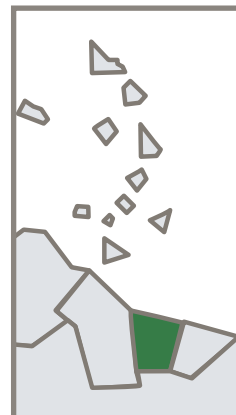


REGIONAL EVALUATION MUNICIPAL SOLID WASTE MANAGEMENT SERVICES



COUNTRY ANALITICAL REPORT SURINAME / EVALUATION 2002

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1. EXECUTIVE SUMMARY

This Analytical Country Report on Solid Waste Management in Suriname represents the main findings of the Regional Evaluation of the Solid Waste Management Services 2002 for Suriname.

It has been prepared in a joint effort of PAHO Suriname and representatives of government agencies with responsibilities for solid waste management, who all participated in the National Coordinating Group. Most information on solid waste management was provided by personal communication with stakeholders, because of the limited availability of reports on the actual situation.

Suriname has a low population density and the majority of the population lives in the coastal zone, with the main urban concentration area around the capital city of Paramaribo, also indicated as Greater Paramaribo. Based on definitions for the current evaluation several more small population centers have been distinguished, all of which are situated in the coastal plain.

Suriname has a small, open economy. Since the 1980s the economy experienced several adjustment shocks due to external and internal developments.

Against the background of an increasing government budget deficit, a growing shortage in foreign exchange within the formal economy, and a massive devaluation of the Surinamese currency, a structural adjustment program (SAP) was implemented in 1993. After a short period of further deterioration of the macroeconomic situation from 1993-1995, a period of monetary stabilization was reached in 1996.

The system for solid waste management in Suriname has not changed considerably during the past decades. The poor economic performance of the country since the 1980s has had a considerable impact on the government institutions, including the solid waste institutions.

Solid waste management activities are best developed in Greater Paramaribo. The organization for solid waste management in the districts is strongly centralized and most activities are to a great extent arranged from Paramaribo.

Solid waste management currently has a low priority at the policy level and is not included in the Medium Term Development Plan for the current period.

Although a draft law is being prepared, there is presently no specific legislation concerning solid waste and there are no technical standards on solid waste management. Aspects of solid waste are covered in the Nuisance Act, the Criminal Act and the Pesticides Act.

The solid waste services and solid waste linked activities in Suriname are the responsibility of several government agencies, and tasks are divided over different ministries. Planning, management and control, and financing of the services are often executed by different sections of a ministry. Much of the mechanical work of solid waste management, including special services, is contracted out.

A proper waste collection and disposal organization is only available in Greater Paramaribo. In the other coastal districts the work is included in the general maintenance tasks of the District Commissioner. In the rural areas and in the interior solid waste is not collected and people bury or burn their waste, or dump it on an open lot or in nearby rivers.

Compactor trucks are doing most collection in Greater Paramaribo, but often also open trucks are being used. In the districts only open trucks are used. The waste is transported to the dumpsite with the same truck. No waste separation occurs and some hazardous waste will be mixed with domestic waste. Recycling of PET is only done at a very limited scale. Deposit is paid on glass bottles with locally produced beer and soft drinks and such bottles are re-used.

All government disposal sites are typically open dumps, without fenced or any form of access control. The collection and disposal system has remained essentially the same for the last couple of decades.

The current practices with respect to collection and disposal of solid waste have resulted in environmental impacts on water, soil and air, and in health risks and nuisances, in particular near present and old dumpsites and near illegal dumps.

Virtually all solid waste management is being financed from the government budget. A tariff only exists for commercial waste hauled by private contractors. The structural lack of government funds has made it impossible to make investment in equipment and sanitary landfills. The majority of equipment used by the government is already beyond its useful economic life and the number is gradually decreasing, usually without replacement. More and more equipment has to be contracted.

The National Coordinating Group has distinguished a large number of serious and very serious limitations in every aspect of the solid waste system.

However, for the near future a new approach has been chosen. There are plans to privatize the Solid Waste Collection and Disposal Division of Greater Paramaribo into a commercial organization, which budget should be covered from payment by the users. Initially this organization will only cover Greater Paramaribo, and in most districts the government will remain responsible for solid waste management. Also will the new organization cover only part of the solid waste management in Greater Paramaribo, and also here government agencies with government financing will remain active in other parts of solid waste management, for instance street sweeping and special services.

At this moment there is no strategy towards the arrangement of a solid waste sector in which all levels of management are incorporated under one umbrella. Also there is no strategy with respect to waste minimization, community participation or other new approaches, which may improve the solid waste management.

After the election in May 2000, the new GOS has indicated in its Medium Term Development Plan 2001-2005, in the chapter on Health Sector Reform, to strengthen Solid Waste collection services in the interest of public health and optimal living conditions. Specific mention is made to improve solid waste collection and disposal services and to address industrial, pharmaceutical and clinical waste. Solid waste management is mentioned in the same document in the chapter on Environmental Management and an investment of US\$ 613.000 was identified for the strengthening the solid waste management services through the Ministry of Public Works. (The MOP 2001-2005 was published after the timeline of 31 December 2001 for this analysis)

2. INTRODUCTION

The Pan American Health Organization (PAHO) cooperates with the countries of the Latin American and Caribbean Region to improve municipal and hazardous waste management, to extend service coverage and to develop human and institutional resources in this field.

Sector analyses made by PAHO in several countries have revealed that the solid waste sector does not have national policies, nor plans and that the urban cleaning area receives little support at the local level.

Based on the gathered information the IDB and the PAHO prepared the "Diagnosis of Municipal Solid Waste Management Situation in Latin America and the Caribbean" (Acurio et al., 1998).

During the above activities it became clear that the establishment of national policies that focus on the improvement of management to achieve proper environmentally sound solid waste management is hindered by the lack of reliable information, while the available information is limited and not systematized.

As a logical continuation of the above activities the execution of the Regional Evaluation of the Solid Waste Management Services 2002 has been programmed with an eye towards providing the most up-to-date information.

As a general purpose, this Evaluation seeks to gain knowledge on the current situation and on prospects of the aforementioned services in the countries of the Region. This will be achieved by systematic information collection through a questionnaire, and the processing and analysis of the information in each one of those countries

A National Coordinating Group has been formed which has been responsible for the collection and verification of the information provided in the questionnaire, as well as for the preparation of the analytical report. This group consisted of WHO/PAHO staff members and staff members from public institutions with ties to the solid waste management in Suriname.

Data collection took place from June till early November 2002. Verification and approval of data took place in three discussion meetings of the National Coordinating Group.

When approved the data were entered into the CEPIS database; the last data have been recorded in November 2002.

This country analytical report presents the main findings of the Evaluation for Suriname. Where necessary it presents background information and justification on the data entered in the questionnaire and it explains aspects not covered.

