
<td>Golden Grove</td>
<td>11,531</td>
<td>Tractor &amp; Trailer</td>
<td>15</td>
<td>17</td>
<td>.8</td>
<td>Samantha Point N.D.C.</td>
</tr>
<tr>
<td>Mocha</td>
<td>Nil</td>
<td>Private Disposal</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil No Collection</td>
</tr>
<tr>
<td>Eccles</td>
<td>13,542</td>
<td>Truck/Tractor &amp;</td>
<td>15.6</td>
<td>14</td>
<td>2.8</td>
<td>Mandela Site Contractor</td>
</tr>
<tr>
<td>Trailer</td>
<td></td>
<td>Horse Cart</td>
<td>4.1</td>
<td>3</td>
<td>1.4</td>
<td>Ogle Contractor</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>26.7</td>
<td></td>
</tr>
</tbody>
</table>

Data compiled by Ministry of Local Government.

N.B. The current sites listed are not authorized sites.

---

^ Information on tonnage per day supplied by Mayor & City Council - Cleansing Department

^ Estate disposes of own waste and that of NDC.
4.4 Shared and Participatory Management (Municipality, Community, NGOs)

The Workshop attracted representation from Groups identified below but who were not previously known, and in fact whose representatives are still to prove that they have substantive and organized support. These were:

- Asha Jyoti
- Consumer Movement of Guyana
- Guyana Consumers’ Association
- Guybernet
- Love Outreach International
- Media EH Network
- Red Thread

Identifiable NGO’s included

- Guyana Advisory Solid Waste Management Association (GASWMA)
- Guyana Association of Professional Engineers (GAPE)
- Red Cross Society

The particular Working Group which addressed the issue of participatory management recorded the following commentary:

(i) Non-formal education was inadequate.

(ii) In the case of formal education, coverage in the school curriculum was limited. The University of Guyana, however, conducted a programme in Environmental Studies

(iii) So far as informal education was concerned, the Media paid scant attention to the topic of solid waste management.

Apart from GASWMA none of the other entities has displayed an identifiably active role with respect to the issue of solid waste management - a disposition that is reflective of other NGO’s and Community Groups who seem preoccupied with issues they regard as having higher priority.

As a consequence there is minimal, if any, activity which can be described as participatory in terms of managing solid waste.

4.5 Small Businesses Involved in Collection, Transportation and Final Disposal

The Workshop was able to identify the Company Caribbean Container Inc. as the only private sector entity dedicated to attracting the public into supplying it with recyclable cardboard. Its current capacity of **35 tons per day** is a far cry from being satisfied. The average intake is just **3 tons per week**. Banks/DIH, a large beverage manufacturer, has an arrangement for a private contractor only to take care of its recyclable waste.

4.6 Micro Enterprises Involved in Sweeping and Cleaning of Ways, Recycling and Segregation

Four Municipalities (Corriverton, Rose Hall Town Council and BV/Triumph NDC are not involved) themselves utilize employees for street sweeping and cleaning of ways. **No other entities are involved.** No recycling or segregation takes place.
A small total of twenty-one persons are employed in manual cleaning: These are made up as below:

- Anna Regina: 1
- Georgetown: 11
- Linden: 7
- New Amsterdam: 2

### 4.7 Contribution of Funds

Contribution of funds has been remarked upon earlier in terms of Municipal Budgets made up of low tax revenues, supplemented by Government subventions. As the Table 12 below shows only the M&CC (Georgetown) currently benefits from external contribution (by the Inter-American Development Bank) specifically for a five acre extension of the Mandela Avenue Landfill which now covers ten (10) acres.

<table>
<thead>
<tr>
<th>MUNICIPALITIES</th>
<th>EXTERNAL - US$</th>
<th>INTERNAL - US$</th>
</tr>
</thead>
<tbody>
<tr>
<td>(M&amp;CC) Georgetown</td>
<td>1,000,000</td>
<td>1,269,369</td>
</tr>
<tr>
<td>New Amsterdam</td>
<td>Nil</td>
<td>104,166</td>
</tr>
<tr>
<td>Rose Hall</td>
<td>Nil</td>
<td>102,083</td>
</tr>
<tr>
<td>Corriverton</td>
<td>Nil</td>
<td>171,875</td>
</tr>
<tr>
<td>Linden</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Anna Regina</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Also committed by the IDB is a further US $10M financing for the Eccles Landfill Site.

