

Chapter 1

Introduction



1 Introduction

1.1 Background

Mexico expands over an area of 1.97 million km² with a population of 93 million. In 1994, GNP per capita was US\$ 4,010. The world's largest metropolitan area, Mexico City and its neighboring Mexico State, is located in Mexico Valley (ZMVM) -- home to approximately 17 million people. The Government of the Federal District (GDF), an administrative body with 16 delegations (delegaciones), govern an area of 1,505 km² and 8.7 million citizens.

Reports indicate that approximately 11,000 ton of waste are generated daily in the Distrito Federal (DF) that are transported to two final disposal sites via 13 transfer stations. Its operation scale is extremely large; 2,011 vehicles and 236 large haulage trucks are used, and in total, 17,000 km of roads are swept.

Given these conditions, the Government of Mexico requested a master plan (M/P) to be made on SWM in the DF and the implementation of a feasibility study (F/S) of (a) selected priority project(s) to the Government of Japan. In response, the Japan International Cooperation Agency (JICA), Japan's technical assistance implementing agency, decided to implement the studies (both of which will be referred to as the study) in close cooperation with the relevant authorities of the Government of Mexico.

The JICA appointed Kokusai Kogyo Co., Ltd. as the consultant of the study.

1.2 Objectives of the Study

1.2.1 Objectives of the Study

The study covers the Federal District (DF) as its subject and aims to achieve the following objectives.

- Formulate an SWM master plan for the target year 2010.
- Carry out the feasibility study of the priority project(s).
- Pursue technology transfer regarding SWM to the counterpart personnel.

1.2.2 Study Area

This study covers the area under the jurisdiction of the Government of the Federal District of the United Mexican States as shown in Figure 1-1.

1.2.3 Solid Waste to be Covered Under the Study

The following six "solid waste" types are covered during the study.

- 1) Domestic waste.
- 2) Commercial waste.

- 3) Institutional waste.
- 4) Market waste.
- 5) Street sweepings waste.
- 6) Medical waste.

1.2.4 Target Year

The target year of the Master Plan is 2010 and that of the Feasibility Study on the priority projects, which was selected during the Phase II of the study, is 2004.

1.3 Key Assumptions (Population, Economic, etc.)

The following assumption were used in this study.

a. Socio-economic Conditions

Item	unit	Present*	2001	2004	2010
1. Population					
Population of study area	persons	8,610,000	8,747,000	8,896,000	9,206,000
Annual growth rate	%/year	-	0.57	0.57	0.57
2. Economic					
GRP(nominal term)	billion pesos	3,182.3	6,169.7	9,630.4	23,463.4
Annual real growth rate of GRP	%/year	7.0	4.4	6.0	6.0
Budget of the GDF (nominal)	billion pesos	31.1	60.3	94.1	229.3
Inflation rate	%	15.7	12.0	10.0	10.0
Currency exchange rate		USD 1=9.1 pesos			

Note : *data of 1997

b. Waste Amount and Composition

Item	unit	Present*	2001	2004	2010
1. Waste generation amount					
Household	ton/year	1,926,000	1,965,000	1,998,000	2,072,000
Commercial	ton/year	1,210,000	1,223,000	1,236,000	1,267,000
Service	ton/year	636,000	649,000	657,000	669,000
Special	ton/year	130,000	134,000	136,000	140,000
Others	ton/year	267,000	270,000	275,000	282,000
Total	ton/year	4,169,000	4,241,000	4,302,000	4,430,000
2. Waste composition					
Spatula	%	0.030	0.030	0.030	0.030
Colton	%	1.300	1.300	1.300	1.300
Cardboard	%	6.680	6.680	6.680	6.680
Leather	%	0.110	0.110	0.110	0.110
Paper container	%	1.910	1.910	1.910	1.910
Vegetable fiber	%	0.690	0.690	0.690	0.690
Synthetic fiber	%	0.850	0.850	0.850	0.850
Gauze	%	0.050	0.050	0.050	0.050
Bone	%	0.270	0.270	0.270	0.270
Vinyl	%	0.370	0.370	0.370	0.370
Disposable syringe	%	0.040	0.040	0.040	0.040
Cans	%	1.240	1.240	1.240	1.240
Ceramics	%	0.300	0.300	0.300	0.300
Wood	%	1.240	1.240	1.240	1.240
Construction waste	%	2.140	2.140	2.140	2.140
Metal	%	2.560	2.560	2.560	2.560
Nonferrous metal	%	0.490	0.490	0.490	0.490
Paper	%	4.410	4.410	4.410	4.410
News paper	%	4.960	4.960	4.960	4.960
Toilet paper	%	5.890	5.890	5.890	5.890
Disposable diaper	%	1.620	1.620	1.620	1.620
X-ray film	%	0.000	0.000	0.000	0.000
Plastic film	%	4.530	4.530	4.530	4.530
Hard plastic	%	3.490	3.490	3.490	3.490
Polyurethane	%	0.160	0.160	0.160	0.160
Foamed polyurethane	%	0.580	0.580	0.580	0.580
Food waste	%	37.700	37.700	37.700	37.700
Garden waste	%	3.180	3.180	3.180	3.180
Sanitary napkin	%	0.040	0.040	0.040	0.040
Rags	%	1.220	1.220	1.220	1.220
Bandage	%	0.010	0.010	0.010	0.010
Color glass	%	2.620	2.620	2.620	2.620

Item	unit	Present*	2001	2004	2010
Transparent glass	%	4.610	4.610	4.610	4.610
Fine fraction	%	1.710	1.710	1.710	1.710
Others	%	3.000	3.000	3.000	3.000
Total	%	100.000	100.000	100.000	100.000

Note : data of 1997

c. Life Span of Equipment and Facilities

	Life span (year)	Salvage value (%)
Truck and heavy equipment	7.0	10
Machinery	15.0	0
Buildings	30.0	0

Note : The life span of civil works and facilities other than building or the disposal site depends on the period of its operation.

1.4 Work Schedule of the Study

The study consisted of the following two phases.

Phase 1: *Study on the present condition of SWM and formulation of Master Plan (June 1998 to November 1998)*

Phase 2: *Feasibility Study on the Priority Projects (November 1998 to May 1999)*

The schedule of the study work is shown in Figure 1-2.

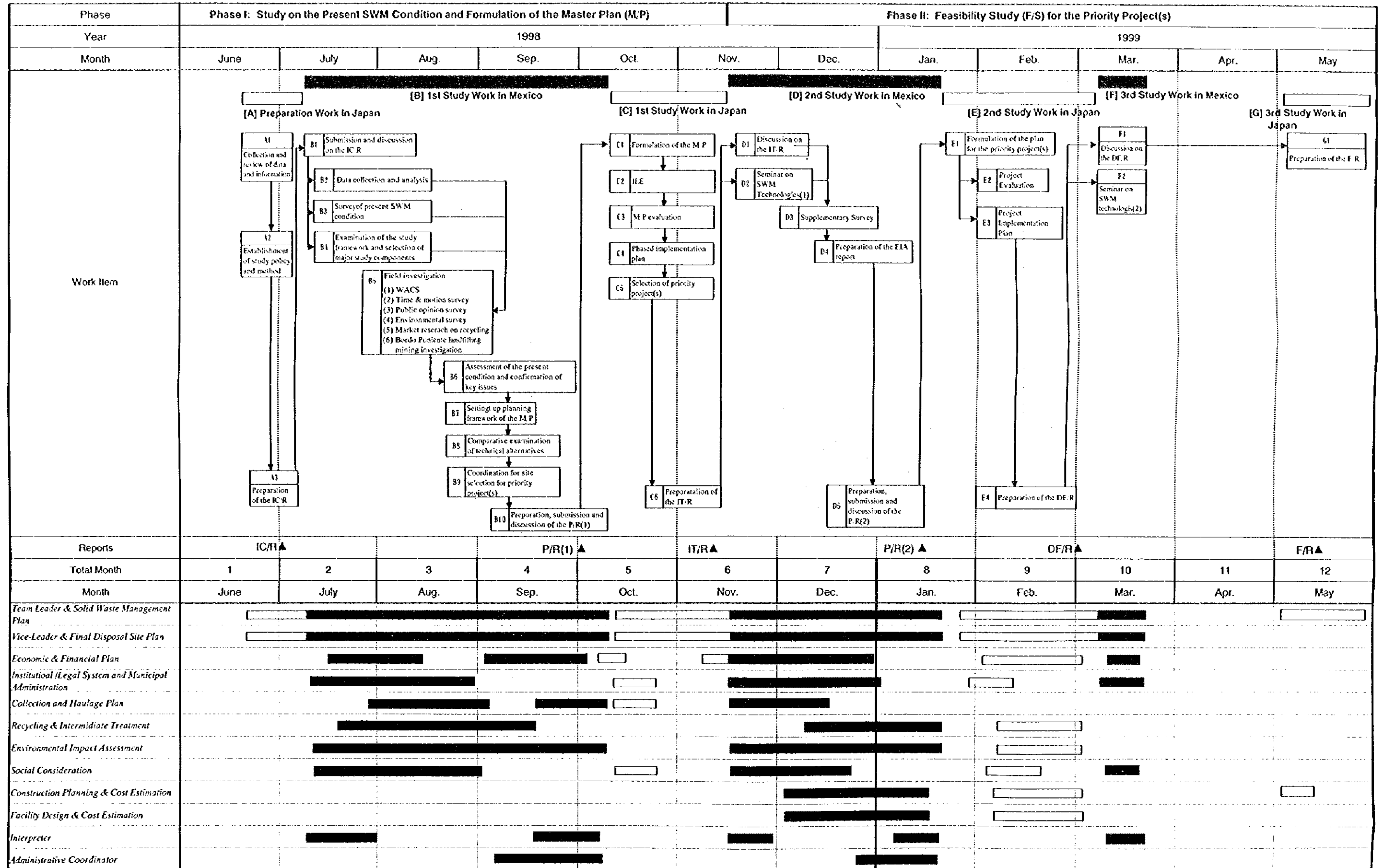


Figure 1-2: Schedule of Study Work

1.5 Study Organization and Persons Involved

The Government of the Federal District (GDF) is the counterpart agency and the coordinating body for negotiations with other governmental and nongovernmental organizations concerned. GDF organized the counterpart team consists of the appropriate number of personnel in charge of various aspects of SWM.

The Advisory Committee was organized by the JICA for the study.