The document aims to enable the following:

- Identify problems, deficiencies, advances, and achievements reached in the solid waste management area in Suriname. As such, it should permit sectoral development and arrangements, as well as policy formulation and national plans aimed at minimizing the waste and improving management and service quality.
- Identify priorities for technical assistance and sectoral investments through the state's budgetary resources and the country's agencies loans and donations.
- Consolidate information available in the countries with an eye towards identifying trends in waste management; orientating cooperation among countries and guiding technical and financial cooperation for external agencies.
- Identify technical and financial cooperation priorities designed to diminish environmental health risks of the population resulting from inadequate waste management.

3. BACKGROUND

2.1 General characteristics of the country

Suriname is situated on the northeastern coast of South America. It covers an area of just over 163,000 sq km. It lies between latitudes 2 and 6 degrees north and 54 and 58 degrees west.

Suriname is divided into three major physiographic regions: the Coastal Plain dominated by swamps and marshes, the Zanderij or Savanna Belt with predominantly sandy and loamy soils on undulating low plateau land, and the Interior Uplands a mostly gently to moderately rolling to occasionally steep hill to mountain land developed on old basement rocks of the Guiana Shield. Most of the land outside the coastal plain is covered with tropical rainforest, with some occasional patches with savannas or savanna forest.

The major part of Suriname has a tropical rainforest climate with two rainy and two dry seasons, with the Long Rainy Season from end April to mid August and the Long Dry Season from mid August to early December.

Administratively Suriname is divided into 10 districts [figure 1; attached], most of which are found in the Coastal Plain. These districts have a Districts Commissioner (DC), who is the representative of the government in the district. The government appoints the DC.

At the end of 2001 the population of Suriname was estimated at slightly over 440,000 inhabitants. The last census dates from 1980 and the current population has been assessed using population statistics. The average population growth in the period 1990-2001 is 0.8%. In the 1980-2001 period the average growth of the urban population (Suriname definition) was 1.4%, and of the rural population 0.65%.

The Interior Uplands and the Savanna Belt cover about 88% of the country and these parts of Suriname are sparsely inhabited with only 10% of the population living there. The remaining 90% lives and works in the coastal plain in the north, where most of the economic activities take place. The majority (nearly 70% of the total population) is concentrated in Greater Paramaribo, the area of the capital Paramaribo and its surrounding population centers.

Some smaller communities are found elsewhere in the coastal plain, none of which has over 25,000 inhabitants.

The selection of the population centers for this study is based upon the criteria that they have administrative autonomy for their solid waste management as defined in the questionnaire.

The selected population centers are presented in table 1.

Table 1. Overview of population centers

District	Population center	Population 2001	Characteristic
Paramaribo	Paramaribo	228,782	Urban
Wanica	Part of Greater Paramaribo	58,349	Mixed urban and rural, much ribbon building
	Lelydorp*	16,029	Mixed urban and rural
Nickerie	Nieuw Nickerie	11,787	Mostly urban
Coronie	Totness	1,734	Rural; ribbon building
Saramacca	Groningen	2,509	Mixed urban and rural
Commewijne	Commewijne zuid: Meerzorg, Nieuw Amsterdam, Tamaredjo and Alkmaar	20,965	Mixed urban and rural, much ribbon building
Para	Para	14,777	Predominantly rural; ribbon building
Marowijne	Mungo	7,279	Mostly urban
	Albina	3,456	Mixed urban and rural

* Population center in the Wanica district that is not included within Greater Paramaribo for this study

Officially the "urban population" of Suriname comprises the total population of the districts of Paramaribo and Wanica. But in particular the district of Wanica comprises considerable portions with rural areas, while population centers with urban characteristics are also found within some other (rural) districts. These latter have been included in the Evaluation, so that the total population of the above population centers (365,668 persons) exceeds the official urban population (303,160 persons).

Finally it should be noted that Suriname has a tribal indigenous population consisting of Maroons and Amerindians. Their total number is estimated at about 35,000 persons.

Life expectancy at birth has considerably increased: in 1980 this was 67.6 years and for 2001 it is estimated at 70.9 years (PAHO/WHO, 2001). For women it is 73.5 and for men 68.3 years.

Infant mortality and under 5 year mortality rates are however slightly rising since 1997, with respectively 20.2 and 27.2 per 1000 life births in 2000 (Punwasi, 2002a).

Suriname is a country with a medium human development (UNDP, 2002). In 2000 the country has dropped in ranking from place 64 to 74 (out of 174). This drop is mainly due to a lower GDP in 2000 compared to 1999.

No accurate data on the poverty situation are available for Suriname. In 1999/2000 for Greater Paramaribo the percentage of poor people has been estimated at 65%. For the whole of Suriname it is assumed that the percentage of poor people lies between 49 and 74% (General Bureau of Statistics, 2001).

For 1999 the illiterate population over 15 years old is estimated at 5.8% (women 7.4% and men 4.1%). These data have been obtained in Greater Paramaribo, representing 70% of the total population (General Bureau of Statistics, 2002). The overall country literacy rate will be slightly lower because relatively more people in the rural areas (including tribal areas) are unable to read and write.

However, in a recent survey, which included the rural areas, Menke (2000) found much higher figures, with a 13.8% overall illiteracy rate (9.8% and 17.7% for respectively men and women).

In 1975 Suriname became independent from the Netherlands.

A military coup in 1980 was followed by a period of political instability and a guerilla war in the interior, which ended with a peace agreement in 1991. During that period the economy was staggering and it was not before the mid nineties that some economic recovery became apparent. At the end of 1994 the inflation reached its

highest level with 370%, but in 2000 it still amounts 59% (based on consumer prices).

The current government has been elected in May 2000.

Suriname has a small, open economy. Since the 1980s the economy experienced several adjustment shocks due to external and internal developments. Economic policies in the 1988-1996 period were strongly influenced by Holland, the most important financial donor of Suriname.

Against the background of an increasing government budget deficit, a growing shortage in foreign exchange within the formal economy, and a massive devaluation of the Surinamese currency, a structural adjustment program (SAP) was implemented in 1993. After a short period of further deterioration of the macroeconomic situation from 1993-1995, a period of monetary stabilization was reached in 1996. From 1997 - 2000 the parallel exchange rate increased enormously and in 2001 the rate was 2200 Surinamese guilders for 1 US dollar.

By 2001, bauxite mining and processing is still the pillar of the economy while the public sector still maintains its position as the most important sector in terms of formal employment and contribution to GDP. Other important economic sectors are gold, oil and oil products, timber, shrimps, bananas, rice and vegetables.

The system for solid waste management in Suriname has not changed considerably during the past decades. The poor economic performance of the country since the 1980s has had a considerable impact on the government institutions, including the solid waste institutions.

Due to lack of available funds the operational capacity of the solid waste management has gradually diminished since the mid 80s. Services became more and more irregular and not all sections of the population centers were covered. In this period many illegal dumps arose. During the period 1996-97 a total of 250.000 M³ of illegal solid waste has been removed from populated areas within Paramaribo. Since then the situation has slightly improved.

