



No.



REPUBLIC OF CUBA
MINISTRY OF SCIENCE, TECHNOLOGY AND ENVIRONMENT IN HAVANA CITY
PROVINCIAL DIRECTION OF COMMUNAL SERVICES

**THE STUDY
ON
INTEGRATED MANAGEMENT PLAN
OF
MUNICIPAL SOLID WASTE
IN HAVANA CITY
- REPUBLIC OF CUBA -**

**Final Report
《 Volume III : Supporting Report**



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LIST OF VOLUMES

Volume I : Executive Summary

Volume II : Main Report

Volume III : Supporting Report

Volume IV : Data Book

SUPPORTING REPORT

Table of Contents

PART 2 THE MASTER PLAN

A. Profile of the Study Area	A.1
B. Collection and Transportation	
B1 Current Conditions	B1.1
B2 Study for the Master Plan	B2.1
B3 Maintenance Workshops.....	B3.1
C. Final Disposal	
C1 Basic Concept for Landfill Plan	C1.1
C2 Planning and Design of Landfill.....	C2.1
C3 Outline of Construction and Expansion of Landfill	C3.1
C4 Condition of Cost Estimate for Landfill	C4.1
D. Environmental Survey	
D1 Site Description for IEE	D1.1
D2 Waste Quality Survey	D2.1
D3 Water Quality Survey	D3.1
D4 Data of Diseases	D4.1
E. Institution and Organization	E.1
F. Financial Situation.....	F.1
G. Industrial and Medical Waste	G.1

PART 4 FEASIBILITY STUDY

H. Waste Collection Vehicles	H.1
I. Maintenance Workshops.....	I.1

PART 2 THE MASTER PLAN

A. Profile of the Study Area

A. PROFILE OF THE STUDY AREA

1. Study Area and Natural Environment

The study area is Havana City, the capital of the Republic of Cuba. Havana City has a population of 2.2 million and is divided into 15 municipalities. The 15 municipalities are further divided into 105 districts. The overall area of Havana City is 727 km², with a mostly flat relief where small hills do not exceed several hundred meters in elevation in the urban areas. The southern sections, in contrast with the north, still maintain original natural conditions.

1.1 Climate

The climate of Havana City can be analyzed from climatic data at two meteorological stations, Casablanca and Santiago de las Vegas.

The annual maximum temperatures in 2003 were 29.3 °C at Casablanca, and 30.0 °C at Santiago de las Vegas, while the respective annual minimum temperatures were 22.8 °C and 20.2 °C. The maximum and minimum temperatures recorded at Casablanca from 1909 to 2003 were 35.8 °C and 8.5 °C, respectively. At Santiago de las Vegas, they were 35.3 °C and 4.5 °C.

The annual rainfall in 2003 was 1350.6 mm. During the rainy season (from May to October), monthly rainfall varies from 44.7 mm to 224.4 mm and the rainfall for these 6 months represented 72% of the annual total. In the rainy season, hurricanes hit Havana City, with the worst storms generally occurring in September and October.

Relative humidity varies seasonally in accordance with the rainfall pattern. The highest means occur between June and November, when values are around 80%, while the minimum values are recorded from January to April.

High wind speeds are not frequent. In 2003, the annual mean wind speeds were 2.7 m/s at Casablanca and 0.9 m/s at Santiago de las Vegas. The predominant wind directions during the year were easterly at Casablanca and southerly at Santiago de las Vegas.

1.2 Hydrology

The area of Havana City is divided into four basins (Almendares Vento, East Basin, West Basin and Havana Bay Basin).

About 47% of the drinking water consumed by the population in Havana City comes from the ground basin of Vento; between 300 and 350 metric tons are extracted from Ejercito Rebelde dam, which is also an efficient reloading facility for Vento Basin. It is also used

extensively for agriculture, especially in Havana City province. The overall basin area is 402.02 km², of which 212.51 km² (52.8%) is in Havana City province and 189.51 km² (47.14%) outside of Havana City province. More than half a million people live in the Basin.