1.5.1 Study Organization

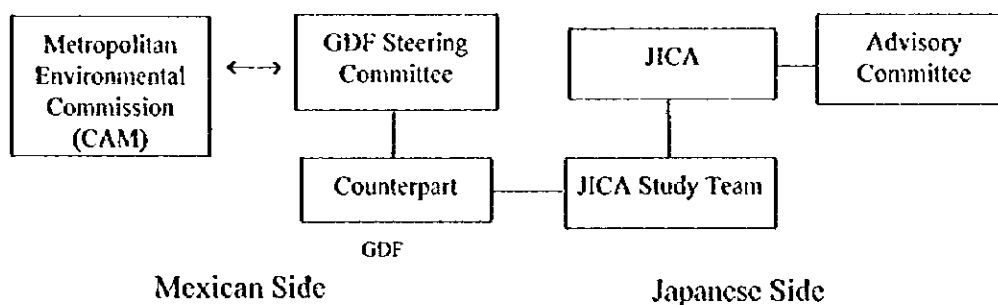


Figure 1-3: Study Organizational Structure

1.5.2 Persons Involved

a. Members of the Study Team

Assignment	Expert	Nationality
Team Leader & Solid Waste Management Plan	Hiroshi KATO	Japanese
Vice-Leader & Final Disposal Site Plan	Tadaya YAMAMOTO	Japanese
Economic & Financial Plan	Takao OZAKI	Japanese
Institutional/Legal System and Municipal Administration	José Felício HADDAD	Brazilian
Collection and Haulage Plan	Héctor CASTILLO B.	Mexican
Recycling & Intermediate Treatment Plan	Tamotsu SUZUKI	Japanese
Environmental Impact Assessment	Noriko OTSUKI	Japanese
Social Consideration	Guido J. ACURIO	Peruvian
Construction Planning & Cost Estimation	Ikuo MORI	Japanese
Facility Design & Cost Estimation	Andrew DORMAN	Australian
Interpreter	Fusako YAMAWAKI	Japanese
Administrative Coordinator	Noriko HIIHARA	Japanese

b. Members of the JICA Advisory Committee

Chairman & Solid Waste Management Planning	Kunitoshi SAKURAI
Solid Waste Management Administration	Ryuzo HIROSE
Economics & Project Evaluation	Masahiro YAMASHITA

c. Members of the Counterpart Personnel

Assignment	Name
Leader (full-time)	Raúl Sergio Cuéllar Salinas
Collection	Ricardo Estrada Núñez
Recycle	Victor Manuel Flores Valenzuela
Treatment	Victor Manuel Flores Valenzuela
Final Disposal	Conrado Sarmiento Bleicher
Environment	Jaime Cuauhtémoc García Reyes
Sociology	Augusto E. Valenzuela López
Financial Analysis	José Luis Alvarez Pacheco - Roberto Arturo Alvarado
Institution	Gerino Guzmán Delgado
Legislation	Germán Gerardo Méndez Ruiz - Sergio Palacios Trejo
Urban Planning	Cristina Ramos Cortéz

1.5.3 Technology Transfer

During the study, the study team endeavored to transfer technology to the Mexican counterpart through the following.

- Joint study
- Explanation of reports
- Counterpart training in Japan under the Japanese technical cooperation scheme
- Seminars on SWM technologies

Chapter 2

Profile of the Study Area



2 Profile of the Study Area

2.1 Natural Condition

2.1.1 Location

Mexico covers 1,958 thousand km², which is the 14th largest of the world. It shares a border of more than 3,100 km with the United States to the north. The other neighbors are Guatemala and Belize in the south-east with frontiers of 940 km and 250 km, respectively. The country faces Pacific Ocean on the west limited with a 7,400 km coast line, and have a 2,800 km shore on the east exposed to Mexican Gulf and Caribbean Sea.

Mexico City lies between 19°03' and 19°35' at north latitude and between 99°22' and 98°57' at west longitude in the south west corner of Mexico Valley, which is in the center of the country. It has an area of 1,505km² and borders the State of Mexico on the west, north and east and the State of Morelos on the south.

2.1.2 Topography

The topography of the country of Mexico is complex: it possesses coastal plains and highlands over 1,000 meters above sea level with volcanoes which are as high as 5,000m. The Mexico Valley, on which Mexico City is located, has an area of 9,600km² and the altitude of its central plain ranges from 2,240 to 2,390m above sea level.

The western part of the country drains towards the Pacific Ocean and the eastern part towards the Gulf of Mexico and the Caribbean Sea. Since the Mexico Valley is surrounded by volcanic mountains of 5,000m at extreme, however, there is no natural outlets for surface waters from the valley. Thus the Mexico Valley forms an independent watershed of its own.

Looking at the DF and its surrounding, there is a mountainous area over 3,000m altitude, called Sierra de Chichinautzin, on the border of DF and the State of Morelos, which also corresponds with the south edge of the Mexico Valley. Mount Ajusco, which is 3,898 meters high and the highest in this area, stands in the middle of Tlalpan delegation in the DF. For this reason, the DF is generally sloping toward north. Another mountainous area, Sierra de Monte Alto, is found about 10 km away to the west of the DF making a gentle slope toward east in the west part of DF. There are other two mountainous areas of smaller scale: Sierra de Santa Catarina in east of the DF divides delegations of Iztapalapa and Tlahuac and Sierra de Guadalupe is on the north border with the State of Mexico.

2.1.3 Climate

The climate of Mexico varies over the country due to its diverse topography: it has areas permanently covered with snow and areas of rain forests with abundant wild lives.

Although the latitude is relatively low, the outstanding topography of Mexico City makes its climate temperate and dry. The annual average temperature in the DF typically ranges from 10 to 25°C with an average of 15°C. The hottest month is May, the minimum temperature being 12°C and the maximum temperature being 26°C, while the coldest month is January with the minimum of 6°C and the maximum of 19°C.

Table 2-1 and Figure 2-1 show the monthly temperature averaged for about half century at three meteorological stations. Tacubaya is in the urbanized area, Ajusco is in a mountain and Gran Canal is in the outskirts of the northeast of Mexico City.

Table 2-1: Monthly Average Temperature

(Degree Centigrade)

Name of the Station	Period	Months											
		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Tacubaya	1921-1996	12.9	14.3	16.5	17.7	17.9	17.3	16.1	16.1	15.8	15.1	13.9	13.0
Ajusco	1962-1987	9.1	10.1	11.9	13.1	13.5	12.8	11.7	12.0	11.6	11.2	10.2	9.6
Gran Canal	1950-1990	13.4	14.7	17.1	18.7	19.3	19.0	18.0	18.2	17.9	16.8	15.1	13.7

Source: CNA

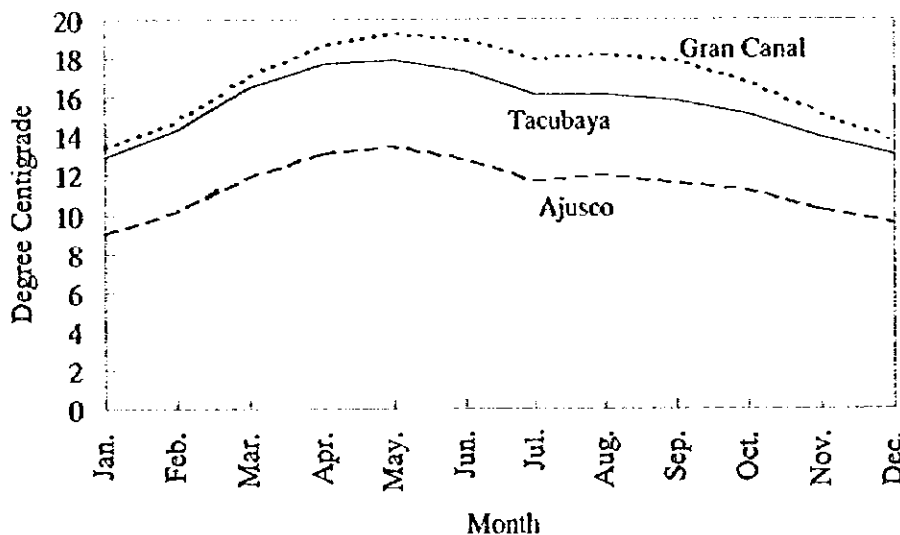


Figure 2-1: Monthly Average Temperature

That hard rain is seen only in a limited season illustrates a tropical feature of Mexico City. Its average annual rainfall is recorded at about 600mm, with a general trend that northwest part of the DF has less rainfall than southeast mountainous area. Most of rainfall is concentrated in a period from June to September. February is the driest only having 5 to 8 mm of monthly precipitation at average in the plateau. (Table 2-2, Figure 2-2)

Table 2-2: Monthly Average Precipitation

(Millimeters)

Name of the Station	Annual Precipitation	Months											
		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Tacubaya	785.9	8.3	5.7	10.2	24.6	57.1	135.7	172.9	157.6	136.1	57.0	14.0	6.7
Ajusco	1,173.6	17.8	12.7	13.2	37.8	95.3	212.2	234.3	237.1	211.9	78.7	13.0	9.6
Gran Canal	580.9	7.4	7.8	10.6	22.3	50.4	99.9	122.2	111.6	92.4	43.2	8.2	4.9

Source: CNA. Monthly Rainfall Record.

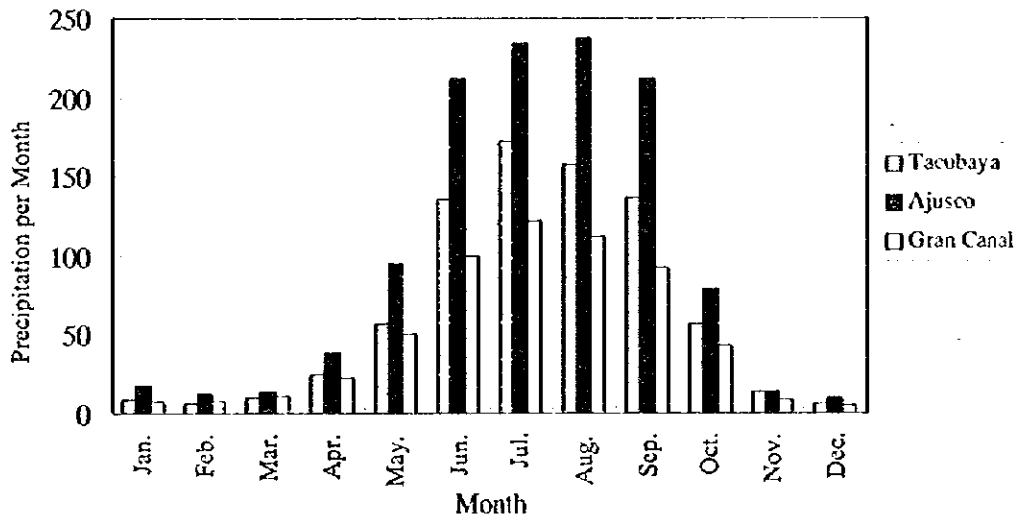
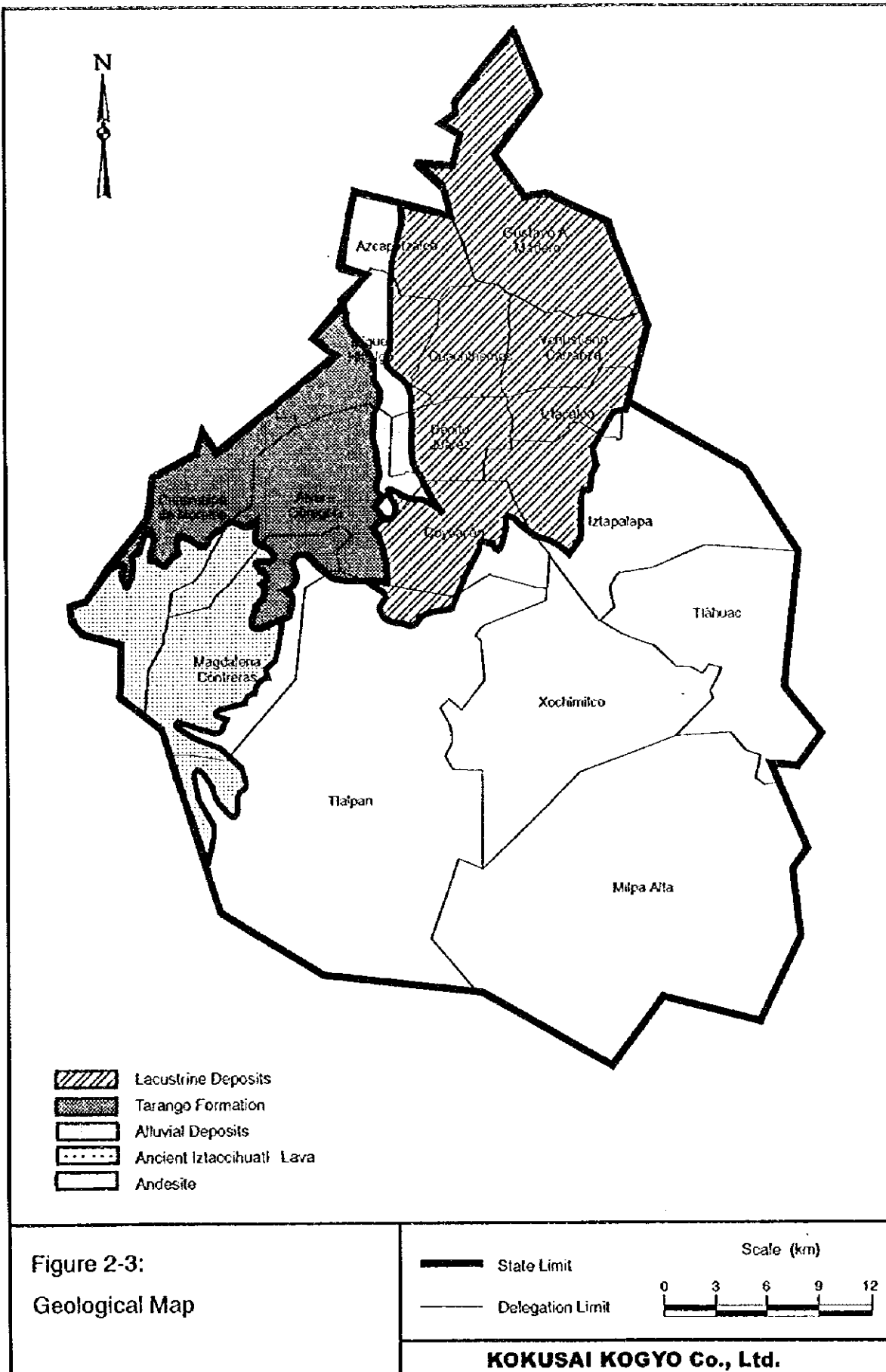