4. FUNCTIONAL AND ORGANIZATIONAL STRUCTURE OF SOLID WASTE MANAGEMENT SERVICES

4.1 Policies, legal and regulatory framework for solid waste management.

Solid waste management is not mentioned in the Medium Term Development Plan 1999-2003 "The national reconstruction" (MOP, 1999), except in the chapter on "Environment", where under "Living environment" the following statement is made:

"In collaboration between ministries, trade and industry, and other social partners a start will be made with a structural improvement of the waste policy."

No concrete results of this intention are available at the end of 2001.

There is no general or specific legislation concerning solid waste and there are no technical standards on solid waste management.

Some aspects of solid waste management are covered by the Nuisance Act, which among others, deals with industrial and commercial waste. Other aspects are covered by the Criminal Act, dealing with littering in public places. The Pesticides Act dictates the safe disposal of unwanted pesticides. However, in the absence of regulations and facilities to do so, compliance is difficult.

4.2 Institutional Framework of solid waste management services

The solid waste management is executed by government agencies.

Responsibilities for operational aspects of solid waste management have been given to three ministries (table 2).

Table 2. Government agencies with operational tasks

Ministry	Service
Public Works (MOW)	<i>Subdirectory of Public Services:</i> Planning and financing of solid waste collection and disposal in Greater Paramaribo <i>Solid Waste Collection and Disposal Division (VOV: Vuilophaal en Verwerking):</i> Execution of solid waste collection and disposal in Greater Paramaribo.
Regional Development (MRO)	Solid waste collection and disposal in the districts (as part of general maintenance tasks; no separate unit)
Health (MVZ)	Directorate of Environmental Management (MB: Milieu Beheer): special services (see below) throughout Suriname, among which is street sweeping. This directorate has sub-units in all districts

The Ministry of Planning and Development Cooperation (MPLOS) is in charge of the coordination of donor-financed development planning, programming and project implementation. The National Planning Office (SPS) undertakes studies regarding production sectors, macro-economy, physical and environmental planning.

The National Institute for Environment and Development Suriname (NIMOS) of the Ministry of Labor, Technological Development and Environment (ATM) is responsible for environmental legislation, the regulatory framework, guidelines and standards, and the monitoring and coordination of enforcement. This institute became operational in 1998 and it is still in the process of developing the necessary legislation and other requirements. As such it is not yet active in the above fields.

For the meantime a cooperation agreement has been signed between the NIMOS and MOW, aiming to improve environmental aspects through advice and training. No concrete steps have yet been made within this cooperation.

The Environmental Control Division (MI: Milieu Inspectie) of the Bureau of Public Health (BOG-MVZ) carries out national routine sanitary and environmental inspections, and investigates complaints from the community.

The Health Education Division of the Bureau of Public Health (BOG-MVZ) conducts some programs in the field of health and the environment to increase awareness in this field.

4.3 Centralization and decentralization of solid waste management services

For Suriname a distinction should be made between the services in Greater Paramaribo and those in the remaining districts.

In Greater Paramaribo the collection and disposal of solid waste are the responsibility of the Ministry of Public Works. The Solid Waste Collection and Disposal Division (VOV) of the Sub directorate of Services of this ministry is responsible for the operational execution of this task. The daily routine operations fall under the competency of the head of this department, but the director is taking the decisions about policy, medium and long-term planning, regulations and financing.

In the districts the Districts Commissioner (DC) coordinates the solid waste management tasks. His own district personnel is employed by the Ministry of Regional Development (RO), but he can also employ personnel of the district office of the Directorate of Environmental Management (Department of Milieu Beheer of the Ministry of Health) for certain solid waste related tasks. There are no strict rules about this local management and the work relations differ between districts. But the DC has no actual control over the personnel of MB and in some cases the districts units of the latter are directed by the head office in Paramaribo.

As for the head of the VOV, also the DC has only the competence over the daily operations, while the other responsibilities are with either the MRO, or the MB, between which no structural coordination exists.

Thus the solid waste management tasks are scattered between several institutions, which are directed from the capital. So it can be characterized as strongly centralized as the central government in Paramaribo takes all the major decisions and establishes the annual budget.

4.4 Financing of the Sector: Collection systems.

The majority of solid waste management in Suriname is financed from the government budget.

An exception is the collection of commercial waste in Greater Paramaribo for which a tariff exists, based on the number of containers filled by the client. This is only done in Greater Paramaribo. Payment is by direct billing of the clients.

Private enterprises offer services for the removal of car wrecks and other bulky waste on a direct pay per truck charge.

In some districts the District Commissioner has initiated a more or less voluntary fee from households and shops in the townships (Groningen in Saramacca and Para). This fee is collected door-to-door on a monthly basis; the money is used for the local solid waste management.

4.5 Operational modalities of the services: private participation, mixed operation, outsourcing, concession by bidding, others.

Several operational tasks related to solid waste management have partly or fully been contracted out to private companies for at least the last 10 years. At the end of 2001 contractors do approximately 85% of the collection

and 50% of the disposal activities in Greater Paramaribo. Trucking services from private companies are contracted for the collection and the transport, while bulldozing services are contracted at the disposal site.

Also 50% of the special services in Greater Paramaribo, in particular the mechanized part, is done under a service contract. The Sub Directorate of Services of the Ministry of Public Works (OW) finalizes the contracts for the acquisition of disposal trucks.

Street sweeping is done manually by government personnel (Milieu Beheer). Contracted trucks do the collection and transfer of the street sweepings. The equipment for special services is mostly obtained under contract with the Directorate of Environmental Management.

In the districts many of the population centers have more or less the same system as Greater Paramaribo. In Commewijne all the collection and transfer is carried out under service contracts, while in Saramacca, Coronie and Nickerie about 50% of this is done under contract. In parts of Wanica (Lelydorp and Domburg) and Marowijne (Albina) the activities are carried out by the Districts Offices.

In part of Mungo, in Onverdacht and in Paranam (the latter two are not included in the questionnaire due to lack of information) the situation is deviating from the remainder of the country.

The collection services in a large part (65%) of Mungo are contracted out to solid waste services of the local bauxite mining company (Suralco L.L.C.). Also the small community of Paranam, in the district of Para, is serviced the Suralco L.L.C. Similarly, in Onverdacht solid waste is collected under contract by the other mining company BHP Billiton.

In part of Para the solid waste collected by the government services is brought to a sanitary landfill operated by the bauxite mining company (BHP Billiton Group).

In Nickerie private companies are occasionally assisting with the management of the local dumpsite. When this private participation is not available, equipment is hired. The operation is minimal and it comprises the occasional shoving up of the waste.

In the districts the number of special services pertaining to solid waste management is limited and these are mostly carried out by manpower, sometimes aided by their own light machines. In Lelydorp the local park is maintained by a group of local people united in a foundation.