Most of the main rivers in Havana City flow from south-west to north-east and discharge into the sea. The lengths of the main rivers are shown in Table 1

Table 1 Main Rivers in Havana City

River	Length (km)
Almendares	46.8
Jaimanitas	11.8
Quibu	11.7
Luyano	10.4
Martin Perez	6.4
Cojimar	22.0
Guanabo	22.1
Itabo	17.0
Bacuranao	21.7

Source: Havana City Territorial Office of Statistics

2. Socio-economic Conditions

2.1 Population

The population of Cuba at the end of 2001 was approximately 11.2 million. The average annual population growth for the past decade (1992 to 2001) was less than 0.4%, which is considered to be well below the Latin American average. In 2001, 25% of the Cuban population was 50 years and over, with 10% being 65 and over. The urban population in Cuba accounts for 75% of the overall total.

The Province of Havana City had a total population of approximately 2.2 million in mid-2002, representing about 20% of Cuba's population and 26% of its total urban population. The population distribution by municipality is shown in Table 2. The population distribution by age is presented in Table 3. The Municipality of Centro Habana is literally located at the center of the province and has the highest population density of 43,047 persons/km². The population of Havana City is older than the rest of the provinces, with 29% of the population being 50 years and over, and 12% being 65 years and over.

Table 2 Population of the 15 Municipalities in Havana City

Municipality	Total	Male	Female	Population Density (Person/km ²)
Playa	181,256	85,048	96,208	5,011
Plaza de la Revolucion	171,528	78,357	93,171	14,511
Centro Habana	149,476	69,542	79,934	43,047
La Habana Vieja	94,635	44,696	49,939	21,046
Regla	42,391	20,347	22,044	4,624
La Habana del Este	185,543	89,853	95,690	1,280
Guanabacoa	106,292	51,417	54,875	834
San Miguel del Padron	153,956	74,062	79,894	5,999
Diez de Octubre	227,501	105,712	121,789	18,734
Cerro	134,778	62,935	71,843	13,149
Marianao	137,838	65,444	72,394	6,464
La Lisa	127,843	61,978	65,865	3,408
Boyeros	188,881	91,820	97,061	1,407
Arroyo Naranjo	199,542	96,526	103,016	2,402
Cotorro	74,453	36,563	37,890	1,134
Total Havana City	2,175,913	1,034,300	1,141,613	2,992

Note: Data as of 30 June 2002

Source: Havana City Territorial Office of Statistics

Table 3 Population Distribution by Age Group in Havana City

Age group	Total	Male	Female
0-4 years	131,711	67,698	64,013
5-9 years	133,765	68,857	64,908
10-14 years	157,669	80,769	76,900
15-19 years	141,197	70,842	70,355
20-24 years	114,454	56,803	57,651
25-29 years	163,328	80,188	83,140
30-34 years	188,962	91,105	97,857
35-39 years	231,900	111,288	120,612
40-44 years	155,369	73,951	81,418
45-49 years	134,333	62,601	71,732
50-54 years	130,878	60,202	70,676
55-59 years	121,056	55,460	65,596
60-64 years	104,612	47,392	57,220
65-74 years	151,532	65,180	86,352
75-84 years	87,489	33,368	54,121
85 years +	27,658	8,596	19,062
Total Havana City	2,175,913	1,034,300	1,141,613

Note: Data as of 30 June 2002

Source: Territorial Office of Statistics of Havana City

2.2 Economic Activities

In the wake of the fall of the Berlin Wall in 1989 and the collapse of the Soviet Union in 1991, Cuba experienced a severe economic depression in the early 1990s. The GDP of

Cuba diminished by 35% from 1989 to 1993. The Cuban government implemented various reforms to stem excess liquidity, increase labor incentives, and alleviate serious shortages of goods and services. The reforms were successful and the GDP picked up again in 1994. During the 10 years of 1995 – 2004, Cuba’s GDP growth has been continuously positive, ranging between 0.2% and 8.4% (Table 4), which is generally higher than the average of Latin America and other Caribbean countries.