Figure 2-2: Monthly Average Precipitation

2.1.4 Geological Condition

Geologically the DF can be classified into five. The northeast part of the DF, in which the most urbanized area of the present city is included, is Lacustrine Deposits since this part was within a single water body at the end of the ice age. This water body was then divided into five lakes, namely Zumpango, Xaltocan, Texcoco, Chalco and Xochimilco. The natural evaporation, withdrawal of lake shore and artificial reclamation have formed what they are now. The center of Mexico City was in the Texcoco lake until about the 18th century. Xochimilco drainage area in the south east of Mexico City is the remnant and the other four lakes are in the State of Mexico.

In the northwest lies the Tarango Formation. The Alluvial Deposits forms a corridor between the Lacustrine Deposits and the Tarango Formation. The south west of the DF part is formed by lava of ancient Iztaccihuatl. The rest is Andesite which is made with lava of Chichinautzin mountains and extends the most south part of the DF.



2.2 Socioeconomic Conditions

2.2.1 Growth and Macro Management of Economy

2.2.1.1 Proposition

a. Growth and Macro Management of Economy

Mexico is now back on the track for steady progress and economic recovery through the unexpectedly rapid and robust accomplishment of four-years of stabilization and reform initiated in FY1995. Over the past four years, reform of the financial sector, monetary, investment, exchange rate and trade regimes, and of the tax system have initiated a quiet economic revolution. With these reforms, Mexico has again joined the growing group of countries that have gradually but persistently taken measures to increase their integration with the globalized economy. Initiated with the outline look at the economic front of global and the Latin American region recently in place, this section overviews the country's long and winding path where the macro management of economy as initiated by the government and the people of Mexico, and growth took place in the past decades. For an easy and quick look at the economy, a chronological changes in major macroeconomic indicators are illustrated in Table 2-5 as attached.

2.2.1.2 Performance in 1997, Short-term Outlook, and Medium Term Policy Framework (PRONAFIDE)

In the course of 1997, considerable advance was attained in series of aspects regarding the domestic environment. Economic performance as borne out by the major macroeconomic indicators is elucidated as follows. In 1997, the GDP at current price amounted to \$418.1 billion equivalent (P3,182.3 billion as per 1997 foreign exchange quotation) strongly arising from \$330.0 billion, and the GDP per capita in nominal term increased in dollar term to \$4,419.9 equivalent from \$3,468 equivalent¹. GDP growth rate in real terms was 7.0 percent arising from 5.1 percent in the previous year. Inflation amounted to 15.7 percent, while the fiscal and current account deficits remained at comfortable levels of -0.5 percent and -1.7 percent, respectively. With the newly created 882,000 permanent jobs in 1997² and a further 122,000 during January and February 1998, the open unemployment rate fell to 3.3 percent in November and 2.8 percent in December 1997. While the figures are the lowest ever since the first quarter of 1994, the portion of the labor force employed at below the legal minimum wage remained at about 14.5 percent.

Deputy Finance Secretary was quoted on 31 July 1998 as saying that the country's GDP growth posted 6.6 percent in real terms in the first half of the year, while exceeding the government and most analysts' projection of 4.5 to 5 percent. In his address, he also indicated that the dip of oil price that inversely affected government spending has not had an impact enough on other economic sectors because of

¹ For comparison, the weighted averages of GDP per capita at current price in 1997 for the world and Latin America amounted to \$5,866, and \$4,604, respectively. (Source: EIU, *Global Outlook*, 1998)

² Source: EIU, *Country Report, Mexico, 2nd Quarter*. The figure supposedly includes the job creation both in the formal and informal sectors. Meanwhile, in the 1st Quarter edition, EIU indicates that 674,000 jobs have been created in the formal sector in the same year.

currently meager share of oil standing at 6 percent of the country's exports. In the meantime, the government downsized its growth outlook for 1998 to 5.0 percent from 5.2 percent, following the announcement of the first of three budget cuts.³

Table 2-3: Key Economic Indicators (1)

GDP (1997, estimate)	US\$ 418.1 billion
GDP per capita (1997, estimate)	US\$ 4,419.9
Annual Real Growth Rate of GDP (1997, estimate)	7.0 %
Consumer Prices % Change (1997) ⁴	15.7 %
Exchange Rate (1997 average, Ps/\$)	7.91

Sources: EIU, *Country Report*, 1st Quarter, 1998

• Short-Term Outlook

Numerically, real GDP growth rate in 1998 would slow to substantial level of around 4.3 percent, while a robust export performance would lift the aggregate supply back to around 5 percent in 1998 and 1999, respectively. In a mid-term outlook for the Mexican economy as a whole, the annual growth rate of real GDP per annum over the period of 1998 through 2002 is forecasted to outnumber the entire world and Latin America with 4.4 percent as against 3.7 percent for the latter. Utility tariff increase and an associated high inflation in the early 1998 drew some attention and worries that year-end inflation rate would be far beyond the target of 12 percent, while reaching at around 13.4 percent in 1998, and subsequently falling around 4 percent down to 9.1 percent in 1999. Should the peso weaken abruptly in the years ahead, the outlook for inflation would be bleaker, accordingly. While exports will continue to rise in the years to come, stronger domestic demand would also increase the pace of import growth. With this in view, the deterioration of the trade balance would widen the current-account deficit to 2.7 percent of GDP and 3 percent in 1998 and 1999, respectively⁵. Mexico's total external debt stock will grow in line with the increase of indebtedness of the private sector. External debt to refinance a large proportion of repayments falling due 1998-2000 will reach \$186.3 billion and \$192.7 billion, or alternatively 160.4 percent and 149.9 percent of export values in 1998 and 1999, respectively. As regards the evolution of exchange rate under the influence of capital flows, and goods/service flows in part, year-end currency quotations of the peso against the US\$ are anticipated to go downward to respective of 8.98 and 9.54 per unit of greenback, or 10.2 percent and 15.3 percent of deterioration from 1997 level, in 1998 and 1999.⁶

³ Source: *The News*, August 1, 1998. Official figures on economic growth will be released on 19 August 1998.

⁴ For reference, another economic report figured out the inflation rate at 15.7 percent in 1997. (IEF, *Mexico Economic Report*, Feb 1998)

⁵ Mexico's trade deficit swelled 22 percent to \$530 million in June 1998, expanding for the 12th month in a row, largely due to the dynamic drop in oil price, an increase in agricultural imports, and the 45-day General Motors strike and plant closing in the US. With this, imports totaled \$10.8 billion, a jump of 7.4 percent from May 1998. In the meantime, the country's exports increased by 9.8 percent over June 1998, growing 10.5 percent for the first half of this year, totaling to the figure of \$10.3 billion. (Ref: *The News*, July 23, 1998)

⁶ EIU, *Op. cit.*, 1st Quarter 1998

2.2.1.3 National Development Program and Recent Peso Plunge 1998

a. National Program for Financing Development 1997-2000 (PRONAFIDE)

Meanwhile, the government announced a macroeconomic scenario in November 1997, namely, the National Program for Financing Development 1997-2000 (PRONAFIDE), thus setting forth the policy framework for the remaining period of the administration currently in place. While elaborating on the government's broad strategy as reflected in the "National Development Plan 1995-2000", the program articulated an explicit statement of principles, coupled with a quantitative baseline scenario, for policy makers to adopt over the 3-4 year period ahead in a bid to maintain a stable macroeconomic environment in the country. While stressing the importance of domestic saving to finance investment, the program aimed to reduce the economy's vulnerability to changes in foreign investors' sentiments. The baseline scenario envisages a gradual return of GDP growth rate of 5.6 percent at the end of the period, led by exports and investment, while consumption picks up at a leisurely pace. Inflation is targeted to keep on a declining path, while falling to 7.5 percent by 2000 from 15.7 percent in 1997. In line with the increase in foreign savings to 3.2 percent of GDP, gross domestic saving is envisaged to reach 22.2 percent of GDP in 2000, both arising from 1.6 percent and 20.6 percent of GDP in 1997, respectively. Current account deficit in 2000 is presumably benchmarked at US\$15.3 billion arising from \$6.0 billion in 1997, whereas the public sector deficit downsizes to 0.3 percent of GDP from 0.5 percent during the same time framework.⁷

Table 2-4: Key Economic/Social Indicators (2)

Public Expenditure as per GDP (1997, estimate)	23.1 %
Central Gov. Fiscal Deficit as per GDP (1997)	-0.5 %
Current Account Balance as per GDP (1997)	-1.7 %
Debt Service Ratio (1997, estimate)	31.3 %
Population Growth, (Annual Average 1993-97)	2.52 %
Population Growth, (End of Period, 1997)	1.7 %
Compensation of Employees as % of GDP (Current, 1995)	31.1%
Unemployment Rate (December 1997)	2.8 %
Income Share of Richest 20% (1992)	55.6 %