4.6 Allocation of municipal resources for the provision of services: sweeping, collection, transportation, and final disposal.

The Solid Waste Collection and Disposal Division (VOV), the Directorate of Environmental Management (MB) and the districts all work with an annual budget approved by the central government.

In 2001 the expenditures for the VOV amounted approx. Sf 4 billion (US\$ 1.8 million). For MB a total of about Sf 7 billion (US\$ 3.2 million) has been spend in that year.

Costs of solid waste management in the districts are more difficult to determine, because the costs are spread across different units. An indication can be obtained from the expenditures for the item "Solid waste and cleaning services" of the districts account [table 3]

Table 3. Annual expenditures for "Solid waste and cleaning services" for the districts (2001).

District	Expenditures 2001		Per capita expenditure (US\$/person)
	Suriname guilder	US\$	
Nickerie	13,400,000	6,100	0.17
Coronie	0	0	0.00
Saramacca	1,600,000	725	0.05
Wanica	5,000,000	2,275	0.03
Commewijne	5,700,000	2,600	0.12
Marowijne	4,600,000	2,100	0.15
Para	2,500,000	1,150	0.07
Brokopondo	0	0	0.00
Sipaliwini	0	0	0.00

It should be noted that the above figures only represent the expenditures for the contracting of services, and do neither include the government personnel costs, nor the costs of operation and maintenance of their own equipment, if available. The figures are very low compared to the estimated per capita expenditure for solid waste services in Greater Paramaribo, which amounts US\$ 6 in 2001.

Usually money is only allocated for the basic needs, and requests for investments are hardly ever approved. The lack of adequate financial resources is one of the factors that hinders the development of a proper solid waste management.

4.7 National and local plans and strategies for the development of the solid waste management services.

In October 1995 the project "Tackling the bottlenecks in solid waste removal in Greater Paramaribo" started. It was a joint project of the Ministry of Public Works and the Dutch Development Agency (DGIS). Even though the project had not yet been concluded, DGIS withdrew from the project in 1998 due to the slow progress made. Since then little progress has been made till October 2001, when the city of Rotterdam presented itself as a partner for technical assistance, education and training.

In the meantime only some minor aspects have been realized. The plan only takes into account the improvement of the solid waste collection and disposal of Greater Paramaribo, but does not include other institutions active in solid waste management in this city. Also the districts are not part of this plan.

In 1999 a working group appointed by NIMOS has prepared a pilot project for action at a local level. The prefeasibility study of this working group on "Municipal and industrial solid waste management in resort Beekhuizen" focused on waste separation at the base, and on composting (Crab et al., 1999). After the prefeasibility study, no follow-up has been given to this project due to "changed priorities".

In conclusion it can be stated that only regional plans are in preparation, but a national plan or strategy for the development of the solid waste services does not exist (2001).

After the election in May 2000, the new GOS has indicated in its Medium Term Development Plan 2001-2005, in the chapter on Health Sector Reform, to strengthen Solid Waste collection services in the interest of public health and optimal living conditions. Specific mention is made to improve solid waste collection and disposal services and to address industrial, pharmaceutical and clinical waste. Solid waste management is mentioned in the same document in the chapter on Environmental Management and an investment of US\$ 613.000 was identified for the strengthening the solid waste management services through the Ministry of Public Works. (The MOP 2001-2005 was published after the timeline of 31 December 2001 for this analysis)

5. DELIVERY OF MUNICIPAL SOLID WASTE MANAGEMENT SERVICES AT LOCAL LEVEL

5.1 Analysis of the quality and coverage of collection, transportation, and final disposal in large, medium, and small population nuclei

In 1982 the Solid Waste Collection and Disposal Division (VOV) in Greater Paramaribo had 30 compaction trucks, but in 1990 only 9 were still operational and in 1994 only 2. In 1996 4 new compactor trucks came into operation of which at the end of 2001 2 were still operational.

With the diminishing number of own trucks, gradually more trucks from private companies were being contracted. At the end of 2001 for Greater Paramaribo 11 compactor trucks, 3 dump trucks, 2 pick-ups and 1 bulldozer are being contracted for the solid waste management by VOV. This equipment is provided by 7 different enterprises.

The districts each have 1 truck, usually a small dump truck, which is often shared by more population centers. This truck is sometimes also used for other transportation tasks.

The majority of the equipment used, including those of contractors, is beyond their useful economic life, being older than 6 years.

In Greater Paramaribo a total of 255 persons are involved in sweeping (155), collection (85) and disposal (15) of solid waste. Of these persons 185 are government employees and 70 are contractors. All the latter are occupied in collection (68) or disposal (2).

A total of 244 persons are employed for special services (162), maintenance (39) and administration (43). These are all government employees.

With the decreasing number of equipment the personnel of the VOV has been halved from 161 in 1990 to 84 in 2001.

For the private sector no data are available of the number of persons employed for the maintenance and administration related to the contracted services.

In the districts 59 persons of the districts office (MRO) are known to be involved in sweeping (4), collection (52) and disposal (3). Data are however incomplete as they are not available for all population centers. Of the known 59 persons 33 are government personnel and 26 are contracted by either the government (22) or by Suralco L.L.C. (4 persons for waste collection and disposal in Mungo).

Data on personnel employed for maintenance, administration and special services are only known for a few population centers. The smaller population centers usually have no maintenance personnel, and no administrative personnel is especially charged with the administration of the solid waste management.

For Para it is known that 10 persons are employed for special services and in Nieuw Nickerie 26; all of them are government personnel.

Besides the above MRO staff, also personnel of the Directorate of Environmental Management (MB) carries out special services in the districts, but their number per population center is not known. It is reported that a total of 671 persons is conducting special services in the districts of Marowijne, Commewijne, Para, Saramacca, Coronie and Nickerie, with an administrative force of 22 persons.

For Greater Paramaribo it has been estimated that the Per Capita Generation (PCG) for domestic waste is 0.8 kg/day, and for municipal waste 1.0 kg/day. These figures are very crude estimates by the head of the VOV, based upon the number of trucks and the total population in the service area.

The figure for domestic waste is more or less supported by the results of a very limited survey in 1990 among 11 households (Vrins et al., 1990). It was found then that lower class households produce 0.47 kg of waste/person per day, while middle-higher class households have a PCG of 0.99 kg/day.

No figures are available for the small population nuclei.

Street sweeping is done in the center of Paramaribo. Based upon the area it is estimated that about 5% of Greater Paramaribo is covered by these services. Also sweeping of public market areas is done in the small population centers. The areas, however, are too small to indicate.

The waste collection in Greater Paramaribo covers about 82% of the population. This figure is based on the number of persons being served. The more rural areas of the Wanica district in the Greater Paramaribo area do not receive any service.

The majority of Greater Paramaribo is serviced by the VOV, but a very small part is covered by MRO.

In the small population centers the coverage of waste collection services is between 3 and 100%. This information has been obtained from the respective District Offices in which the centers are located. The accuracy of some of the data is doubted as field observations point to a much lower coverage, for instance in Albina.