Apart from the proposed development of the already mentioned Eccles landfill, there are no announced plans for solid waste management in respect of which funding has been raised as an issue to be addressed.
### 5. STRENGTHS AND CRITICAL ASPECTS OF THE SECTOR

#### 5.1 Conclusions of the Analysis Pointing Out the Strengths and Weaknesses of Solid Waste Management

Table 13 following indicates the Strengths and Weaknesses of the Solid Waste Management System:

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>· Proclaimed political desire to address solid waste disposal as an urgent</td>
<td>· There is no coordinated national policy. Except for the EPA, a number of</td>
</tr>
<tr>
<td>matter of policy, e.g. the establishment of the Environmental Protection</td>
<td>Agencies are implementing essentially outdated laws and regulations</td>
</tr>
<tr>
<td>Agency</td>
<td>· There is a lack of appreciation of solid waste as a sector of economic</td>
</tr>
<tr>
<td>· The development of new communities and increased consumption of</td>
<td>activity</td>
</tr>
<tr>
<td>packaged material has increased recognition of the importance of solid</td>
<td>· There is obvious need for a single overarching regulatory body for solid</td>
</tr>
<tr>
<td>waste management issues.</td>
<td>waste management.</td>
</tr>
<tr>
<td>· The Ministry of Health has declared its leadership interest in effective</td>
<td>· There is no effective coordination among the Agencies involved.</td>
</tr>
<tr>
<td>solid waste management at the national level.</td>
<td>· Because of archaic laws, enforcement is minimal. No generally autho-</td>
</tr>
<tr>
<td>· Some Municipalities have effective administrative, organisational and</td>
<td>rised disposal systems.</td>
</tr>
<tr>
<td>operational capacity to deal with solid waste (in collaboration with pri-</td>
<td>· Levy income not available to be applied to Solid Waste Management</td>
</tr>
<tr>
<td>vate contractors)</td>
<td>activities</td>
</tr>
<tr>
<td>· Some Municipal legislation, but mostly outdated.</td>
<td>· Inadequate funding</td>
</tr>
<tr>
<td>· There is a levy on imported plastic drink and food containers.</td>
<td>· Insufficient characterization of the problem</td>
</tr>
<tr>
<td>· Capable Agencies and officials in areas where solid waste is well</td>
<td>· Insufficient information and lack of knowledge about existing funding</td>
</tr>
<tr>
<td>managed</td>
<td>for solid waste management.</td>
</tr>
<tr>
<td>· The local government system forms a good basis on which to organize</td>
<td>· National inability to implement agreed declarations</td>
</tr>
<tr>
<td>future solid waste management systems</td>
<td>· Lack of coordination amongst local authorities, municipalities and other</td>
</tr>
<tr>
<td></td>
<td>lead agencies e.g. (Ministry and Council)</td>
</tr>
<tr>
<td></td>
<td>· Lack of cohesion and commitment between policy makers and technocrats</td>
</tr>
<tr>
<td></td>
<td>· Sporadic and modest quality of public awareness and educational pro-</td>
</tr>
<tr>
<td></td>
<td>grammes.</td>
</tr>
<tr>
<td></td>
<td>· No Financial planning strategies</td>
</tr>
<tr>
<td></td>
<td>· Lack of understanding of linkage between solid waste management,</td>
</tr>
<tr>
<td></td>
<td>health, environment and development</td>
</tr>
<tr>
<td></td>
<td>· Not knowledgeable about the requirements for the sourcing and type of</td>
</tr>
<tr>
<td></td>
<td>financing from funding agencies, policymakers and stakeholders</td>
</tr>
<tr>
<td></td>
<td>· Need for effective monitoring and enforcement</td>
</tr>
</tbody>
</table>
6.1 The Impact of Solid Waste Management Services on Health and the Environment

The diseases identified by the Workshop as likely to arise from the negative impact of solid wastes include:

Typhoid, malaria, hookworm, filaria, dengue, diarrhoea, gastroenteritis, leptospirosis, salmonella.

6.2 Epidemiological Studies Conducted to Measure Impact of Inadequate Waste Management on Health

It is immediately admitted however, that no epidemiological study has been conducted to link or evaluate the impact of inadequate management of solid waste on public health.

For example, the known incidence of diarrhoea has not necessarily been proven as related to solid waste mismanagement.