Sources: EIU, *Country Profile*, Dec 1997, Institute of International Finance, *Mexico Economic Report*, Feb 1998, World Bank, *Country Assistance Strategy*, Nov. 1996, OECD, *Economic Survey 1998, Mexico*, February 1998, Banco de México, *The Mexican Economy 1998*

⁷ To be noted that macroeconomic variables as given in PRONAFIDE are presented not as forecasts but rather as trend evolutions that serve as a benchmark, while developments from one year to another could fluctuate around the baseline. (Ref: OECD, *Economic Surveys 1998, Mexico*, 1998, Banco de Mexico, *The Mexican Economy*, 1998, June 1998)

b. Peso Plunge in August 1998

With jitters over Russia and fears that Venezuela could be forced to follow Moscow's lead and devalue against the US currency, the shock wave swept Mexican and other Latin American markets in the end of August 1998. The Mexican peso, battered to a new historic low of 9.78 per dollar on 21 August 1998, was being quoted at a sliver under 10.0 to the US currency at the international airport foreign exchange booths over the weekend, while culminating in a sharp outflow of funds and raising the prospect of further hemorrhaging. Provided that the trend in the finance markets liners for sometime to come, imports become costly, forcing local prices upward. With this in view, few analysts foresee inflation coming in below 14 percent for 1998, while the government has thus far declined to revise the country's inflation target of 12.0 percent for the same year. In the financial market, the benchmark 28-day government treasury certificates (*cetes*) rose to 36.94 percent, a dramatic 978 basis point leap, on 8 September 1998 to a 28-months high, while the stock market (*Bolsa*) IPC index rose for a second day and the peso remained unchanged at 10.26 per US dollar.⁸

In the meantime, the government seems currently not ready for market intervention by way of injecting more dollars from the reserves to support the exchange rate. Also, the government has already been forced to cut \$4 billion in spending from its 1998 budget due to the 10-year lows of crude oil prices. Oil prices have not yet recovered to the point that would allow Mexico to avoid further budget adjustments. Nonetheless, Under-Secretary for Revenue is quoted as saying that the Ministry of Finance has virtually ruled out further budget cuts this year because the 1999 budget has to be sent to Congress by mid-November.

⁸ Source: *The News*, 9 September 1998

Table 2-5: Economic Indicators

	Actual										Estimate			Project
	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998		
86-96 Av.														
GDP (\$ bil. Current) 2/														
GDP (Peso bil. Current) 6/	193.3	390.4	507.6	686.4	865.2	1,019.2	1,127.6	1,419.1	1,835.5	2,508.0	3,260.3			
GDP (Peso bil. 1993 price) 8/				1,140.8	1,189.0	1,232.2	1,256.2	1,311.7	1,230.8	1,294.5	1,385.2			
GDP pc (\$ Current) 5/						4.097	4.421	4.535	3.029	3.468	4.091			
Real GDP GR 1/	2.0	1.9	4.2	5.1	4.2	3.6	2.0	4.4	-6.2	5.1	7.0			
Inflation (CPI, %) 5/	159.1	51.7	19.7	29.2	18.8	11.9	8.0	7.1	52.0	27.7	15.7			
Current Account Deficit (% of GDP) 2/								-7.0	-0.6	-0.7	-1.8			
Total External Debts (% of GDP) 5/						36.2	38	38.6	60.2	50	38.5			34.9
Net Public Debt (% of GDP) 2/3/	73	61.9	55.1	45.8	35.8	26.7	21.9	21.9	31.3	28.6	22.3			
Debt Service Ratio 5/					37.7%	45.0%	32.8%	34.2%	28.9%	35.2%	35.1%			21.8%
Exports (\$ bil.) 2/	27.6	30.7	35.2	40.7	42.7	46.2	51.9	60.9	79.5	96.0	110.4			
External Debt Services (\$ bil.) 2/					16.1	20.8	17	20.8	23	33.8	38.8			
Total External Debts (% of GDP) 2/								33.7	59.2	49.8	38.2			
Interest Payments (% of GDP) 2/4/				9.6	5.1	3.9	2.8	2.3	4.6	4.4	4.1			
Fiscal Deficit (% of GDP) 5/						-1.4	-0.3	0.7	0.6	0.5				
Public Sector Deficit (% of GDP) 2/ to 35				-2.2	-0.4	1.4	0.7	-0.3	-0.2	-0.1	-0.7			
Unemployment Rate, % of Labor Force	3.8	3.9	3.5	2.9	2.7	2.8	3.4	3.6	6.3	5.5				
3-month CETES (interest rate)	102.8	58.65	44.77	35.03	19.82	15.89	15.5	14.62	48.24	32.91	19.9			
Deposit Rate (average cost of funds)						15.7	15.5	13.3	39.2	28.4	20.5			
Real Deposit Rate 5/						0.2	5.2	5.9	3.1	-4.3	0.1			
Compensation of employee, % of GDP 1/	30.5	26.8	29.5	29.5	30.9	32.9	34.7	35.3	31.1					
Av. Remuneration p.c. 7/		5.150	6.547	8.406	10.966	13.624	15.891	17.819	20.877	25.776				
Public Sector		8.872	11.292	14.862	19.291	23.863	29.308	34.047	39.485	49.463				
Private Sector		4.258	5.447	6.995	9.184	11.572	13.278	14.687	17.111	21.143				
Minimum Wage, nationwide Jan	2.8	7.0	7.8	10.8	12.1		13.1	14.0	15.0	20.7	24.3			28.0
Minimum Wage, DF & A region	3.1	7.8	8.6	11.9	13.3		14.3	15.3	16.3	22.6	26.5			30.2
Real Minimum Wage Index (1985=100) 2/	86.1	75.2	70.3	63.8	61	58.2	57.3	57.3	50.2	46	48.5			48.4
Exchange Rate (Period Ave) 2/ 6/	1.378	2.273	2.461	2.813	3.018	3.0949	3.1156	3.37	6.4	7.6	8.1			9.1
Population (mil) 3/	81.2	82.84	84.49	86.15	87.84	89.54	91.21	93.01	91.1	92.9	94.7			
GDP (P bil. Current) 1/	193.3	390.5	416.3	548.9	738.9	949.1	1,125.3	1,256.2	1,420.2	1,837.8	2,544.2			
GDP p.c. (P. Current)														
Av. Nominal Earnings Change (%)						25.7	17.6	10.0	17.3	20.0				
Industrialized Countries real GDP Growth Rate 5/	3.3	4.3	3.2	2.0	0.4	1.9	1.4	3.1	2.0	2.5	2.7			2.3
SLIBOR (6-month, av.) 5/						3.9	3.4	5.1	6.1	5.6	5.9			6.2
Brent spot oil price (\$/brr. av.)						19.34	17.03	15.82	17.06	20.65	19.1			18.5
Mexico crude oil export price (\$/brr)						14.85	13.29	13.88	15.58	18.23	16.87			13.97

	Actual										Estimate		
	86-96 Av.	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	Project 1997	1998
GDP by Origin (% current pr)													
Agriculture, Forestry, Fishing					7.2					5.0		5.2	
Mining					2.1					1.6		1.3	
Manufacturing					19.0					19.1		20.1	
Construction					3.6					3.7		4	
Electricity, Gas, and Water					1.2					1.2		1.5	
Commerce, Restaurants, Hotels					22.6					19.2		18.5	
Transport, Communication					8.3					9.1		9.9	
Finance, Insurance, real estate					12.1					16.8		15.3	
Community Service					16.3					20.7		21.2	
Imputed Banking Services 2/										96.4		-2.7	
GDP by Origin (P bil, current pr)													
Agriculture, Forestry, Fishing										71.0			
Mining										22.7			
Manufacturing										271.3			
Construction										52.5			
Electricity, Gas, and Water										17.0			
Commerce, Restaurants, Hotels										272.7			
Transport, Communication										129.2			
Finance, Insurance, real estate										238.6			
Community Service										294.0			

1/ -1988:1980 price basis, 1989-1996:1993 price basis, OECD 1998

2/ Source: Banco de Mexico, The Mexican Economy 1998

3/ EIU, Country Profile, Mexico 1997-98, IMF/IFS (1991-1994)

4/ total interest payments of the budgetary public sector

5/ Institute of International Finance, Mexico Economic Report, 1998(1995-98), IMF, IFS, (1987-94)

6/ IMF, International Financial Statistics, July 1998

7/ INEGI, Ingreso y Gasto, 1997, p.29

8/ Banco de Mexico, The Mexican Economy 1998

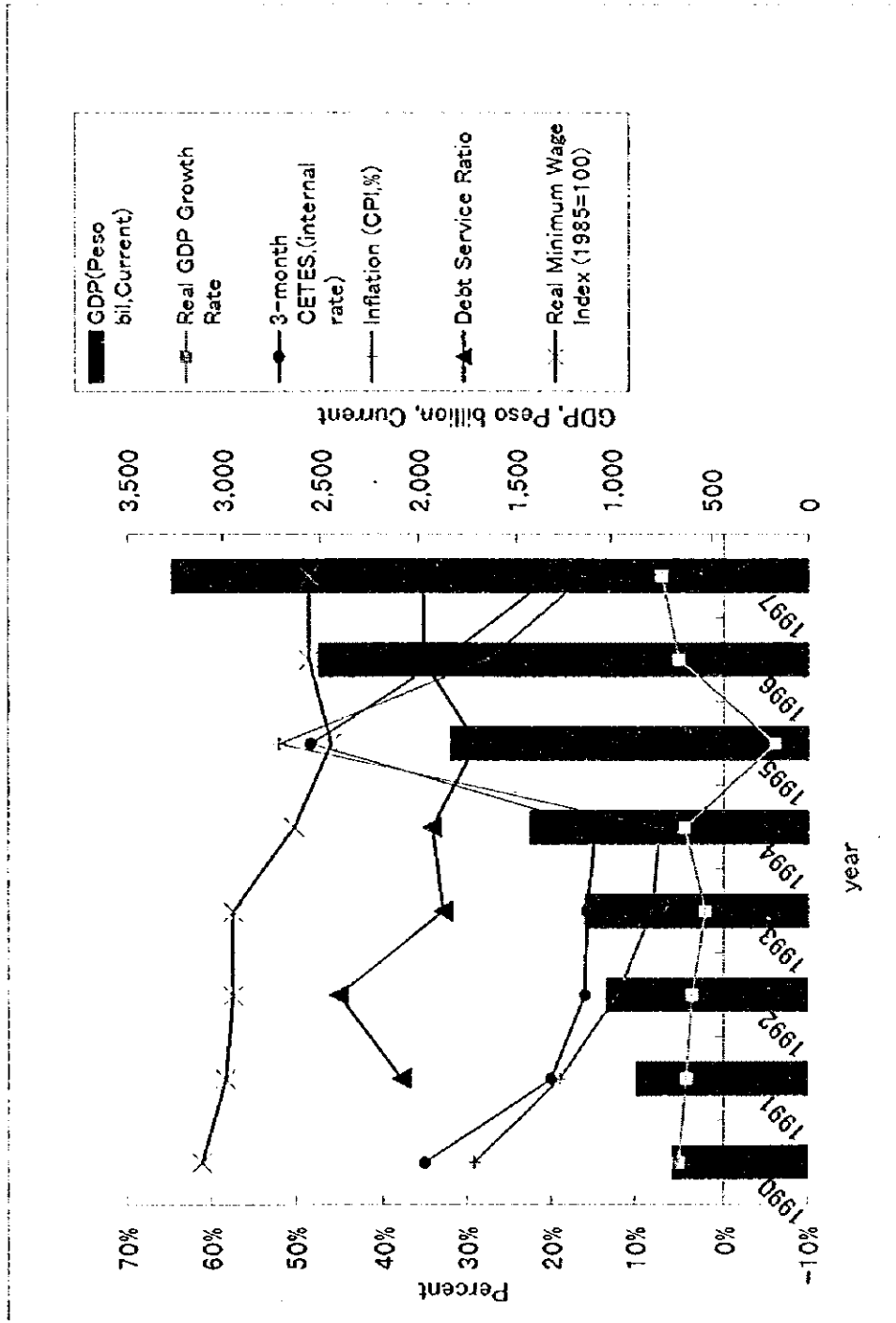


Figure 2-4: Chronological Change in Macro Indicators, 1990 - 1997

2.2.2 Regional Economy, Federal District

The United Mexican States is divided into five major regional groups, vis-à-vis, North, Central, South, East, and West, with the numbers of states therein ranging 10, eight⁹, six, four, and four, in that order. Administratively, the Federal District (DF) is a part of the Central region with other seven states inclusive of State of Mexico, Guanajuato, Guerrero, and the remaining.