In Totness only waste from the schools and the government offices is being collected.

In areas without waste collection, the waste is either buried or burned at the parcel, or it is disposed of elsewhere, which may be along the road, either dumped or placed along collection routes.

The tribal communities in the Interior of Suriname in general do not produce much waste, which is mostly discarded in nearby open water (river, creek, lake, sea).

In Greater Paramaribo the frequency of collection is twice a week for most households, but once a day for the center of Paramaribo.

In the other population centers the frequency ranges between 1 and 3 times a week.

All collected household and municipal waste is transported directly to the disposal site, using the collection truck. Also in the small population centers no separate transfer occurs.

Final disposal is in open dumps in nearly all population centers. The exceptions are formed by population centers that are serviced by the solid waste service of the two bauxite companies in Suriname, of which the waste is disposed off at sanitary (Suralco L.L.C.) or controlled landfills (BHP Billiton Group).

These landfills only receive the non-hazardous waste of living quarters, schools, shops, and plant and administration facilities. Suralco L.L.C. has some secure landfills for their hazardous waste.

The disposal sites and some characteristics are listed in table 4.

Table 4. Overview of disposal sites

Disposal site	Receiving waste from:	Type	Management
Ornamibo	Greater Paramaribo, Lelydorp, Domburg	Open dump	Government
Zoelen	Alkmaar, Meerzorg, Nieuw Amsterdam, Tamanredjo	Open dump	Government
Mungo, along road to Patamacca	Part (35%) of Mungo	Open dump	Government
Albina, along east-west connection	Albina	Open dump	Government
Damboentong	Groningen	Open dump	Government
Totness, near the mouth of the freshwater canal	Totness	Open dump	Government
Rijsdijk	Nieuw Nickerie	Open dump	Government
Curmotibo	Part of Mungo (65%) and non-hazardous household and office waste Suralco L.L.C. - Curmotibo operations	Sanitary landfill, compacted clay bottom	Suralco L.L.C.
Stowell	Household waste from Onverwacht en Onverdacht (Para), and non-hazardous household and office waste BHP Billiton and its contractors	Controlled landfill	BHP Billiton Group
Paranam	Paranam and non-hazardous household and office waste Suralco L.L.C. - Paranam operations	Sanitary landfill, compacted clay bottom	Suralco L.L.C.

The dumpsite of Totness is very close to a drainage canal and some of the waste may also end up in the water. In Nieuw Nickerie the dumpsite is close to the Corantijn River and it has been reported that some waste occasionally ends up in the river.

The waste dumped at all the open dumpsites may contain hazardous waste, because also waste of small industries, shops and workshops is dumped here, while also the household waste may contain hazardous waste, as there is no separation.

Bulky waste, like car wrecks, freezers and washing machines are not accepted at most dumpsites. This type of waste is occasionally dumped along rivers or the sea to serve as a fill and to protect the land against tidal erosion. Rubble and demolition debris is often used as a fill of low-lying open lots.

Special services are mostly executed by the Directorate of Environmental Management (MB). They comprise the following:

Activity	Paramaribo	Other districts
Maintenance of parks and public squares, including the green component.	X	X
Maintenance of roadsides.	X	X
Demolition of tumble-down buildings	X	
Maintenance of public graveyards.	(X)	
Clearing of small illegal dumps.	X	
Washing of monuments.	X	(X)
Collection of car wrecks, rubble etc.	X	

Recycling is not formally done, and also informal recycling is rather uncommon.

Except for some composting by people at home no organic recycling is done.

Recycling of inorganic material occurs at a very small scale in the form of:

- PET bottles of the Fernandes Bottling Company are recycled by shredding after which the shredded material is used as a fill material used in concrete building blocks. The recycled volume is still small compared to the PET bottle use.
- At a small scale various plastic materials are recycled to PVC pipes.
- Lead from batteries: There are a few small enterprises that collect batteries from service stations and battery shops. They remove the lead, which is exported to Brazil. The extent of this activity is not known.
- Scrap metals from abandoned equipment of the aluminum and other industries are produced by COBO, who exports the scrap to abroad. The company focuses on industries, although occasionally also car wrecks have been stripped and shredded.
- Glass bottles: Only a small portion of the glass bottles used in Suriname has a deposit. Since there is no glass recycling capacity the other bottles are disposed off. The local beer brewery sends its old and broken bottles to the glass factory in Port of Spain, Trinidad and Tobago.

The total quantity of recycled materials is not known, but it is probably very low.

One medical waste incinerator is operational in Suriname, which processes the waste of 3 hospitals and several other institutions. Two other hospitals have an incinerator, but it has not been installed yet. The regional clinics have a small drum incineration unit to dispose of their medical waste.

5.2 Cost analysis and rates for delivery of the service

No accurate data on costs of the services are available. For the collection and disposal of solid waste in Greater Paramaribo a rough estimate has been made through dividing the total annual expenditures by the estimated number of tons of annual waste. This gives a crude figure of approximately 22 US \$ per ton. The figure does mainly reflect the operational costs and leaves out the depreciations on own investments.

For Nieuw Nickerie a similar calculation was possible using the costs per contracted truck divided by the amount of waste collected. This gives a figure of 16 US \$ per ton. The costs of disposal are not included in this latter figure, but these are very low in Nieuw Nickerie because hardly any activities take place at the dumpsite, except for an occasional round of grading and compacting of the waste.

For other population centers no figures could be deduced.

For sweeping and special services no cost estimates were possible at all.

Rates for solid waste management are only very occasionally applied. Greater Paramaribo has rates for the collection of commercial waste only, which is rated per container (1100 liters). There is a monthly subscription fee and a collection fee per container. Costs are roughly 10 US\$/ton.

In Para and Groningen shops are asked for a voluntary contribution in order to guarantee the collection of their waste, as government funding is far from sufficient for a proper solid waste management. A fixed price is paid every month for such commercial waste. When calculated on weight basis this costs about 1.12 US\$/ton.

In Groningen households are asked for a voluntary fee as well. This fee amounts to 2.25 US\$/month per household. Personnel of the districts office collect the fee door-to-door.

5.3 Municipal development and its relation to solid waste management

In case of new municipal development projects outside the normal coverage range of the solid waste services, this project may or may not be included in the services, depending on local conditions (distance, amount of

households, condition of the roads etc.). In case no solid waste services are employed it is left to the local people how to get rid of their solid waste. In order to have it collected the people of the non-serviced quarters have to dump their waste along the nearest collection route. In the absence of receptacles the waste is often just dumped somewhere, and in the end such locations will end up as small waste dumps.

5.4 Administrative management, economic and financing modalities of solid waste management services

Administrative management of solid waste services is poor and scattered across the different institutions involved. The administration is mostly limited to the human resources and financial expenses.

Incomes of the solid waste services are deposited on the general account of the ministry and the money is not directly available for the solid waste services.