The growth rate of Cuba’s GDP increased to 3% in 2004, despite havoc caused by the worst drought in the last 40 years and two hurricanes that seriously affected productive activities. The adverse events in 2004 included the crisis of the national electricity and energy system and exacerbated foreign currency reserves, especially due to the US restriction limiting Cuban-Americans’ trips and their money remittance to Cuba.

Table 4 Growth of Cuba’s GDP

(% change year on year)

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Cuba	2.3	8.4	2.7	0.2	6.1	6.0	3.0	1.2	2.5	3.0
Latin America and the Caribbean	1.1	3.7	5.2	2.3	0.5	3.7	0.4	-0.6	1.9	5.5

Source: “2004 Preliminary Balance of Economies of Latin America and the Caribbean”, ECLAC

Cuba’s GDP amount, the composition by expenditure, and the composition by sector are summarized in Table 5. GDP values are expressed in pesos, which are an aggregation of Cuban local pesos (CUP) and Cuban convertible pesos (CUC) at par. The compositions of CUP and CUC are not available. Official estimates for conversion of the peso value GDP into the dollar value do not exist either. Hence, the real US\$ value of Cuba’s GDP is uncertain. In cases where Cuba’s GDP is shown in US\$, an exchange rate of peso 1:US\$1 is generally applied. ECLAC employed an exchange rate of peso 1.25:US\$1 in the “Statistics yearbook for Latin America and the Caribbean 2003”.

The GDP composition by expenditure in 2003 shows that private consumption accounted for 67%, followed by government consumption (21%), gross fixed investment (10%), and net export (2%). Sectorwise, services accounted for 67%. MSWM was included in community, social and personal services, all of which accounted for 20% of GDP. The agriculture sector and industry sector accounted for 7% and 26% respectively.

Table 5 Composition of Cuba's GDP

Year	1999	2000	2001	2002	2003
Total GDP					
At current prices (billion pesos *)	26.1	28.2	29.6	30.7	32.3
At constant 1997 prices (billion pesos *)	25.0	26.5	27.3	27.7	28.5
Composition by expenditure					
Private consumption	67%	64%	65%	65%	67%
Government consumption	21%	20%	20%	21%	21%
Gross fixed investment	13%	14%	13%	11%	10%
Increase in stocks	0%	1%	1%	1%	0%
Exports of goods and services	18%	19%	18%	17%	18%
Imports of goods and services	19%	18%	17%	15%	16%
Composition by sector					
Agriculture	7%	7%	7%	7%	7%
Industry	28%	29%	27%	27%	26%
Mining	1%	2%	2%	2%	2%
Manufacturing	18%	18%	18%	17%	16%
Electricity, gas and water supply	2%	2%	2%	2%	2%
Construction	6%	7%	6%	6%	6%
Services	65%	64%	66%	66%	67%
Commerce, restaurants and hotels	27%	28%	28%	28%	29%
Transport, warehousing and communication	10%	9%	10%	10%	10%
Financial service, real estate and corporate service	8%	7%	8%	8%	7%
Community, social and personal services	19%	18%	19%	20%	20%
Import duties	1%	1%	1%	1%	1%
Total	100%	100%	100%	100%	100%

* CUC and CUP are aggregated at par.

Source: "Statistical Yearbook of Cuba 2003" National Statistics Office

The distribution of the working population is shown in Table 6.

Table 6 Employment by Economic Activity, 2003

Sector	No. of workers ('000)	Share in total
Agriculture	1,119	27%
Industry	714	18%
Mining	27	1%
Manufacturing	463	11%
Electricity, gas and water supply	50	1%
Construction	174	4%
Services	2,242	55%
Commerce, restaurants and hotels	520	13%
Transport, warehousing and communication	200	5%
Financial service, real estate, and corporate service	58	1%
Community, social and personal services	1,465	36%
Total	4,074	100%

Source: "Statistical Yearbook of Cuba 2003" National Statistics Office

The agriculture sector employed 27% of Cuba's total work force, which was relatively high taking account of its GDP share of 7%. It is noted that 36% of the total working population were engaged in the provision of community, social, and personal services. The share of state employment has decreased since the early 1990s when more than 90% of total employment was held by the state. In 2003 the state accounted for 76% of total employment (Table 7). The official data shows extremely low unemployment rates (Table 8). This is because workers have been retained on the payroll, even when production ceased, until alternative employment is found.