2.2.2.1 Macroeconomic Indicators

As is well aware of, the DF is the center of national activities, of government, of industry and trade, of finance and commerce, and of education and culture. On the economic front, the nominal Gross Regional Product (GRP) was \$ 97.0 billion in 1997 while accounting for 24.1 percent of the aggregate supply of the country. Of this, the largest chunk emanated from the service sector with 23.1 percent followed by other major sectors, vis-à-vis, the manufacturing, Trade, Finance and Insurance, Transportation and Communication, Construction, Mining, and Agriculture and Livestock sector while each of which accounting for 21.6 percent, 21.3 percent, 16.7 percent, 10.8 percent, 6.1 percent, 0.3 percent, and 0.1 percent, in that order.¹⁰ As shown above, little contribution has been made to GRP from the primary sector that pertains to the Agriculture and Livestock, and the Mining sub-sectors therein in DF.

With the total population of a little less than 8.5 million (9.3 percent of the country's total population), the nominal Gross Regional Product (GRP) per capita of DF was about \$11,426 in 1997 which stands at around 2.6 times higher than the aggregate national products per capita. Annual average rate of growth in GRP for DF over the period of 1990 through 1996 was 2.1 percent, whereas that remained 3.5 percent during the period of pre-currency crisis in the end of 1994.

Viewed in this light, productivity of human resources, as borne out by the GRP per capita, in DF was placed well above the national average, while reflecting an extreme supremacy in the economy. State profiles in numerical and visual information are attached as Table 2-6 and Figure 2-6, respectively.

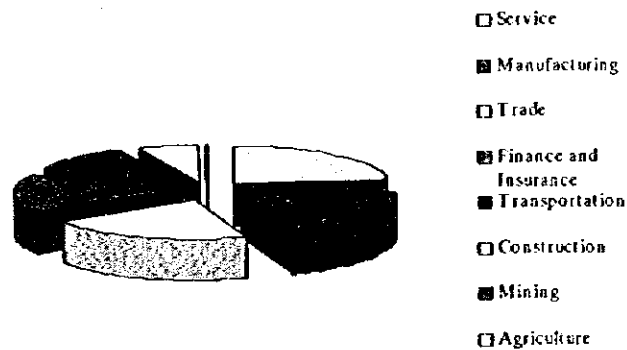


Figure 2-5: Industrial Structure of DF, 1997

Table 2-6: State and DF Profiles, 1997

⁹ Correctly, the Central region comprises seven states and Distrito Federal.

¹⁰ Source: *Ibid.*, p.127

Table 2-6: State and DF Profiles, 1997

	Actual Figures			Percentage Share			
	Land Area (sq. km)	Population ('000)	Firms ('000)	Land Area	Population	Firms	GNP
North (10 States)	1,119,437	20,812	489	57.3%	22.8%	22.3%	24.5%
Baja California	69,921	2,112.1	47.2	3.6%	2.3%	2.2%	2.5%
Baja California Sur	73,475	375.5	10.9	3.8%	0.4%	0.5%	0.5%
Coahuila	149,982	2,173.8	54.0	7.7%	2.4%	2.5%	2.8%
Chihuahua	244,938	2,793.5	64.1	12.5%	3.1%	2.9%	2.9%
Durango	123,181	1,431.7	29.4	6.3%	1.6%	1.3%	1.2%
Nuevo Leon	64,924	3,550.1	89.9	3.3%	3.9%	4.1%	6.5%
Sinaloa	58,328	2,425.6	49.4	3.0%	2.7%	2.3%	2.2%
Sonora	182,052	2,085.5	48.0	9.3%	2.3%	2.2%	2.6%
Tamaulipas	79,384	2,527.3	65.8	4.1%	2.8%	3.0%	2.6%
Zacatecas	73,252	1,336.5	29.8	3.7%	1.5%	1.4%	0.8%
Central (7 States & DF)	257,802	33,277	838	13.2%	36.5%	38.3%	45.8%
Aguascalientes	5,471.0	862.7	24.7	0.3%	0.9%	1.1%	0.9%
Distrito Federal	1,479.0	8,489.0	303.8	0.1%	9.3%	13.9%	24.1%
Estado de Mexico	21,335.0	11,707.9	226.0	1.1%	12.8%	10.3%	10.5%
Guanajuato	30,491.0	4,406.6	105.9	1.6%	4.8%	4.8%	3.5%
Guerrero	64,281.0	2,916.6	60.2	3.3%	3.2%	2.8%	2.0%
Morelos	59,928.0	1,442.7	42.7	3.1%	1.6%	2.0%	1.6%
Queretaro	11,749.0	1,250.5	27.0	0.6%	1.4%	1.2%	1.4%
San Luis Potosi	63,068.0	2,200.7	47.9	3.2%	2.4%	2.2%	1.8%
South (6)	332,856	11,465	252	17.0%	12.6%	11.5%	9.2%
Campeche	50,812.0	642.5	17.3	2.6%	0.7%	0.8%	1.6%
Chiapas	74,211.0	3,584.8	65.5	3.8%	3.9%	3.0%	1.8%
Oaxaca	93,952.0	3,228.9	69.2	4.8%	3.5%	3.2%	1.7%
Quitana Roo	50,212.0	703.5	18.1	2.6%	0.8%	0.8%	1.3%
Tabasco	25,267.0	1,748.8	27.8	1.3%	1.9%	1.3%	1.5%
Yucatan	38,402.0	1,556.6	53.7	2.0%	1.7%	2.5%	1.3%
East (4)	130,430	14,358	323	6.7%	15.8%	14.8%	10.3%
Hidalgo	20,813.0	2,112.5	39.1	1.1%	2.3%	1.8%	1.6%
Puebla	33,902.0	4,624.3	123.6	1.7%	5.1%	5.7%	3.2%
Tlaxcala	4,016.0	883.9	22.8	0.2%	1.0%	1.0%	0.6%
Veracruz	71,699.0	6,737.3	137.6	3.7%	7.4%	6.3%	4.9%
West (4)	112,911	11,247	285	5.8%	12.3%	13.0%	10.2%
Colima	5,191.0	488.0	15.5	0.3%	0.5%	0.7%	0.6%
Jalisco	20,813.0	5,991.2	151.8	1.1%	6.6%	6.9%	6.6%
Michoacan	59,928.0	3,870.6	95.0	3.1%	4.2%	4.3%	2.3%
Nayarit	26,979.0	896.7	22.9	1.4%	1.0%	1.0%	0.7%
Total	1,953,436	91,158	2,187	100%	100%	100%	100%

Order by Size of Aggregate Products

State	GRP Share	Accumulative GRP Share
1 Distrito Federal	24.1%	100.0%
2 Estado de Mexico	10.5%	76.0%
3 Jalisco	6.6%	65.5%
4 Nuevo Leon	6.5%	58.9%
5 Veracruz	4.9%	52.4%
6 Guanajuato	3.5%	47.5%
7 Puebla	3.2%	44.0%
8 Chihuahua	2.9%	40.8%
9 Coahuila	2.8%	37.9%
10 Sonora	2.6%	35.1%
11 Tamaulipas	2.6%	32.5%
12 Baja California	2.5%	29.9%
13 Michoacan	2.3%	27.4%
14 Sinaloa	2.2%	25.1%
15 Guerrero	2.0%	22.9%
16 San Luis Potosi	1.8%	20.9%
17 Chiapas	1.8%	19.1%
18 Oaxaca	1.7%	17.3%
19 Campeche	1.6%	15.6%
20 Morelos	1.6%	14.0%
21 Hidalgo	1.6%	12.4%
22 Tabasco	1.5%	10.8%
23 Queretaro	1.4%	9.3%
24 Quintana Roo	1.3%	7.9%
25 Yucatan	1.3%	6.6%
26 Durango	1.2%	5.3%
27 Aguascalientes	0.9%	4.1%
28 Zacatecas	0.8%	3.2%
29 Nayarit	0.7%	2.4%
30 Colima	0.6%	1.7%
31 Tlaxcala	0.6%	1.1%
32 Baja California Sur	0.5%	0.5%

Order by Size of Aggregate Products

1	Distrito Federal	24.1%	100.0%
2	Estado de Mexico	10.5%	76.0%
3	Jalisco	6.6%	65.5%
4	Nuevo Leon	6.5%	58.9%
5	Veracruz	4.9%	52.4%
6	Guanajuato	3.5%	47.5%
7	Puebla	3.2%	44.0%
8	Chihuahua	2.9%	40.8%
9	Coahuila	2.8%	37.9%
10	Sonora	2.6%	35.1%
11	Tamaulipas	2.6%	32.5%
12	Baja California	2.5%	29.9%
13	Michoacan	2.3%	27.4%
14	Sinaloa	2.2%	25.1%
15	Guerrero	2.0%	22.9%
16	San Luis Potosi	1.8%	20.9%
17	Chiapas	1.8%	19.1%
18	Oaxaca	1.7%	17.3%
19	Campeche	1.6%	15.6%
20	Morelos	1.6%	14.0%
21	Hidalgo	1.6%	12.4%
22	Tabasco	1.5%	10.8%
23	Queretaro	1.4%	9.3%
24	Quintana Roo	1.3%	7.9%
25	Yucatan	1.3%	6.6%
26	Durango	1.2%	5.3%
27	Aguascalientes	0.9%	4.1%
28	Zacatecas	0.8%	3.2%
29	Nayarit	0.7%	2.4%
30	Colima	0.6%	1.7%
31	Tlaxcala	0.6%	1.1%
32	Baja California Sur	0.5%	0.5%