The administrative system does not allow any economic analysis of the services.

In the districts most solid waste services are paid from the general district management budget. The budget head "Solid waste and cleaning services" is used to contract equipment for the service.

Contractors are selected after tendering procedures, which are often organized and concluded at an administrative level above the operational level. In the smaller population centers tendering is sometimes not feasible because only one applicant is available for the specified job.

5.5 Shared and participatory management (municipality, community, NGOs).

The Suralco L.L.C. has taken the responsibility for the solid waste management in part of Mungo and in Paranam. The BHP Billiton Group does the same in Onverdacht.

At other locations there is, except for an occasional campaign, hardly any participation of the community or from NGO's in the local solid waste management.

5.6 Small businesses involved in the collection, transportation, and final disposal of the waste and their contractual relation with the municipalities.

There are some small, commercial enterprises, which collect the solid waste that is not taken by the regular services. This waste includes garden waste and bulky wastes like washing machines, building rubble etc.

Usually these companies are not specializing in waste, but they are common carriers.

They can be requested to collect the waste at home or at the business location. They charge on the basis of the volume of the bulk. The waste is ideally dumped at the local dumpsite. These commercial companies do not have to pay for delivering of waste at the dumpsite. Despite that, they often dump their waste along the public road, in order to avoid the relatively long trip to the dumpsite.

The majority of these businesses are active in Greater Paramaribo.

5.7 Micro enterprises involved in sweeping and cleaning of ways, recycling, and segregation.

No enterprises are involved in sweeping.

Cleaning of streets is also mostly a government task, but some part of it is contracted, in particular the maintenance of roadsides (mowing, leveling), and the cleaning of ditches and canals. Many small private enterprises are involved [Greater Paramaribo, elsewhere] in the latter work.

Recycling is done by a few enterprises only. The Fernandes Bottling Company has its own small PET recycling plant as part of the corporate Coca Cola policy to limit pollution.

COBO is specialized in (industrial) scrap production, but the recycling is done abroad

A small private company recycles plastics to produce PVC pipes (Lemmers).

Several private persons remove the lead of car batteries and send it abroad for recycling.

5.8 Important sectoral projects that are being carried out in the country.

Sectoral projects currently being carried out are:

From end 1998 till mid 2001 a master plan study has been conducted to the drainage of Greater Paramaribo. This study has produced recommendations and guidelines for the rehabilitation, the improvement and the future management of the drainage infrastructure of Greater Paramaribo. The implementation of the study results is awaiting external financing.

For several other sectors sector studies are currently being conducted.

5.9 Contribution of funds

In 1996 some investments have been made from the development aid fund of the Netherlands on behalf of the solid waste service of Greater Paramaribo. More funds were available for investment in equipment and in a sanitary landfill, but the project has been stopped in 1998, due to the slow progress in the preparation of the required legislation and in the inability to select a location for the landfill.

6. STRENGTHS AND CRITICAL ASPECTS OF THE SECTOR

6.1 Conclusions of the analysis, strengths and weakness of solid waste management

Institutional framework, policies and plans

The sector is faced with a large number of serious and very serious limitations:

- There is no coherence between the different levels (policy and planning, tactical and strategical, and operation) within solid waste management in Suriname. Thus one can not speak of "a national solid waste sector".
- There is no leader institution.
- There is no structured cooperation between involved institutions, which leads to inefficiency, duplication of functions and sometimes a poor performance.
- The administrative, institutional and organizational capacity of executing and regulating agencies is insufficient to properly deal with the complex tasks of proper solid waste management.
- There is no operational, financial and environmental planning, because funds are scarce.
- The solid waste management only deals with collection and disposal, and there are no policies for treatment (minimization, recovery, reuse, recycling) of solid waste.
- The only plans pertain to the improvement of the solid waste situation in Greater Paramaribo; these aim at the short and medium term only.
- In the absence of adequate legal instruments the monitoring of compliance is rather futile.

Legal and regulatory framework

Also with respect to legal aspects there are serious and very serious limitations:

There is no coherent legislation dealing with solid waste and with solid waste management and the existing legislation is very obsolete. A regulatory framework is virtually absent.

With respect to social security and occupational health legislation is present, but also this is rather obsolete and scattered.

Enforcement is difficult due to the lack of proper regulations, the limited manpower and the absence of adequate facilities.

The development of new legislation proves to be a very slow process in Suriname

Human resources

Except for an occasional workshop the staff of the solid waste management services did not receive any systematic training. In the districts this is even more serious than in Paramaribo.

Furthermore it may occur that executives with insufficient skills are appointed due to the existing civil servant promotion system, which sometimes places seniority over skill level. Also political interference may occasionally play a role.

Technical and operational

The collected solid waste will comprise some hazardous and special waste, as all waste is collected through the same system. The solutions for this problem are at hand, but are not implemented due to other limitations.

Bulky wastes are neither accepted by the solid waste services nor at the solid waste dumps. This creates a problem and many pieces of bulky waste end up as illegal waste on open lots, in open waters or along roads.

Environmental and health area

The environmental problems related to the current solid waste dumping methods are recognized and know-how about a proper sanitary landfill is available. This know-how is however not applied due to other limitations.

The health and environmental authorities are occasionally requested to give their advice on solid waste matters, but their advice is not binding, and in practice it is often overruled, with reference to force majeure.

Supervision of the solid waste system by these authorities is absent, and monitoring and control is very limited and usually only passive (in case of complaints or calamities).

Financial and economic area

A major limitation is that the solid waste services are still largely free, and no revenues are generated. Public services are paid by the Government Treasury. The budget has been limited for many years and hardly any investments in the solid waste management services could be made. The investments that have been made were mostly paid for from foreign aid funds.

In some smaller population centers households and shops are asked for a voluntary contribution and to some degree this seems to work for their communities.

Social and community

Efforts made at schools and by some organizations to provide good health and environmental education and awareness are opposed by the actual situation.

There is a general idea in the community that the government has to provide all kind of services for free, and there is no payment culture for services at all. This makes it very difficult to introduce new approaches for the required services. The eroding quality of services makes the population however increasingly aware that payment may improve the solid waste situation. A few districts already show this.

6.2 Factors (institutional, technical, financial and others) that limit or increase the effectiveness and efficiency of solid waste management services

More external funds for investments could be made available once legal, structural and organizational adjustments within the solid waste services would be accomplished.

Plans have however mainly been focusing on improvement of the solid waste management in Greater Paramaribo and not on the national level.

The scattering of the different local solid waste services over different institutions and the strongly centralized character of the organization strongly reduces the efficiency of the services.

The financial dependence of the solid waste services on the national budget is a major factor limiting its effectiveness.

The lack of policy and the slow political decision-making is a major limitation for the efficiency and effectiveness of solid waste management services at all levels. There also appears to be a lack of political commitment.

The opportunities for recycling of solid waste are limited due to the small market of Suriname.