With the possible exception of the Hinterland areas, where malaria and worm infestation are identifiable, there is no significantly visible negative medical impact.

It is true, however, that fires from uncontrolled landfills and open dumps and the ensuing smoke can affect asthmatics.

The open and indiscriminate dumping which takes place permits the breeding of rodents, mosquitoes and flies, all of which can transmit diseases. Scavenger animals also are capable of transmitting infections.

Exposure to food-borne and water-borne diseases is a recognizable threat.

6.3 Occupational Health of Formal and Informal Workers Involved in Collection and Transportation

The six Municipalities declare employment of a total of 194 workers of which 109 are formal and 85 informal.

146 are males and 48 are females.

M&CC (Georgetown) alone records 58 formal workers and 73 informal workers.

Linden reports 26 formal and 9 informal workers, respectively. Rosehall and Corriverton each employ 10 formal workers.

With the exception of some large organizations like GUYSUCO and GUYMINE (Public Corporations) and Private Sector Organizations like, Banks/DIH, Demerara Distillers and Omai, too many employers, as well as their employees, are reluctant to observe the statutory safety regulations and utilize essential protective gear. Additionally, the gear is too often inadequate and/or unsuitable.

Worker education in occupational health and safety needs more stringent enforcement, together with the application of penalties for breaches.

Hospital waste was identified as particularly hazardous. Both in public and privately managed hospitals the quality of management of potentially hazardous medical wastes needs to be substantially upgraded.
Other identifiable occupational hazards include:

- **Paint** - a hazard to those involved in the production process e.g. painters, as well as SW workers who handle empty paint drums and cans.
- **Agro-chemicals** - workers unreasonably exposed to pesticides and weedicides can be affected by inhalation; risk of waterways and agricultural produce being contaminated.
- **Batteries** - exposure to lead poisoning.
- **Inks/Dyes** - over-exposure to textile workers.
- **Glue** - over-exposure to workers in the plywood manufacturing industry.

### 6.4 Equity/Quality Of Service

The Workshop's perception of this factor is reflected in **Table 14** below:

**Table 14**

<table>
<thead>
<tr>
<th>Quality of Service</th>
<th>Good</th>
<th>Satisfactory</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public cleaning and recollection on downtown areas</td>
<td>1</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Recollection and public cleaning in poor/peri-urban areas</td>
<td>0</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Recollection and public cleaning in high class neighborhood areas</td>
<td>0</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Drainage cleaning</td>
<td>0</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Final Disposal Site</td>
<td>1</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2</strong></td>
<td><strong>7</strong></td>
<td><strong>36</strong></td>
</tr>
</tbody>
</table>

The above represents an across-the-board perspective and is not limited to a particular community.
7.1 Community Participation - Mobilisation and Community Organization

It can only be emphasized that the community interest in solid waste management is limited to ad hoc protests by desperate groups when on occasion there are garbage pile-ups in particular neighborhoods. Even then there is little concerted representation or sustained mobilization of public awareness of solid waste management as a community or national issue.

7.2 Education and Sanitary Environmental Communication

The Workshop sought to address the education and public awareness component of the topic with the following recommendations:

- Conduct ‘train the trainers’ programmes.
- Introduce advocacy and networking with various sources.
- Allow community groups to participate in public awareness programmes.
- Disseminate information in order that the entire society at all levels can be more environmentally conscious. This would entail:
  - Debates
  - Road marches, media awareness
- Co-ordinate solid waste education content with National Health Promotion.
- Develop a sense of social responsibility towards sustainable environmental practices, using public awareness partnerships.
- Each municipality, Company, N.D.C., etc. must have an environmental plan which caters for including stakeholder contribution.
- Network within industry, labour, community.
- Exhibit more public interest ads on television.
- Conduct comprehensive education/awareness programmes in Environmental Health and Safety.
- Establish environmental clubs at schools and in communities; as well as conduct workshops.

Other Supportive Activities

- Encourage more corporate involvement, inclusive of investments in the maintenance of equipment, recycle and reuse of garbage.
- Small groups could come together and split-up, tackling communities in a national clean-up day.
- Make dumping at roadside a serious offence.
- Create an Environmental Police Force.
Other recommended actions which emerged from the Group concerned the following:

(a) Individual/Stakeholders' Action

Participate in programmes designed to inform and educate on solid waste issues, impacts.