Table 7 Employment Structure, 2003

	No. of workers ('000)	Share in total
State entities	3,105	76%
Autonomous state trading companies	180	4%
Other state entities	2,925	72%
Non-state entities	969	24%
Joint ventures	27	1%
Co-operatives	293	7%
Private entities	649	16%
Self-employed	151	4%
Other private entities	498	12%
Total	4,074	100%

Source: Statistical Yearbook of Cuba 2003

Table 8 Urban Unemployment (%)

Year	1999	2000	2001	2002	2003	2004
Cuba	6.0	5.5	4.1	3.3	2.3	2.0
Latin America and the Caribbean	10.7	10.2	9.9	10.8	10.7	10.0

Source: "Statistic Yearbook of Latin America and the Caribbean 2004",
ECLAC

The composition of Cuba's exports and imports is shown in Table 9. Sugar has traditionally been a dominant export earner. However, its importance has decreased in recent years. Sugar earnings represented 80% of total goods export earnings in 1990, but reduced to only 18% in 2003. Exports of other agricultural products and fish have not changed so much. Another strong export earner is nickel. Nickel and cobalt reserves in Cuba are among the world's largest. Nickel output, in particular, increased rapidly in recent years. Export earnings from nickel and other mineral products were 39% of total goods export earnings in 2003.

Fuel import cost 1 billion pesos, or 22% of total import spending in 2003. As a result of continuous efforts to improve domestic oil production, the self-supply ratio has reached around 45%. Although preferential financing terms to purchase oil from Venezuela exist, Cuba's vulnerability to oil prices and supply has not yet been eliminated.

Table 9 Composition of Cuba's Exports and Imports

(Million pesos at current prices *)

Year	1999	2000	2001	2002	2003
Export					
Nickel and other metals	430	618	481	459	651
Sugar	471	458	556	454	297
Tobacco products	205	166	217	144	215
Fish	96	87	80	98	63
Vegetable and fruit	75	90	62	30	59
Medicine	32	33	43	51	48
Iron and steel	43	61	40	40	35
Cement	35	22	28	35	34
Other products	108	139	115	111	260
Total	1,496	1,675	1,622	1,422	1,662
Import					
Oil and fuel	731	1,158	977	869	1,006
Machinery & equipment	1,144	1,202	1,237	982	999
Foodstuffs	722	672	756	738	855
Manufactured goods (intermediate products)	688	673	677	526	600
Manufactured goods (final products)	448	503	508	428	515
Chemical products	429	419	478	427	416
Raw materials (excluding foods and oil)	91	95	91	107	134
Other imports	97	73	70	62	94
Total	4,349	4,796	4,793	4,141	4,619

* CUC and CUP are aggregated at par.

Source: "Statistic Yearbook of Cuba 2003", National Statistics Office

The Ministry of Finance and Prices seldom publishes official inflation figures. According to an ECLAC report¹, the inflation rates were 2.9% in 1998, -2.9% in 1999, -3.0% in 2000, -0.5% in 2001, 7.0% in 2002, and 5.0% in 2003. The measurement of inflation in Cuba is difficult because retail spending is divided between a number of markets such as CUC/CUP/US dollar and state/private. In the state-run CUP shops, rationed basic goods are sold at subsidized fixed prices, while prices in the free markets are determined by market conditions, and quoted in CUC.

The Gross Regional Domestic Production (GRDP) of Havana City is not computed in Cuba at present. As an alternative, the production data for Havana City was used to estimate the economic size of Havana City (Table 10).