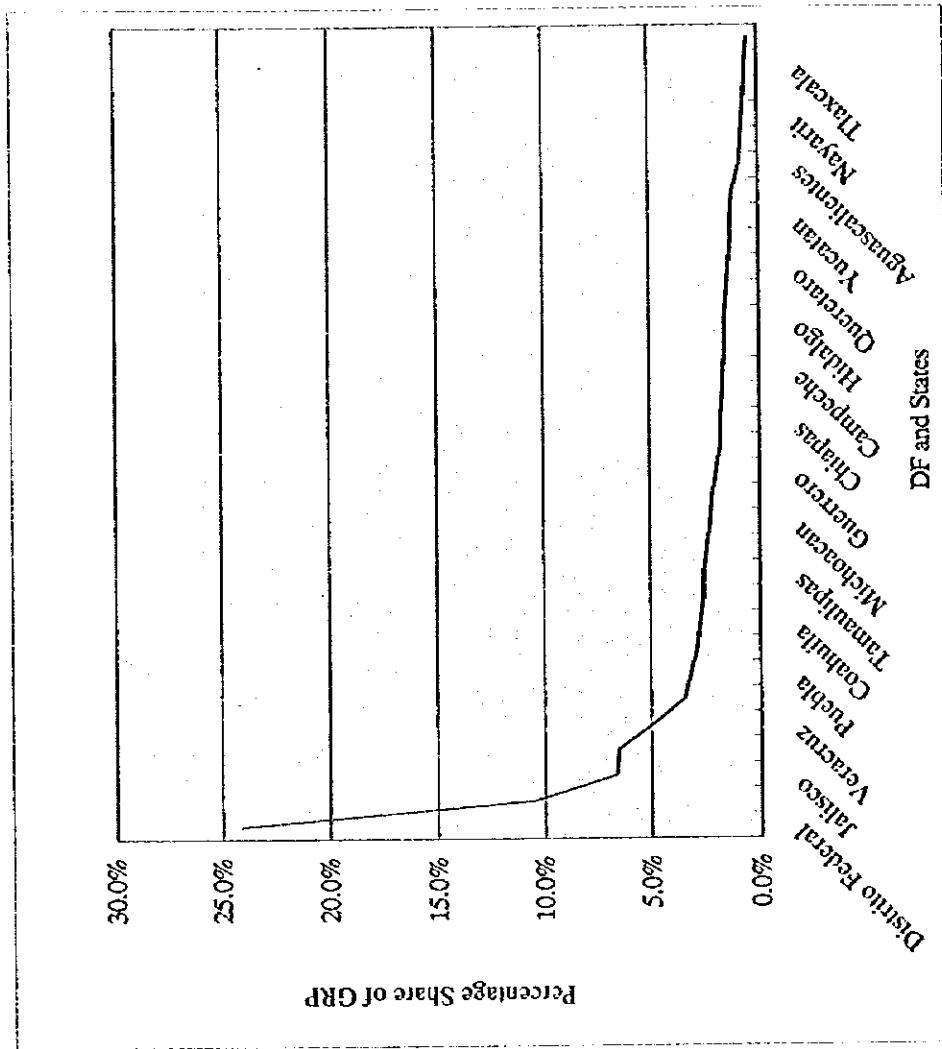


Figure 2-6: Order by Size of Aggregate Products

2.2.3 Administration

The DF government is in charge of the Federation Powers and the local Legislative, Executive and Judicial powers; these are:

- The DF Legislative Assembly.
- The DF Government Head.
- The Justice Superior Court.

The DF Legislative Assembly (ALDF) has the fundamental function of legislating matters for the DF in areas that are specifically conferred to the assembly by the Political Constitution of the Mexican United States. Among the most important powers related to urban cleansing, the ALDF has responsibility for:

- Issuing legal precepts to organize public treasury, major accounting and budget, accounting and public expenditure of the DF.
- Legislating to preserve the environment and ecological protection.
- Regulating the provision and concession of public services.
- Legislating for cleansing services.

The Head of Government in the DF, regarding Urban Cleansing, has the power to:

- Sign coordination agreements with the Federation, States and Municipalities and also conciliation agreements with social and private sectors.
- Sign coordination agreements regarding hazardous waste which are considered of low hazardousness respecting what is established in the General Law of Ecological Balance and Environmental Protection.
- Agree with the Federation, bordering States and Municipalities on the constitution, integration and operation of "Metropolitan Commissions for the collection, treatment, and disposal of solid waste".
- Sign agreements with the Federation, bordering States and Municipalities, respecting what is established by the Metropolitan Commissions, in order to define territorial and functional scopes regarding the provision of public services.

The main task of the DF Justice Court is to apply the judicial function in the territory of that entity, following what is established by the Organic Law.

To execute the Public Administration task, the DF headquarter is supported by several Centralized Administrative Units as well as some decentralized organs. The main Centralized Administrative Units are the following:

- Secretariat of Government.
- Secretariat of Urban Development and Housing.
- Secretariat of Economic Development.
- Secretariat of Environment.
- Secretariat of Works and Services.
- Secretariat of Finance.

- Secretariat of Transportation and Roads.
- Secretariat of Public Security.
- Main Officer.
- General Controllorship.

The decentralized administrative organs over which government management is sustained are called **Political Delegations** which have functional autonomy over its territory.

The DF Public Administration has, within its responsibility, public services established by the law, regarding administrative and financial management. Public services could be given as concession, in case where it is required by the general interest and the nature of the services can allow this to take place. Concession could be given to those who meet the requirements as stipulated in the Law, but only after a declaration were issued by the Government head.

2.2.4 Population

a. Population Trend in the GDF

The National Census, which started in 1895 in Mexico, has been implemented every 10 years since 1930. The last one was the 11th National Census, conducted in 1990. Besides, an extra census focusing on only population and the number of households were carried out in 1995.

Population and average annual population growth rate of the DF, State of Mexico and the country from 1930 to 1995 are presented in Table 2-7.

Table 2-7: Population and Population Growth of the DF, State of Mexico and the Country

Year	DF		State of Mexico		MEXICO		Ratio of DF to MEXICO (%)
	Population persons	Average Annual Growth Rate (%)	Population persons	Average Annual Growth Rate (%)	Population persons	Average Annual Growth Rate (%)	
1930	1,229,576	---	990,112	---	16,552,722	---	7.4
1940	1,757,530	3.6	1,146,034	1.5	19,652,552	1.7	8.9
1950	3,050,442	5.7	1,392,623	2.0	25,779,074	2.8	11.8
1960	4,870,876	4.8	1,897,851	3.1	34,923,126	3.1	13.9
1970	6,874,165	3.5	3,833,185	7.3	48,325,238	3.3	14.2
1980	8,831,079	2.5	7,564,335	7.0	66,846,833	3.3	13.2
1990	8,235,744	-0.7	9,815,795	2.6	81,249,645	2.0	10.1
1995	8,489,007	0.6	11,707,964	3.6	91,158,290	2.3	9.3

Source: Estadísticas Históricas Mexico, INEGI, DGE

b. Population Projection Method for the DF

The projection of DF's population is attempted by several institutions including PAHO, whose study results are shown in the PAHO's report.

The DGSU calculates the population for each year using the results of the 1990 Census and the predetermined population growth rate of each delegation (see Table 2-8).

The predetermined annual growth rate was officially reported by the Department of the DF (DDF) in 1996. On the other hand, PAHO's population estimation was based on different growth rate based on their own study. Accordingly, there is a disparity in the result of population estimation by the DGSU and PAHO. Annual population growth rate used by PAHO was 0.59%, which was applied to all delegation.

The present study will follow the method of the DGSU to estimate the DF's population.

Table 2-8: Predetermined Population Growth Rate for Delegations

Delegation	1990 - 1995	1996 - 2000	2001 - 2010
Alvaro Obregon	1.22	0.44	0.47
Azcapotzalco	-1.64	0.25	0.28
Benito Juarez	-1.68	0.25	0.28
Coyoacan	1.71	0.45	0.58
Cuajimalpa	3.53	1.72	1.75
Cuauhtemoc	-2.13	0.30	0.33
Gustavo A.Madero	0.89	0.10	0.13
Iztacalco	-1.59	0.03	0.41
Iztapalapa	2.65	0.53	0.68
M.Contreras	2.05	1.28	0.61
Miguel Hidalgo	-2.13	0.30	0.33
Milpa Alta	3.00	1.39	1.43
Tlahuac	4.46	1.40	1.71
Tlalpan	3.97	0.98	1.01
V.Carranza	-2.04	0.26	0.29
Xochimilco	3.22	1.40	0.99
Total in the DF	0.60	0.50	0.57

Source: Programa General de Desarrollo Urbano del Distrito Federal Version 1996, DIARIO OFICIAL 15 de julio de 1996.

c. Estimated Population

The result of population estimation for the whole DF and delegations for 1997, where population data of the 1990 Census and predetermined population growth rate shown in Table 2-8 were used, is presented in Table 2-9 together with data of the 1990 and 1995 censuses.

Table 2-9: Estimated Population of the DF for 1997

Delegation	Population(persons)		
	1990 (Census)	1995 (Census)	1997 (Estimated)
Alvaro Obregon	642,753	676,930	688,923
Azcapotzalco	474,688	455,131	439,188
Benito Juarez	407,811	369,956	376,576
Coyoacan	640,066	653,489	703,086
Cuajimalpa	119,669	136,873	147,340
Cuauhtemoc	595,960	540,382	538,315
Gustavo A.Madero	1,268,068	1,256,913	1,214,625
Iztacalco	448,322	418,982	414,048

Delegation	Population(persons)		
	1990 (Census)	1995 (Census)	1997 (Estimated)
Iztapalapa	1,490,499	1,696,609	1,717,259
M.Contreras	195,041	211,898	221,463
Miguel Hidalgo	406,868	364,398	367,495
Milpa Alta	63,654	81,102	75,866
Tlahuac	206,700	255,891	264,349
Tlalpan	484,866	552,516	600,703
V.Carranza	519,628	485,623	471,241
Xochimilco	271,151	332,314	326,658
Total GDF	8,235,744	8,489,007	8,567,135

As seen in the table, total population of the DF in 1997 is estimated at 8,567,135. This and the population data of the 1990 Census give an average annual population growth rate of about 0.6%.

The figures shown in Table 2-9 are to be used in the present study.

2.2.5 Industrial Structure of Mexico

In respect of the industrial structure, there has been considerable annual variation in performance by sectors on the economic front, reflecting the uncertain course of macroeconomics policies and the economy's vulnerability to external shocks. Mexico is predominantly a service-producing country with the tertial sector accounting for about 68.3 percent of the aggregate supply in 1996, whereas the primary and the secondary sectors contributed 5.4 percent and the balance 26.3 percent in the same year, respectively. Desegregating the aggregate supply in the economy by sectors, the largest chunk emanates from the manufacturing sector while accounting for 19.6 percent, followed by the commerce/restaurants and hotels sector, personal services, financial services, transport and communications, agriculture, construction, mining, and electricity/gas and water sector with 19.3 percent, 19.3 percent, 16.0 percent, 9.7 percent, 5.4 percent, 3.9 percent, 1.7 percent, and 1.1 percent, in that order. Of this construction, commerce/restaurants and hotels, manufacturing, and transport and communications were, among others, the fastest growing sub-sectors during 1997, with the average output growth rates of 10.2 percent, 9.9 percent, 9.8 percent, and 9.5 percent, in descending order. It would be noted that contribution of the sectors that have high linkages with manufacturing activities, vis-à-vis, transport and communications, construction, and electricity/gas and water, is somewhat moderate comparing to manufacturing.