Access available material, e.g. booklets, fliers (from EPA for example).

(b) Action by Community/NGO's/NDC's

Organize and participate in activities aimed at improving knowledge of SWM, e.g. workshops, seminars, UG courses.

(c) Municipal Action

Municipalities should engage/consult their public constantly and through all appropriate forms.

(d) Institutional Action

- Schools to include solid waste knowledge in their curricula - Environmental Studies.
- Training must therefore take place at the Teachers Training Institution - the Cyril Potter College of Education.
- More training should be conducted at the University level.
- Media should allocate more human resources, material and time to the dissemination of relevant information aimed at raising consciousness.
- The involvement of Religious Groups should be encouraged.
- Employment of adequately trained staff of Inspectors and engineers to be stopped.
- Privatize Solid Waste Disposal Systems.

(e) Government Action

- Corporatize Municipalities as necessary.
- Revise outdated Laws.
- Provide adequate funds for training and development of disposal facilities.
- Establish Municipal Courts to deal expeditiously with solid waste infractions, amongst other community issues.
- Ministry of Education to be more proactive in support of the solid waste education programmes.
- Ministry of Health must be a leading change agency.

7.3 Informal Sector Workers in the Segregation and Recycling of Materials

Of the six Municipalities only the following three (3) reported informal worker activity:

Georgetown - 50 males, 15 females and 8 children (called wastepickers) are active at the Mandela Avenue landfill selecting out recyclable waste material for sale.

Linden - 6 males and 3 females 'waste pickers' are similarly occupied.

New Amsterdam - only about 4 persons are involved in 'waste picking'.

None of these persons live on the sites.
8.1 Reform and Modernisation

The policy for the effective solid waste management should address the following areas:

- a waste strategy
- a regulatory framework—monitoring and enforcement
- an institutional and operational framework
- a public awareness and education strategy
- a cost recovery strategy

8.2 Reform and Modernisation to Correct Problems and Increase the Effectiveness and Efficiency of Solid Waste Management

8.2.1 Municipal Priorities - Public Education

Public education and public awareness are other priority areas for Guyanese municipalities. Public cooperation is key for the successful implementation of many municipal services. In general, the endemic ineffective provision of services has discouraged the public from paying taxes, from complying with by-laws, and from collaborating with the implementation of campaigns on littering, public health, traffic safety and other public initiatives. Information and technical assistance to improve public cooperation and compliance in all these areas is urgently needed. The municipalities lack the technology (computers and audio-visual equipment), materials, and technical and social marketing skills to set up public education programs. The City of Georgetown is interested in developing a program on Public Education on Municipal Matters with special attention to involving children. They have requested assistance for the implementation of a pilot program involving the public and various municipal departments in the rehabilitation of the Thomas St., in downtown Georgetown. The city would also like assistance in historic preservation and establishing City archives, to enhance the public’s knowledge of an admiration for their city.

8.2.2 Municipal Priorities - Human Resources Management

The public’s perception of the government and the public service in Guyana has adversely affected the government’s ability to attract qualified personnel. The government has a difficult time retaining qualified people because the public service pays low salaries and carries little prestige.

Guyana needs to target municipal officials in public education campaigns to raise their consciousness about the importance of their work, the consequences of their errors, and about communicating with the public. Municipal staff who work directly with the public would benefit from an effective customer service program that emphasizes the importance of monitoring public satisfaction with municipal services.

Municipalities lack financial planning (established budgeting procedures; structured financial planning methods, business plans) and administration processes and systems (bookkeeping, reporting systems). Although councils prepare annual estimates for expenditures, these are not consistent with the income estimated for the period. Manual systems, lack of financial resources and limited staff capacity are part of the problem. Accounting procedures are not standardized, and the larger municipalities have long-standing arrears in major accounts. Council audits are mandatory (by the Auditor General) but have not been conducted in the past couple of years.
In terms of operations and service delivery, there are limited management systems in place, lack of staff and staff capacity to operate municipal services, and lack of equipment and modern technology. Garbage collection and roads maintenance were privatized in an attempt to overcome the shortage of staff. In addition, confusion over lines of authority and responsibilities contribute to lack of accountability for the provision of such services.