¹ "Economic Study for Latin America and the Caribbean 2002-2003", ECLAC

Table 10 Production of Havana City

(Unit: billion pesos at current prices *)

	2000	2001	2002	2003
State sector	5.3	5.4	5.8	5.1
Joint venture companies	1.0	1.1	1.3	1.5
Trade companies	2.9	2.9	2.8	3.0
Total production (Havana City)	9.2	9.4	9.9	9.5
GDP (Cuba total)	28.2	29.6	30.7	32.3
Havana City production / Cuba GDP	33%	32%	32%	30%

* CUC and CUP are added up at par.

Source: Havana City Territorial Office of Statistics

The total production of Havana City was 9.5 billion pesos in 2003, or 30% of Cuba's GDP. Table 11 shows the sector classifications of the state entities' production and the number of dependent workers. The manufacturing sector was the largest producer, accounting for about half of the total production by state entities in Havana City. The construction sector was the second largest producer, followed by the transport sector. In total, nearly 80% of the production was generated by these three sectors. In terms of worker distribution, the commerce sector was the largest employer, accounting for 15% of the total workforce. This was followed by the manufacturing sector where 13% of total workers were retained.

Table 11 Industry Classification of Havana City by Production and Workforce

(Data of 2003)

Sector	Production (million pesos*)	Share	Number of workers	Share
Manufacturing	2,361	46%	122,079	13%
Construction	855	17%	48,046	5%
Agriculture	75	1%	29,071	3%
Forestry	46	1%	1,212	0%
Transport	435	9%	41,070	4%
Communication	53	1%	12,257	1%
Commerce	170	3%	141,279	15%
Other production activities	228	4%	9,769	1%
Communal services	104	2%	43,955	5%
Science and technology	161	3%	17,813	2%
Education	9	0%	76,579	8%
Culture and art	137	3%	30,067	3%
Public health, sport assistance	11	0%	87,372	10%
Finance and insurance	201	4%	8,725	1%
Administration	17	0%	33,977	4%
Other non production activities	216	4%	215,523	23%
Total	5,078	100%	918,794	100%

* CUC and CUP are added up at par.

Source: Havana City Territorial Office of Statistics

The production of 15 municipalities in Havana City is shown in Table 12. Playa, Plaza de la Revolución, Centro Habana, and La Habana Vieja are the four main municipalities in terms of industrial production. Those four municipalities accounted for approximately 70% of the total production. The production by joint venture companies and trade companies

was also concentrated in these four municipalities. In addition, La Habana del Este and Boyeros had relatively large production, also generated by joint venture companies and trade companies.

Table 12 Production of the 15 Municipalities in Havana City

(Million pesos at current prices)

Municipality	2000	2001	2002	2003
Playa	1,795	2,100	2,106	2,344
State sector	696	628	627	709
JV companies & trade companies	1,099	1,472	1,479	1,634
Plaza de la Revolucion	1,705	1,667	1,636	1,821
State sector	698	765	782	894
JV companies & trade companies	1,007	902	855	927
Centro Habana	1,575	1,106	2,227	1,343
State sector	591	345	1,382	392
JV companies & trade companies	985	761	845	951
La Habana Vieja	1,097	1,092	1,042	985
State sector	872	887	862	813
JV companies & trade companies	224	205	181	171
Regla	552	637	250	329
State sector	524	602	217	285
JV companies & trade companies	29	35	32	45
La Habana del Este	195	224	243	231
State sector	82	110	117	121
JV companies & trade companies	113	115	126	110
Guanabacoa	121	121	124	134
State sector	119	119	118	126
JV companies & trade companies	3	3	5	8
San Miguel del Padron	102	105	113	102
State sector	99	105	113	102
JV companies & trade companies	3	0	0	0
Diez de Octubre	331	343	328	349
State sector	310	324	310	328
JV companies & trade companies	20	19	18	21
Cerro	449	351	381	382
State sector	401	285	301	289
JV companies & trade companies	48	65	79	92
Marianao	211	230	247	216
State sector	154	155	156	131
JV companies & trade companies	57	75	92	85
La Lisa	173	175	184	207
State sector	160	164	163	171
JV companies & trade companies	13	11	21	36
Boyeros	647	972	757	767
State sector	335	623	386	394
JV companies & trade companies	312	350	371	372
Arroyo Naranjo	77	99	88	103
State sector	77	99	88	103
JV companies & trade companies	0	0	0	0
Cotorro	192	189	205	231
State sector	191	187	199	220
JV companies & trade companies	2	2	6	11
Total Havana City	9,223	9,410	9,933	9,542
State sector	5,308	5,396	5,821	5,079
JV companies & trade companies	3,915	4,014	4,112	4,463