As regards the manufacturing sector, the metal products, machinery and equipment sub-sector holds the largest share with 5.9 percent of GDP, followed by food, beverages and tobacco sub-sector, the chemical, petroleum products, rubber and plastics sub-sector, the clothing and footwear sub-sector, the non-metallic minerals except oil sub-sector, and the others, each of which accounting for 5.0 percent, 3.0 percent, 1.7 percent, 1.4 percent, and the balance 2.6 percent of GDP, in that order. Of this, the annual growth rates of the metal products, machinery and equipment sub-sector, the printings, the basic metal, and other industries were above the sectoral

average of 9.8 percent, with 16.9 percent, 13.7 percent, 12.9 percent, and 12.6 percent, respectively.¹¹

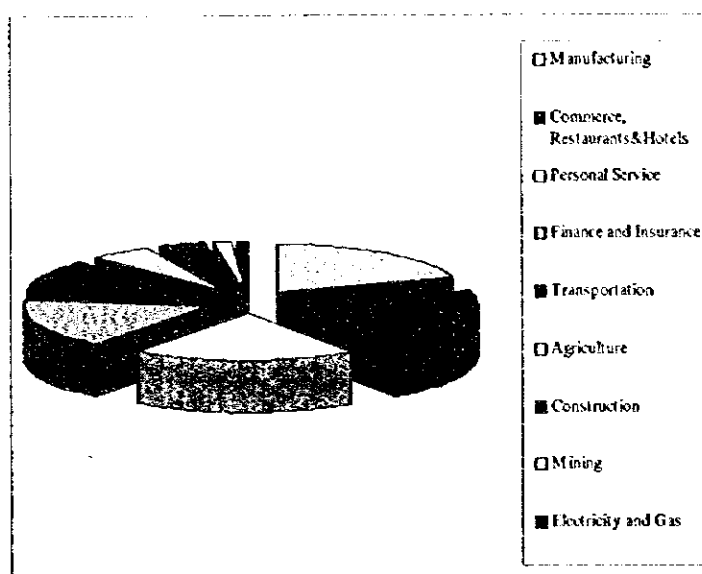


Figure 2-7: Industrial Structure in Mexico, 1997

2.2.6 Education

The correlation between the education of population and public cleaning leaves no room to doubt. In general terms, the higher the education level of the population is, the greater environmental and ecological consciousness will be, as well as better personal hygiene and cleaning customs for their housing and public areas. Besides, it will be better prepared to take part in the management of its urban services, including public cleaning.

Illiterate population aged 15 years and older in the DF amounted to 182,000 people in 1995, which is the last information, and represented 3.0% of the 6,122,000 inhabitants. This illiteracy rate is very low if compared with that at a national level (10.6%). On the other hand, and as in the rest of the country, illiteracy rate among women (2.2%) is almost three-fold of that of men (0.8%). Within the 16 delegations that form the DF, Benito Juarez (1.3%) is the one with the lowest illiteracy rate, and Milpa Alta has the highest (5.7%) (Table 2-10).

Table 2-10: Illiterate Population Aged 15 Years and Older in the DF, by Delegation and by Sex Group (Nov. 1995)

Delegation	Total population (000)	Illiterate population			
		Illiterate population (000)	% Total	% Men	% Women
Federal District	6,122	182	3.0	0.8	2.2
Azcapotzalco	337	8	2.3	0.6	1.7
Coyoacán	493	11	2.2	0.6	1.6
Cuajimalpa de Morelos	93	4	3.8	1.1	2.6
Gustavo A. Madero	909	27	3.0	0.8	2.2

¹¹ Source: Banco de Mexico, *The Mexican Economy 1998*, June 1998, Table 11

Delegation	Total population (000)	Illiterate population			
		Illiterate population (000)	% Total	% Men	% Women
Iztacalco	307	8	2.6	0.7	1.9
Iztapalapa	1,160	42	3.6	1.0	2.6
Magdalena Contreras, LA	150	6	4.0	1.3	2.7
Milpa Alta	53	3	5.7	1.9	3.8
Alvaro Obregón	485	16	3.3	0.8	2.5
Tlahuac	170	7	4.1	1.2	2.9
Tlalpan	394	13	3.3	1.0	2.3
Xochimilco	228	9	3.9	1.3	2.6
Benito Juárez	297	4	1.3	0.3	1.0
Cuauhtémoc	408	9	2.2	0.5	1.7
Miguel Hidalgo	282	6	2.1	0.4	1.8
Venustiano Carranza	357	9	2.5	0.5	2.0

Source: Prepared by the Study Team, based on INEGI's "Anuario Estadístico del Distrito Federal", year 1997.

Regarding the school level of the population aged 6-14 years, the "1996 Population and Housing Counting" shows that in 1995, 97.3% of this age group attended schools; this represented an increase over 1990, when the attendance rate was 95.1%. This percentage also shows that the DF is in better conditions than other states in the country, taking into account that the mean attendance rate is 92.2%.

Table 2-11 shows the number of pupils that registered in the different educational levels, teachers, schools and classrooms in the DF for the 1995-96 period.

Table 2-11: The Number of Pupils Registered, Teachers, Number of Schools and Classrooms in the DF (1995-96)

Educational level	Pupils registered	Teacher staff	Schools	Classrooms
1. Preschool	307,808	12,026	2,513	11,865
2. Primary level	1,105,368	39,421	3,336	41,945
3. Training for work	183,269	4,710	594	3,447
4. Secondary	522,634	34,582	1,279	13,247
5. Intermediate Professional	62,030	6,481	151	1,944
6. High school	325,103	21,697	506	8,820
Total DF	2,506,212	118,917	8,379	81,268

Source: Prepared by the Study Team, based on INEGI's "Anuario Estadístico del Distrito Federal", year 1997.

The education plans and programs for primary level schools, elaborated by the Secretariat of Public Education and applied to the country as of September 1993, stipulates as one of their objectives that children acquire "the basic knowledge to understand natural phenomena, specially those related to the preservation of health, the protection of the environment and the rational use of natural resources".

According to the aforementioned, the subjects known as Natural Sciences - to a greater extent- and Civic Education - to a less extent - went through some issues related to the use of drinking water, air, water and soil pollution, origin and fate of the wastes generated by houses and the community, organic and inorganic garbage, although these topics account for only 10% of the total issues in Natural Sciences.

2.2.7 Community Structure

The DF consists of 16 political delegations, which are divided at the same time into *colonias*, *manzanas* (blocks) and *calles* (streets).

In semi-rural delegations such as Milpa Alta, Cuajimalpa, Magdalena Contreras, Xochimilco and Tlahuac, there exist *pueblos* (villages) or *barrios* (neighborhoods), apart from the *colonias*.

The participation of the residents' associations, the *colonia* heads and the *manzana* leaders will be priceless for the education of the population and its succeeding participation in the improvement of SWM for the DF.

2.2.8 Squatter Settlements

Marginal settlements of squatters, which are known in Mexico as "*colonias populares*" emerged in 1940. Estimations from the year 1976 showed that almost 50% of the metropolitan zone population lived in "*colonias populares*", which accounted for 64% of the urbanized area of the city.

The general condition for the emergence of squatter settlements is the free or low-price availability of land in the peripheral areas, which can be owned or even squatted on by families that demand housing. The features of these settlements are due to the presence of acutely adverse environmental conditions, no public services at all or a limited access to them, or there exists a problem as regards to the land tenure. In most cases, some or all of these factors are combined.

The increasing number of "*colonias populares*" at the northern and northeastern zone of the DF has been fostered by the urbanization and growth of the municipalities in the State of Mexico that surround the DF; as a consequence, the DF has been enclosed at the northern and northeastern zone by the co-urbanized municipalities. In the DF's southern and southwestern zone, that corresponds to the delegations Alvaro Obregón, Milpa Alta, Cuajimalpa, Magdalena Contreras, Xochimilco and Tlahuac, the squatter settlements are limited due to the special attention by the GDF to preserve the so-called "ecological preservation zones", therefore the "*colonias populares*" cannot easily constitute in those limits.

Nevertheless, the expansion of squatter settlements in the Metropolitan Zone (co-urbanized municipalities of the State of Mexico) still continues, yet at a slower rate than in previous decades, due to the following reasons:

- Urban and rural migration.
- Precarious economic and concrete deficiencies conditions.
- Migration from other zones in Mexico City because of deteriorated housing which has turned uninhabitable.
- Excessive housing costs.

During the 70's, the governmental bodies started considering some programs aimed at regulating land tenure and the introduction of public services in squatter settlements.

According to the INEGI (1995 Population and Housing Counting), in November 1995 houses in the DF without drinking water installations represented only 2% of the total, and those houses whose sewerage was not connected with the public network nor to

septic pits accounted for 3.6% of total houses. From the aforesaid, it can be concluded that the "colonias populares" regularization process was developed significantly. On the other hand, this group of people - almost 400,000 persons - do not have a solid wastes collection service.

Besides, according to the publication "Orientation of the management of solid wastes in Mexico city, July 1992" (Orientacion del manejo de residuos solidos en la ciudad de Mexico, Julio 1992), the number of squatter settlements receiving deficient waste collection service reached 42 (most of) which were in nine delegations.

2.2.9 Public Health

The institutions by which the DF attends to public health and renders social security services are grouped as follows:

- Governmental bodies such as the Secretariat of Health and Assistance (SSA) and GDI's Medical Services;
- Social Security Institutions, formed by the Mexican Social Security Institute (IMSS), the Institute of Security and Social Services for State Workers (ISSSTE) and the services rendered by Petróleos Mexicanos (PEMEX), Ferrocarriles Nacionales de México (Mexican National Railways), the Secretariat of National Defense (SDN) and the Secretariat of Navy (SM); and
- The private sector.

It is difficult to establish a direct relation between the inappropriate management of solid wastes and health, since there are several causes for diseases such as poverty, malnutrition and a lack of basic sanitation services, besides lack of or deficient management of solid wastes. However, according to the morbidity and mortality statistics of population in general terms, some infectious diseases are detected that may be prevented or reduced with proper environmental sanitation, including the appropriate management of solid wastes.

Table 2-12 shows the morbidity and mortality rates due to diarrhea diseases (one of the causes selected) in the DF delegations in 1991; these figures confirm that the delegations of low socio-economic conditions with deficient sanitation services, such as Milpa Alta, have the highest morbidity and mortality rates.

Table 2-12: Morbidity and Mortality due to Diarrhea Diseases in the DF - 1991

Delegation	Morbidity rate	Mortality rate
A. Obregón	1,592	9.0
Azcapotzalco	563	7.8
Benito Juárez	942	7.5
Coyoacán	1,589	6.7
Cuajimalpa	2,180	13.8
Cuauhtémoc	1,050	7.3
G. A. Madero	503	8.7
Iztacalco	951	8.2
Iztapalapa	533	9.8
Magdalena Contreras	1,226	8.6
Miguel Hidalgo	1,257	9.3

Delegation	Morbidity rate	Mortality rate
Milpa Alta	6,574	23.2
Tláhuac	3,333	10.3
Tlalpan	1,196	8.4
V. Carranza	1,238	9.3
Xochimilco	1,547	11.2

Source: SSA-OPS Rates based on per 100,000 inhabitants.