8.3 Alternatives and Suggestions to Increase the Effectiveness of Solid Waste Management Services

The Workshop recommended that a study group be appointed of relevant technical, administrative and legal experts to draft recommendations for an appropriate national policy on solid waste management, together with the development of a structure for a national authority.

It was felt that since the gestation period for such activity is likely to be prolonged, the authorities should be persuaded to give more immediate attention to issues of:

a) Enforcement
b) Public education

There is immediate need to organise a monitoring group to conduct site inspections to collect verifiable data on the existence or otherwise of systems around the country, in order to establish a reliable database. The information will also facilitate the mounting of better structured public awareness and educational programmes aimed at the widest possible range of target groups.

Relevant training of all participating officials, managers, operatives, media personnel must be given high priority. Some areas of training are listed below.

Waste Management

· Solid waste in relation to Public Health.
· Preparation of budget.
· Designing of Data Collection.
· Hazardous wastes.
· Projection of wastes production.
· Sources and types of solid waste: Domestic/Commercial/Industrial.
· Determination of moisture content and calorific value.
· Determination of density and per-capita production.
· Determination of collection frequency and the effects of collection frequency.
· Manual/Mechanical storage containers for Domestic/Commercial/industrial.
· Litter containers, design and siting.

Transfer Stations

· Inter-relation of collection and disposal system.
· Long-distance, transport methods, transfer stations/design and operation.
Refuse Disposal

- Land disposal.
- Site selection collaboration with other public agencies.
- Water pollution control at disposal sites.
- Planning and preparation.
- Site operation - manual/mechanical methods.
- Vector control.
- Deposit of hazardous wastes.
- Composting

An important aspect of the information must be to ‘sell’ solid waste management as a viable economic activity. The Minister of Local Government and Regional Administration has publicly declared himself as very keen on this approach, and has invited entrepreneurs to be creative and explore its business possibilities.

Unfortunately there is as yet no coordinated quantification of the financial investment necessary, so it is difficult for any one investor to access information which will inform the development of a business plan that can survive the scrutiny of bankers. Some suggest anyhow that duty free concessions on specific equipment and fuel should be part of the configuration.

8.4 Suggestions for Increased Effectiveness of Solid Waste Management

The future of solid waste management cannot be divorced from the future development of Local Government in terms of governance and management, and the substantive increase in the awareness of businesses, NGO’s and other stakeholders of the critical importance of effective solid waste management to the health of individuals and communities; as well as the related implications for economic development and job creation across the nation.

To this extent therefore the pacesetting must be generated at the highest national level - the principal agencies being the Ministry of Local Government, the Ministry of Health, with vital support from the Ministry of Education and Ministry of Legal Affairs. It is at this level that the private sector must be engaged and be required to be energetically involved in partnering, leading, sponsoring, and investing in management of a ‘product’ for which several of their sector are responsible.

8.4.1 Incentives/Subsidies

At the same time consideration will have to be given to the justification and feasibility of the relevant authorities providing incentives, subsidies and rewards that may be attributable to public and private entities, NGO’s, Community Groups, Schools and Individuals.

8.4.2 Regulation

Intense activity will be needed to draft and promulgate the comprehensive range on legislation by which future solid waste management policy, plans and regulation of services will be based.

8.4.3 Changing Lifestyles, Production and Consumption Patterns

A sound waste management programme must go beyond the mere disposal or recovery of wastes and seek to address the root cause of the problem, which when addressed can mean changes in lifestyles and in production and consumption patterns.
Considerable research will have to be conducted towards stabilizing or reducing the production of wastes destined for final disposal; as well as to improve procedures for evaluating waste quantity and composition in order to adopt more effective policies for beneficially modifying production and consumption patterns.

8.4.4 Reuse and Recycling

Because some disposal practices can pose a threat to the environment, and as the economies of waste disposal services change, it will be important to strengthen and increase the utilisation of waste recycling and reuse systems, in respect of which incentives may also be applicable.

This is an area of activity in which women’s and youth groups can be highlighted.

Whether wastes are minimised, after treatment there can still be residual negative impact on the environment. It will be necessary to continually upgrade the quality of the treatment of wastes.

8.4.5 Financing: Cost Recovery

Little can be achieved, however, without adequate financing. Financing mechanisms will have to be devised therefore, particularly taking into account the poor segments of the population.

The principle may have to be applied to ensure that those who generate the wastes pay the full cost of disposal.