Source: Havana City Territorial Office of Statistics

2.3 Currency

There was a triple-currency system in Cuba until 2004. Although the legal Cuban currencies were the Cuban local peso (CUP) and Cuban convertible peso (CUC), US dollars were also circulated in normal commerce and transactions. The CUP was used for pricing of goods and services provided by Cuban local materials. The CUC was used for pricing of goods and services for which raw materials were imported. The US dollar was used equally at par in CUC transactions. Changes in the currency exchange rates are shown in Table 13. The triple-currency system veered to a dual-currency system in November 2004 when US dollar cash transactions started to be levied at 10%. This aimed to restrict the US dollar use and instead, encourage the CUC use. In April 2005, CUC had appreciated against US dollars and all other hard currencies by 8%.

Table 13 Changes in Peso Exchange Rates

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
CUC exchange rate *a (US\$/CUC)	1	1	1	1	1	1	1	1	1	1	1	1.08 *c
CUP exchange rate *b (CUP/CUC)	95	32	19	23	21	20	21	26	26	26	26	24 *c

*a: Official exchange rate

*b: Legal but unofficial exchange rate available only domestically, for personal transactions of exchanging CUC for CUP

*c: Effective from 9 April 2005

Source: "Economic Study for Latin America and the Caribbean"; ECLAC, and Central Bank of Cuba

2.4 Tourism

The tourism industry has become the most dynamic sector of the economy. The industry has also created a demand that has contributed to the revitalization of other sectors of Cuba's economy. The international tourism system in Cuba comprises 44 main entities. Of these, 33 are directly run by the Ministry of Tourism, eight by Gaviota, and three by the Historian's Office. In 1990, Cuba received 340,000 foreign tourists, with international tourism revenues totaling US\$243 million. In 2003, gross revenues totaling about US\$2 billion were generated by the tourism industry. The tourism industry's contribution in Cuba's total foreign revenue rose from 4% in 1990 to 41% in 2001. The biggest proportion of investment in the tourism industry was directed towards hotel construction. Eight tourism areas, in which 92% of the total number of rooms are concentrated, are Havana City, Varadero, Jardines del Rey, Santa Lucía, Holguín, Santiago de Cuba, the south-central coast (Trinidad-Cienfuegos), and the Los Canarreos Archipelago. Direct employment in the tourism sector has grown in recent years from 54,000 to 100,000 jobs, while indirect employment rose from 30,000 to close to 200,000. The change in the number of foreign tourists is presented in Table 14. Approximately 1 million foreign tourists visited Havana City in 2003, which accounted for 51% of the total visitors to Cuba. There was a drop in

2002 due to the negative impact on global tourism caused by the September 11 attacks. However, tourist arrivals in Cuba bounced back from the shock and exceeded 1.9 million in 2003.

Table 14 Change in the Number of Foreign Tourists

(Unit: 000 persons)

	1999	2000	2001	2002	2003
Tourists to Havana City	867	951	980	959	974
Tourists to Cuba	1,603	1,774	1,775	1,686	1,905
Weight of Havana City	54%	54%	55%	57%	51%

Sources: Statistic Yearbook of Cuba 2003 and Havana City Territorial Office of Statistics

2.5 Education

Cuba has the highest literacy levels and highest average levels of educational attainment in Latin America. Education is free. The school system comprises preschool, primary education (6 years), basic secondary education (3 years) late secondary education (3 years) and higher education (5 - 6 years). Compulsory education covers primary and secondary education. The school attendance rate in the compulsory education age range was 98% in Havana City in 2000.