7. RELATION OF SOLID WASTE MANAGEMENT SERVICES TO HEALTH, ENVIRONMENT, ECONOMIC, AND SOCIAL DEVELOPMENT

7.1 Impact of solid waste management services on health and the environment.

The incidence of some diseases has been related to improper solid waste management. In many cases, inadequate solid waste management contributes to conditions conducive for the spread of water-, fecal-, and waste-related diseases.

Dengue Fever is prevalent in the coastal zone of Suriname and frequently its incidence flares up. These incidences are related to the proliferation of *Aedes Aegypti* breeding sites in, among others, uncollected and littered waste.

In a recent study on surface- and groundwater quality in Greater Paramaribo it has been concluded that "an important diffuse source of pollution is formed by the illegal solid waste dumps" (Ingenieursbureaucombinatie DHV-WL-AMI-SUNECON, 2001).

The same study reports extensive clogging of open drains and sewers by uncollected and littered domestic waste and PET bottles. These tertiary drain channels are an important part of the drainage system of Greater Paramaribo. During the rainy season, the clogging of such drains causes widespread and prolonged flooding of residential areas, with significant spread of fecal matter from flooded septic tanks and the dispersal of rats and snakes from their underground nesting places. Peaks in the incidence of gastro-intestinal diseases are related to the rainy seasons (BOG). Also incidences of Leptospirosis are associated with the rainy season and the frequent floods (BOG).

The disposal sites for the waste of Greater Paramaribo have been and still are a source of concern. Due to insufficient funds hardly any management of the sites is executed, resulting in a significant pollution of air, surface and ground water, and soil of the surrounding area, and considerable nuisance to the local population.

The situation in the districts is more or less comparable to that of Greater Paramaribo.

People living near the dumpsites have raised many complaints. The solid waste is set afire every now and then and smoke covers extensive living areas downwind of the dump. Besides this the dumpsite as well as illegally dumped waste in the surrounding areas give rise to bad odors, and an increase of disease vectors like mosquitoes, flies, cockroaches and rats.

In addition to the open dump fires also residential and garden waste burning causes much nuisance in living areas. Waste burning is a common practice in rural areas and other population centers with an inadequate solid waste management. But also in Paramaribo where waste collection services exists most of the garden waste is burned. In days of little wind many citizens experience not only the nuisance of smoky air, soot deposits in the dwellings, but also associated respiratory problems.

It has been claimed and reported that occasionally percolation and drainage water from closed and illegal dumpsites has resulted in large fish kills in drainage canals. However, the cause-effect relationship was not proven.

Finally it has been reported that some living quarters have been established on top of abandoned and covered waste dumps

7.2 Epidemiological studies on impact of inadequate waste management on health

With respect to diseases related to solid waste management only routine data on the incidence of gastro-intestinal diseases, dengue and leptospirosis are available. In 2000 the Cumulative Incidence Rate (CIR) is 26.3 and

9.5 cases per 100.000 inhabitants respectively for dengue and leptospirosis. The Case Fatality Rates (CFR) is 3.7 and 0.9 respectively.

There have been dengue epidemics in 1998 and 1999/2000, in the latter case with sero types 1 and 2.

The incidence of leptospirosis shows an up-and-down trend throughout the years (CIR between 5.4 and 16.7 per 100.000 inhabitants for the period 1995-2000).

No concrete epidemiological studies have been conducted to determine the direct impact of inadequate solid waste management on the incidence of these diseases. Other factors like poverty and malnutrition, an inadequate maintenance of the drainage and sewerage system and poor sanitation services, which often coincide, will also contribute to the incidence of diseases.

7.3 Occupational health of formal and informal workers involved in collection and transportation.

The government workers have to do a general medical test every year. The workers are supplied with the normal safety materials.

7.4 Equity of the services: equity, efficiency, quality, effectiveness, and sustainability on the basis of the economic and social development of the country.

Even though Suriname is a country with a medium development status it is felt that it could perform much better with respect to the solid waste management services.

Especially services to the peri-urban and poorer communities could improve. The public health risks affecting the whole urban population is affected by inadequate services in these areas. A tariff structure with higher charges to those more affluent residents with higher generation of waste would benefit the services for the poor (see also paragraph 8.6).

The general education level is good, the required know-how is available in the country, technical assistance has been offered by several international agencies and funds can be made available for investments in the sector.

7.5 Analysis of the economic value of the sector.

Hardly any data is available to make an economic analysis of the solid waste sector, such as the generation of work related exchange of goods and services, development of small business, and recycling.

8. PARTICIPATORY MANAGEMENT IN SOLID WASTE MANAGEMENT

8.1 Community participation: mobilization and community organization, participation of NGOs and other groups of civil society in solid waste management

Since 1993 Suriname has participated in the global "Clean up the World" campaign, organized in September, during which all kind of clean-up activities are conducted with broad participation of community based organizations.

In 2001 the "Opo Yu Ay" (Open Your Eyes) campaign started, which aims to increase awareness about the environment among secondary school kids. The campaign comprises a competition between schools, which all have to study a certain environmental problem for which they have to provide a solution. The campaign also includes a number of TV spots on environmental subjects, aiming at raising public awareness.

Another campaign in the solid waste field is the PET bottle-recycling program of a local soft drink manufacturer. The collection is mainly done by primary schools, that this way raises funds for their own projects. In 2001 about 60 schools were participating in the project, which is supported by PAHO Suriname, the Environmental Union and the Boy scouts (Anon., 2003).

The University of Suriname, through its Environmental Department, is doing some research in the field of solid waste management. The results have not yet been published.

The PAHO is supporting the local solid waste services with direct technical assistance, institutional development and training. Recently PAHO supported the development of a public awareness campaign with 5 TV spots and several radio messages to be aired before, during and after the CARIFESTA week. The messages focused on anti littering, health implications and compliance with the collection scheme for residential waste.

8.2 Municipal support for community programs

The government is supporting the Clean-Up-the World campaign by providing trucks and logistical support. However, the government has very limited resources for such support.

8.3 Education and sanitary environmental communication

Within the primary school curriculum some attention is paid to solid waste as part of the nature science program. At level 4 (ages 9-10 years) attention is given to the relation between diseases (a.o. dengue) and solid waste and at level 6 (ages 11-12 years) a full lesson is spend on solid waste: "Solid waste a growing problem".

At all levels some aspects of hazardous materials are dealt with.

At the secondary level solid waste issues are not included in the curriculum.

8.4 Hygiene and occupational safety programs for staff members of the sector

Such programs do not yet exist, but they are planned for the semi-commercial (parastatal) solid waste company (SAVEB) that is being created.