Making the 'block community' pay when any one of its residents is the polluter can have a chastening effect. The peer group pressure can prove to be more effective than a statutory sanction.

8.4.6 Financial Estimates - 10 Years

It seems patently clear at his juncture that it would not be feasible for this Report to attempt any estimate of financial requirements to increase coverage and quality of services (most of which is non-existent) over the next ten years.
APPENDIX 1

GROUP 1

Mr. M. Embleton, Consultant
Mr. Lennox Rahat, EH Unit, MOH
Mr. Kestine Garnett, EH Unit, Ministry of Health
Dr. David Singh, Director, Environmental Management Division
Mrs. Colleta Benn - Alphonso, Georgetown Public Hospital Corporation
Mr. Rufus Lewis, Cleansing Officer, Mayor & City Council
Mr. Jimmy Lorrimer, Caribbean Container Inc.
Mr. Marvin Simpson, Guybernet
Mr. Earl B. John, GASWMA

Working Group Guidelines

Working Group 1

Guide

This working group will analyse aspects related to functions and organizational structure of solid waste management systems in Guyana. In this group there will be part technicians and decision-makers of municipalities and other governmental organisations (finance and planning) and private sector (contractors, banks) with relevant knowledge on solid waste/public cleaning, including managerial, legal aspects.

Representatives from UN international agencies, bilateral and multilateral agencies may be part of this group.

Expected results of the working group: Subsidize elements to overall discussion on strengths and critical aspects and permit elaborate future prospective to the sector.

Questions to be discussed and answered:

1. Does a national policy exist on solid waste as reflected?
2. Are there local policies on solid waste?
3. Is there any regulatory framework on solid waste? Make it explicit.
4. Present the main laws, regulatory and equivalent legal instruments where "sw" is directly or indirectly mentioned. (Constitution)
5. Review important approved (or unapproved) projects on solid waste management (public, private or community projects).
6. Total expenditure of municipal administration on solid waste (including technical and administrative personnel, equipment operations and maintenance, other) (US$/year).

7. Existing funds (internal and external) for solid waste management (US$).

8. What special units are there in the municipality responsible for "sw"? If the answer is "yes" how many people work on it (skills and function).

ii. Explain types of modalities of existing services such as concession by bidding, mixed operation, outsourcing, private contract, etc.

GROUP 2

Mr. Floyd Patterson, Assistant Town Clerk, Linden Town Council
Mr. Maurice Walker, Guyana Advisory Solid Waste Management Association
Mr. Selwin Grenion, Mayor & City Council
Mr. Morse Archer, Cevons Waste Management Inc.
Mr. Kuar Sukhnandan, Anna Regina Town Council
Mr. Mohamed Khan, Ministry of Local Government
Mr. Cyril Abrams, Ground Engineering
Ms. Kenisha Garnett, Guyana Association of Professional Engineers
Mr. Moortaza Jiwanji, Environmental Economist, Environmental Protection Agency
Mr. Noel Persaud, Mayor & City Council
Mr. Mark Harding, Civil Defence Commission
Mr. Clive Williams, University of Guyana
Mr. Buddy Hassan, Crawler and Wheeled Tractor Spares

Working Group II

Guide

This working group will analyse aspects related to delivery of municipal solid waste management services at the local level in Guyana. In this group there shall be part technicians of municipalities and other governmental organisations (Statistic Bureau, Planning, Ministry of Local Government), consultancies (GASWMA….) and Private Sector (contractors), preferable professionals in sanitary engineering with road experience in the solid waste matters with relevant knowledge on solid waste/public cleaning (codes). Representatives from UN international agencies, bilateral and multilateral agencies may be part of this group.

Expected results of the working group: Subsidize elements to overall discussion on strengths and critical aspects and permit elaborate future perspective to the sector.

Guide questions for discussion:-

1. The size of population served by "sw" collection (number of people, % of the population).

2. Cost of services for collection, transport and final disposition (gys/ton).
3. Existing rates for "sw" services (collection, transport, …) according zones; residential, commercial, industrial and services (including health services).

4. Category of the various entitled (public, private, community) officially working in sweeping, cleaning, recycling, segregation, etc (like contractors, sub contractors, …).

5. Existing funds (internal and external) for solid waste management (US$).

6. Estimate economic impact of the sector in terms of generation of work, business and exchange of goods and services, for instance:

7. How many formal workers (families) are occupied on solid waste recollection and/or recycling? What is the average income/month?