2.6 Public Health Conditions

Cuba's health statistics are comparable with those of industrialized countries because of the emphasis of the government on the universal provision of basic needs and healthcare. Health data for Cuba and Havana City are almost identical. The main causes of death are heart disease, malignant tumors and cerebrovascular disease both in Cuba and Havana City, which are similar to those in developed countries. Cuban life expectancy at birth was 76 years in 2003. The infant mortality rate was 7 per 1,000 live births in 2003. Cuba has the highest ratio of doctors to population in the world. Havana City had 20,697 doctors in 2002, which was a rate of 1 doctor per 105 inhabitants. Morbidity data for Cuba is shown in Table 15. It should be noted that nationwide incidences of all those diseases except food poisoning show a decrease during the period 1999 - 2003.

Table 15 Incidence of Obligatory Declaration Diseases

Disease	1999	2000	2001	2002	2003
Blennorrhagia	23,225	19,067	14,908	12,883	10,471
Brucellosis	17	24	27	23	17
Soft chancre	-	3	3	3	-
Acute diarrhea	953,696	862,580	868,477	887,901	746,164
Diphtheria	-	-	-	-	-
Acute infectious encephalitis	-	-	-	-	-
Scarlatina	2,080	2,616	2,046	1,499	1,347
Paratyphoid fever	-	-	-	-	-
Typhoid fever	131	37	24	10	-
Viral hepatitis	18,119	18,317	14,850	14,149	8,615
Food poisoning	8,747	7,781	6,621	9,752	10,387
Leprosy	333	278	267	316	251
Meningocortical diseases	70	56	43	31	34
Aseptic Meningoencefalitis	4,639	19,027	14,477	3,641	2,544
Bacterial Meningoencefalitis	747	617	492	376	415
Malaria	4	38	8	22	13
Infectious Parotiditis	-	-	-	-	-
Poliomyelitis	-	-	-	-	-
hydrophobia	-	1	-	-	1
Acute respiratory disease	5,216,286	4,823,831	4,873,390	4,504,237	4,596,265
Rubella	-	-	-	-	-
Measles	-	-	-	-	-
Syphilis	12,285	9,199	6,281	4,612	3,293
Tetanuses	2	1	2	2	3
Whooping cough	-	-	-	-	-
Tuberculosis	1,111	1,133	901	861	807
Chicken pox	32,156	48,259	26,381	16,791	14,079

Source: "Statistics Yearbook of Cuba 2003", National Statistics Office

3. Administrative Divisions

Cuba has a centralized political system. The head of state is the President. The highest executive body is the Council of Ministers, which has an Executive Committee comprising the president, the first vice-president and the vice presidents of the Council of Ministers. Cuba is divided into 15 administrative regions comprising 13 provinces, Havana City, and a special municipality. Each region has a provincial government, which is called the Provincial Administration Council (CAP). There are 169 municipalities under those regions. The Province of Havana City is divided into 15 municipalities, which include Playa, Plaza de la Revolución, Centro Habana, Habana Vieja, Regla, Habana del Este, Guanabacoa, San Miguel del Padron, Diez de Octubre, Cerro, Marianao, La Lisa, Boyeros, Arroyo Naranjo, and Cotorro.

The municipal government is called the Municipal Administration Council (CAM). An additional bottom tier of local government is the People's Council. Each municipality in Havana City has three to ten People's Councils, totaling 101 within Havana City.

In Cuba, activities related to MSWM are included in community services together with funeral services, O/M of recreational areas, etc. At each administrative level, there exists an implementation organization, advisory or regulatory organization, and control organization, all of which are interrelated.