8.5 Informal sector workers in the segregation and recycling of materials, presence of children and mothers who live and work in garbage

In 1994 a study has been conducted to the waste pickers at the "Jan Steen" dumpsite (Playfair, 1994). The group consisted of sixty persons, of which ten were below 15 years of age. Thirty women were working at the site at

that time. Some of the waste pickers stayed at the dumpsite, but most of them lived elsewhere. Items of their interest include the following:

- Glass and plastic bottles and jars
- Lead (car batteries) and copper (wire)
- Parts of machinery and apparatus
- Aluminum scrap
- Plastic bags
- Firewood
- Glass fragments
- Clothing

At the time of this study the country was at the low of an economic crisis and there was a general shortage of many items. Waste picking was a way to provide for one's family.

The economic situation has improved since those days and only a few items will be in demand now.

Also at the former "Charlesburg" dumpsite waste pickers, including children, have been spotted, but no data are available on their number and composition.

At the current "Ornamibo" dumpsite waste pickers have been active for some time, and despite having been sent away several times they continue to come back, often interfering with the daily operations at the site. Daily 3-4 persons are reportedly looking for items as listed above.

Also at the "Zoelen" dumpsite of the district of Commewijne waste pickers have been reported. It is estimated that on average 4 children, 3 men and 3 women are looking for anything valuable in the waste. At this dumpsite waste from four population centers (Alkmaar, Meerzorg, Nieuw Amsterdam and Tamanredjo) is disposed off.

No waste pickers are reported in other districts, or information is not available.

9. FUTURE PROSPECTIVES

9.1 Future needs for investment and for institutional reorganization.

An assessment has been made about the deficit of equipment. An additional 13 compactor trucks will be needed above the current 13 compactor trucks. These compactor trucks are all over 6 years old and require replacement in the near future. Twenty of these trucks will be needed for Greater Paramaribo and the remainder for the districts.

Even more important are the investments required to establish sanitary landfills for Greater Paramaribo and the 5 or 6 districts. The latter number will depend upon the possibility of combined use of landfills. A projection of the required investments has been made for Greater Paramaribo, amounting approximately US\$ 5 million for equipment and a sanitary landfill (Anon., 2002).

At present an institutional reorganization is only foreseen for Greater Paramaribo, where an independent and commercial solid waste collection and disposal company (SAVEB) is being developed. A board with representatives from the responsible ministry (MOW) and from the stakeholders will control this semi-government organization.

9.2 Reform and modernization.

To correct problems and increase the effectiveness and efficiency of solid waste collection, the SAVEB is considering to implement a collection system with communal containers in certain areas with limited or no access of the larger compactor trucks. House to house collection will continue in those areas with good access roads. Furthermore waste minimization will be encouraged through information programs.

Due to financial restrictions only minor changes are planned at the Directorate of Environmental Management. These include the acquisition of mechanical sweeping equipment and equipment for tree maintenance for Paramaribo.

9.3 Alternatives suggestions:

To increase the effectiveness of solid waste management services it has been suggested to improve community participation by increased involvement of the local government structures (resort councils). At this moment this participation is limited to a few resorts only and no concrete plans have been drafted how this participation should take shape.

9.4 Arrangement of the solid waste management "sector"

As part of the sectoral analysis for the Urban Environment, it has been proposed to prepare a Masterplan study to solid waste management (including special waste, septic tank sludge, chemical waste etc). The Masterplan study should also deal with aspects like prevention, waste minimization and recycling.

As part of the current plan for decentralization certain government tasks will be assigned to the district authorities, among which is the solid waste collection and disposal. No details on this have been elaborated yet.

It has been suggested that a national solid waste authority will be required with administrative, planning and monitoring autonomy in order to guarantee that national regulations, guidelines and technical standards are also implemented at district level.

9.5 Regulation of the services

A law is being prepared dealing with all types of waste ("afvalstoffenwet"). This law should provide regulations and technical standards about the handling, collection, storage and disposal of specified waste types.

9.6 Subsidy policies

The gradual introduction of a tariff structure linked to another utility, such as the electricity bill, is being considered for the coming years. A surcharge for residential and/or commercial waste collection could be based on a certain percentage of the electricity bill. Larger consumers would pay more than small consumers, thus intrinsically applying a cross subsidy to poorer consumers.

The rate of the tariff will be raised gradually during the 2002-2007 period, and in 2007 a average monthly rate of US\$ 5 per household is foreseen, which should cover 90% of the operational costs of the solid waste services. The necessary investments and the remaining 10% of operational costs will be financed from the government budget and from donations. This projection applies for Greater Paramaribo only.

9.7 Financial requirements to increase the coverage and quality of the services for the next 10 years

Projections have been made for Greater Paramaribo only (Anon., 2002). It has been estimated that in the period 2002-2007 approximately 19 million US\$ will be required for operational costs of the solid waste services of this area. The required finances will be covered from external financing (1.8 million US\$), the government budget (9.8 million US\$) and from payment by users (7.6 million US\$).

No additional suggestions were provided to overcome problems in the smaller townships and depressed urban and peri-urban areas.

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11. ACRONYMS AND GLOSSARY

ABS	General Bureau for Statistics	Algemeen Bureau voor de Statistiek
BOG	Bureau of Public Health	Bureau Openbare Gezondheidszorg
CEPIS	Pan American Center for Sanitary Engineering and environmental Sciences	Centro Panamericano de Ingeniería Sanitaria y Ciencias del Ambiente
CFR	Case Fatality Rate	
CIR	Cumulative Incidence Rate	
DC	Districts Commissioner	Districts Commissaris
IDB	Inter-American Development Bank	
MATM	Ministry of Labor, Technological Development and Environment	Ministerie van Arbeid, Technologische ontwikkeling en Milieu
MB	Directorate of Environmental Management	Milieu Beheer
MI	Environmental Control Division (BOG)	Milieu Inspectie (BOG)
MOW	Ministry of Public Works	Ministerie van Openbare Werken
MPLOS	Ministry of Planning and Development Cooperation	Ministerie van Planning en Ontwikkelingssamenwerking
MRO	Ministry of Regional Development	Ministerie van Regionale Ontwikkeling
MVZ	Ministry of Public Health	Ministerie van Volksgezondheid
NIMOS	National Institute for Environment and Development Suriname	Nationaal Instituut voor Milieu en Ontwikkeling Suriname
PAHO	Pan American Health Organization	
PCG	Per Capita Generation	
SAVEB		Surinaams Afval Verwijderings Bedrijf N.V.
Sf	Surinam guilder	Surinaamse gulden
SPS	National Planning Office	Stichting Planbureau Suriname
VOV	Solid Waste Collection and Disposal Division	Afdeling Vuilophaal en - Verwerking
WHO	World Health Organization	

MAP OF SURINAME: POLITICAL BOUNDARIES (AS PER JANUARY, 1985)



No	District	Area (km ²)	No	District	Area (km ²)
1.	Paramaribo	183	6.	Saramacca	3,636
2.	Wanica	443	7.	Coronie	3,902
3.	Para	5,393	8.	Nickerie	5,353
4.	Brokopondo	7,364	9.	Marowijne	4,627
5.	Commewijne	2,353	10.	Sipaliwini	130,566