8. How many informal workers (families) are occupied on solid waste recollection and/or recycling? What is the average income/month?

9. The estimated amount of paper, plastic, metal, glass recycled (ton/year) price/ton.

10. Characterize the problematic of the industrial (hazardous) wastes management.

**GROUP3**

Ms. Yonette Smith, Environmental Health Officer, New Amsterdam Town Council

Mr. Don Wickham, Occupational Health & Safety Officer, Linden Hospital Complex

Ms. Oneka Cummings, Guybernet

Mr. Ian Jones, UNICEF Representative

Ms. Eliza Florendo, Environmental Protection Agency

Dr. Vibart Shury, GASWMA

Ms. Rose Shanomae, University of Guyana

Ms. Wendy De Cunha, Chief Health & Education Officer, M&CC

Dr. Luiz Valdes Garcia, Epidemiologist, PAHO/WHO

Mr. Mark Bynoe, University of Guyana

**Working Group III**

**Guide**

This working group will analyse the relation of solid waste management and aspects related to health, environment, economic and sustainable development in Guyana. In this group there shall be part technicians of governmental organizations (Ministry of Health, environmental Protection Agency, hospitals, Ministry of Local Government) and private sector specialised in health and/or environmental sciences wand with relevant knowledge on regulations and standards applied to the subject. Representatives from UN international agencies, bilateral and multilateral agencies may be part of this group.

Expected results of the working group: Subsidize elements to overall discussion on strengths and critical aspects and permit elaborate future perspective to the sector.
Examples of some diseases associated with mismanagement of solid waste* cholera, typhoid fever, salmonellosis, dysentery, diarrheas, gastroenteritis, leprosy, food poisoning, dengue, leptospirosis, bubonic plague, hantavirus.

Guide questions for discussion:

1. What are the potential negative impacts of solid waste management in Guyana related to human diseases (domestic/medical/hazardous)?

2. Is there any epidemiological study conducted to link/evaluate the impact of inadequate management of solid waste and public health?

3. What are the main problems related to occupational health (formal and informal workers) and solid waste collection, transportation and final disposal?

4. The group has to discuss and estimate the economic value of the impacts of solid waste mismanagement on human health, environmental protection and sustainable development.

5. How are the people or social groups most exposed to contract diseases originated by the solid waste contamination? What types of infectious diseases affect predominantly them?

6. Existing Funds (internal and external) for solid waste management (US$).

**GROUP 4**

Mr. Carl A. Foo, St. Joseph Mercy Hospital
Ms. Jocelyn Dow, Red Thread
Ms. Paloma Mohamed, Guyenterprise
Mr. Ray Hilliman, Ministry of Labour
Ms. Julia Da Silva, Guybernet
Mr. Patrick Dial, Guyana Consumers’ Association
Ms. Sharifah Razack, Director of Education, EPA
Ms. Bernadette Adonis, Red Cross Society
Mr. Devanand Bhagwan, Asha Jyoti
Mr. Cecil Griffith, Media EH Network
Mr. Emerson Branford, CMOG
Ms. Norma James, Love Outreach International
Mr. Garfield Parker, Guybernet

**Working Group IV**

**Guide**

This working group will analyse aspects related to participatory management on solid waste management systems in Guyana. In this group there shall be part persons of community organizations, NGOs, education sector, media workers, tourism, universities, Governmental Organizations and Private Sector with relevant perception of solid waste/public cleaning issues. Representatives from UN international agencies, bilateral and multilateral agencies may be part of this group.
Expected results of the working group: Subsidize elements to overall discussion on strengths and critical aspects and permit elaborate future perspective to the sector.

Guide questions for discussion:-

1. What are the potential negative impacts of solid waste management in Guyana related to human diseases?
2. Identify on going (or under approval) projects in solid waste management including public and community participation.
3. How much public education community has access to.
4. Informal curricula education how much "sw" and health is addressed.
5. Existing funds (internal and external) for public awareness and education on solid waste management (US$).
6. In organizations how much resources are allocated on "sw" issues and community participation.
7. The group has to estimate the quality of the delivery service as consumers in terms of equity and perceived quality.
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11. WORKING TEAM

Shury, Dr. V. President, GASWMA, Mr. Walker, M. Vice President, GASWMA, John, E. B.

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