At the state level, the competent authority of such community services is the Ministry of Economy and Planning (MEP). Within MEP, the Department of Territorial Planning and Community Services (DPTSC) is charged with community services. Although MEP plans, adjusts and makes the main budgets for all community services in Cuba, technical coordination is dependent on other ministries with proper capabilities. In MSWM, technical issues are assisted by the Ministry of Science, Technology, and Environment (CITMA) while medical and sanitation issues are addressed by the Ministry of Public Health (MINSAP). The Ministry of Labor and Social Security sets and controls the number of workers and the wages paid in community services.

At the provincial level, the CAP of Havana City has the Provincial Department of Community Services (DPSC) as a competent department for community services. The DPSC is naturally under direct supervision of the CAP. Furthermore, in the Cuban administrative structure, a department within each CAP is also supervised by its C/P ministry at the state level. Thus, the DPTSC can also be regarded as a supervisory authority of DPSC at the state level.

The organization that takes charge of MSWM under the administrative hierarchy of the DPSC comprises three components. Firstly, there is the Provincial Unit of Hygiene (UPPH), which is one of the six sections directly under the DPSC. Mechanized cleaning work and O/M of final disposal sites are mainly dealt with by the five sections under the DPSC, which include the Section of Recycling and Final Disposal Sites, the Section of Collection by Compactor Truck, the Section of Bulky Waste, the Section of Street Cleaning, and the Workshop.

Second is the traditional manual cleaning work, which is dealt with at the municipal level. Each Municipality in Havana City has a Municipal Department of Community Services (DMSC), which takes charge of manual cleaning work.

Thirdly, there are two autonomous companies under the DPSC, namely Aurora Plaza and Aurora Habana Vieja. Those Aurora companies were created with the aim of making SWM a self-sustainable business in strategically important areas. The tariffs for various SWM services are set. The Aurora companies collect charges from residents and entities that have

foreign currency income. In the case of general residents and entities with no foreign currency income, the provincial government transfers the corresponding funds to the Aurora companies. The Aurora companies have their own staff for MSWM and cleaning work but borrow trucks and drivers from the DPSC for mechanized solid waste collection in certain locations. The business model of Aurora is also currently being experimented with in three other municipalities (Playa, Centro Habana, and Habana del Este).

Apart from the above-mentioned organizations, some other public organizations are noticeably involved in the process of MSWM. The Union of Enterprises of Raw Material Recovery, which procures raw material for the steel industry, is under the jurisdiction of the Ministry of Steel and Metallurgy and part of the procurement depends on iron waste recycling. Although the Union of Enterprises of Raw Material Recovery has expanded object-recycling materials to non-ferrous items such as plastics and papers, iron items are still the dominant collection items. The Historian's Office is a state organization directly under the state government. Its main function is to preserve and utilize historical sites located in the Habana Vieja area. According to this objective, the Historian's Office is also charged with street cleaning and MSW collection in Habana Vieja zone. A company dealing with solid waste collection was created under the Historian's Office.

4. Land Use

Havana City is the center of all the economic activities of Cuba as well as the heart of tourism and industry. The old city area and its fortifications were designated by UNESCO as a world heritage in 1982. In terms of land utilization, 304 km² (41.8%) is currently used for agriculture, while the remaining 422 km² (58.2%) is used for non-agricultural purposes. The data on the land utilization plan in Havana City are summarized in Table 16. It is estimated that the residential area in Cuba totals 2,394 km², of which Havana City has 237.44 km². This accounts for 32.7% of the Havana City area. The other notable uses are 20.43 km² (2.6%) for roads, 27.27 km² (3.8%) for industrial areas and 25.89 km² (3.6%) for water resources and related facilities.

Table 16 Land Use Plan in Havana City

Items	Area (km ²)	Share in total
Agricultural Area	304.30	41.8%
Non Agricultural Area	422.84	58.2%
Residential Area	237.44	32.7%
Roads	20.43	2.6%
Industrial Area	27.27	3.8%
Water resources and related facilities	25.89	3.6%
Others	111.81	15.4%
Total	727.14	100.0%

Source: Delegacion Provincial del MINAGRI, 2002