2.3 Urban Structure

2.3.1 Land Use Conditions

a. General Structure of Land Use

Land use of the DF can be roughly divided into two. The south half is an area which has high ecological value, corresponding to the delegations of Tlahuac, Milpa Alta, Xochimilco, Tlalpan, Magdalena Contreras, Cuajimalpa de Morelo and the south of Alvaro Obregon. The other half is an urbanized area where human habitations, commercial activities and offices are concentrated. Delegations of Cuauhtemoc, Benito Juarez, Iztacalco, Coyoacan and Iztapalapa are those particularly densely populated. Delegation of Gustavo A. Madero, located at the north end of the DF, is also highly populated, but also enjoys natural environment of the foot of Sierra de Guadalupe in its north.

In the DF, there are totally eight National Parks, six areas designated as ecology protection areas and one forest protection area. Their distribution, shown in Table 2-13, agrees with what is stated above; the majority of those environmentally valuable areas are in the south of the city, especially in Magdalena Contreras where nearly half of the territory is rich in natural resources.

Table 2-13: Surface Area of Nature Protection Areas by Delegation

(as of 31 December 1996)

	National Parks (ha)	Ecology Conservation Areas (ha)	Forest Protection Areas (ha)	Ratio of These to the Total Area of Each Territory (%)
Federal District	3,705.0	4,874.6	3,100.0	1.2
Coyoacán	432.0	-	-	7.5
Cuajimalpa de Morelos	1 865.0	-	-	24.6
Gustavo A. Madero	302.0	687.0	-	11.1
Iztapala	80.0	576.4	-	5.5
Magdalena Contreras	86.0	-	3,100.0	45.2
Tlalpan	940.0	727.0	-	5.5
Xochimilco	-	2,657.0	-	20.9
Miguel Hidalgo	-	227.2	-	4.8

Source: Secretary of the DDF; Committee of Natural Resources

2.3.2 Population Density

Using the 1990 Census and population data estimated for 1997, population density in the DF and in each delegation were calculated. The result is shown in Table 2-14.

The DF's population in 1997 is estimated at 8,567,135 and its surface area is 150,552 ha, thus the population density comes to 56.90 person/ha. This is considerably high compared to the population density for the whole country, which is reported by PAHO to be 0.46 person/ha.

The number of delegations whose population density is higher than the DF average is 10 out of 16. The delegations of Iztacalco, Cuauhtemoc and Iztapalapa are the ones which are particularly densely populated.

Table 2-14: Population Density in the DF by Delegation

Delegation	Area (ha)	1990		1997	
		Population (persons)	Population Density (persons/ha)	Population (persons)	Population Density (persons/ha)
Alvaro Obregon	8,586	642,753	74.86	688,923	80.24
Azcapotzalco	3,451	474,688	137.55	439,188	127.26
Benito Juarez	2,750	407,811	148.29	376,576	136.94
Coyoacan	5,540	640,066	115.54	703,086	126.91
Cuajimalpa	7,700	119,669	15.54	147,340	19.14
Cuauhtemoc	3,309	595,960	180.10	538,315	162.68
Gustavo A. Madero	8,700	1,268,068	145.75	1,214,625	139.61
Iztacalco	2,306	448,322	194.42	414,048	179.55
Iztapalapa	11,940	1,490,499	124.83	1,717,259	143.82
M. Contreras	7,004	195,041	27.85	221,463	31.62
Miguel Hidalgo	4,764	406,868	85.40	367,495	77.14
Milpa Alta	27,820	63,654	2.29	75,866	2.73
Tlahuac	9,300	206,700	22.23	264,349	28.42
Tlalpan	31,200	484,866	15.54	600,703	19.25
V. Carranza	3,442	519,628	150.97	471,241	136.91
Xochimilco	12,740	271,151	21.28	326,658	25.64
DF Total	150,552	8,235,744	54.70	8,567,135	56.90

2.3.3 Transportation

The transport of the DF heavily depends on its extensive road network to such an extent that it suffers from notorious air pollution.

There are two main ring road called Circuito Interior and Periferico. The former goes around the most urbanized area of the DF while the latter runs in the outer area some sections of which are in the State of Mexico.

Principal road which runs from north to south is Insurgentes, which links Pachuca Hidalgo and Cuernavaca via Mexico City. Principal roads which run from east to west include Reforma, which leads to Toluca; Ermita Iztapalapa, to Puebla; Oceania and Via Tapoa to the east; and Mexico Tacuba, to Queretaro.

A number of axes roads (called *Ejes*) form a latticed road web throughout the urbanized city center (i.e., north part of the DF). *Ejes Sur* and *Ejes Norte* go in a latitudinal direction in the south and north halves of city center, respectively, while *Ejes Poniente* and *Ejes Oriente* are in a longitudinal direction in the west and east halves of city center, respectively. Then they are linked with secondary and tertiary roads extending to the suburban area. Roads in the south part of the DF are distributed sparsely, which indicates that the area is undeveloped and rich in natural environment.

Besides the road transport, the subways (or here called Metro) provide a great number of people with another essential means of travel within the city and between the city and the State of Mexico. The use of the subways has been facilitated by the restriction of the use of vehicles in the city to improve air quality and the intention of the people not to be involved in the traffic congestion. Since the open of the first line in 1968, there have been developed nine lines and they are being further extended.

The other type of transport includes railways run by the National Railway (*Ferrocarriles Nacionales*). There is a central station in the Delegation Cuauhtemoc, but the railway is not used for daily activities but used only for long-distance travels.

2.4 Financial Conditions

2.4.1 Public Finance of DF Government¹²

2.4.1.1 Budgetary Revenues and Expenditures of DF¹³

While weakening financial base of the DF and state governments, in the remote area in particular, and subsequent unbalanced regional growth becoming a growing concern for the Federal government, economic management of the government of Federal District (DF) has been somewhat volatile to external factors, and internal tax fundamentals as well. The DF government budget coinciding with the calendar year comprises recurrent revenue and expenditure with no "development budget" being stipulated explicitly in the official documents. Current revenue sources for the DF government pertains to (i) own revenue and (ii) contribution from the Federal government, with the line items of the former including (a) Taxes (*Impuestos*), (b) Service Fees (*Derechos*), (c) Contribution not included from Federal Government (*Contribuciones no Comprendidas*), (d) Products (*Productos*), (e) Good Use

¹² With a paucity of reliable and consistent data and numerical information timely available, it makes most likely that the issue of public finance in Mexico is limited to the budgets of the Federal government and public entities (PEs) included in the Fed budget. These PEs included in the Fed budget or under budgetary control pertain to Petróleos Mexicano (PEMEX), Comisión Federal de Electricidad (CFE), Luz y Fuerza del Centro, Ferrocarriles Nacionales de México (FNM), Compañía Nacional de Subsistencias Populares (CONASUPO), Productora e Importadora de Papel (PIPSA), Aeropuertos y Servicio Auxiliares (ASA), Caminos y Puentes Federales de Ingresos y Servicios Conexos (CAPUFE), Lotería Nacional para la Asistencia Pública, Instituto Mexicano del Seguro Social (IMSS), and Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado (ISSSTE).

¹³ References: *Gaceta Oficial del Departamento del Distrito Federal*, December 1994-1998, National Statistics, Geography and Informatic Institute (INEGI), *El Ingreso y El Gasto Público en México*, 1997, DF, *XIV Censo Industrial, XI Censo Comercial y XI Censo de Servicios*, 1995, *Finanzas Públicas Estatales y Municipales de México 1990-1995*, 1997, *Sistema de Cuentas Nacionales de México*, DF, *Clasificador por Objeto del Gasto*, 1995, HACIENDA, *Informes Sobre la Situación Económica, las Finanzas Públicas y la Deuda Pública*, first quarter 1998, *Cuaderno Estadístico Básico de las Finanzas Públicas del Distrito Federal*, 1997, *Cuenta Pública del DF, 1995-1997, Presupuesto Autorizado para DF, 1995-1997*

(Aprovechamientos), (f) Debt Carry-Forwards from Previous Year (*ADEFAS*), and (g) Others (*Otros Ingresos*). The latter pertains to (a) contribution for improvements (*Contribuciones de Mejoras*), (b) auxiliary items of contribution (*Accesorios de las Contribuciones*), (c) federal tax revenue share (*Participaciones en Ingresos Federales*), and (d) share due to coordination activities (*Participaciones por Actos de Coordinación*). Of the funds transferred from the Federal government, tax revenue shares (*participaciones*) transferred from the Federal government constitutes the major source of income for DF government and other local (state and municipality) governments as well.

One of the salient features of the budgetary processes at DF is its treatment of carry forwards over fiscal years. The budget deficit at the end of fiscal year is to be carried forward as an opening balance for the following year, and be subject to the assessment by the Secretariat of Finance at DF if the deficit be complemented by new money in March or April. In the fiscal years of 1997 and 1998, budget deficits carried over from the preceding years were P.500 million and P. 600 million, accounting for 1.6 percent and 1.5 percent of the total budget, respectively¹⁴. On the other side, budget surplus or unutilized budget is not to be carried forward to the next fiscal year. In the normal fiscal practice, budget adjustment would take place in prior to the last quarter of the year, while considering realignment of budget inclusive of reallocation among and/or cancellation of projects. Any adjustment of budget would not take place after October or November in the year.¹⁵

Change in financial position at DF government during the recent four years of 1995 through 1998 is summarized and given below as Table 2-15. Further, a table of revenues and expenditures at each level of the governments at the central and subordinates, with the budget allocation for SWM, is attached as Table 2-16.

Table 2-15: Change in Financial Position of DF Government, 1995-1998

	1995	1996	1997	1998	(P. million) Annual Nominal Increase(%)
Revenue	18,153.6	25,097.3	31,105.4	38,712.0	28.7
Of which Own Revenue	10,944.7	13,980.6	17,060.1	21,464.6	25.2
Expenditure	19,386.3	27,664.2	33,566.6	42,574.4	29.9
Debt Service	221.9	1,599.4	1,860.4	2,609.4	127.7

Source: Gaceta Oficial del Distrito Federal, 1994-1997, Cuenta Pública del DF 1998

Table 2-16: Public Revenues, Expenditures and Budget Allocation for SWM, 1995-1998

	1995	1996	1997	1998	(P. million)
I. Revenue					
1. Federal Government	283,195	392,600	503,300		
2. DF Government	18,153	25,097	31,105	38,712	
Of which Own Revenue	10,944	13,980	17,060	21,464	
II. Expenditures					

¹⁴ Source: Gaceta Oficial del departamento del Distrito Federal, December 1996, 1997

¹⁵ Hearty thanks are due to Lic. Rosalba Cruz Jimenez for her precious and the most relevant information on the issue.

	1995	1996	1997	1998
1. Federal Government * ¹	293,800	580,700	730,400	
2. DF Government (Aggregate)	19,865	27,664	33,566	42,574
Of which Gasto de Capitol (%) * ²	31.2	35.9		
3. Of which Debt Service	222	1,599	1,860	1,908
4. Secretariat of Works and Services	3,693	5,967	6,888	8,890
5. DGSU * ³	787	1,220	1,051	
6. Delegations * ⁴	3,529	4,795	6,102	6,629
III. SWM Budget Allocation				
1. SEDESOL	-	-	-	70.0
2. Local (DGSU+Delegations)	950.2	1,092.9	1,481.9	1,560.4
3. DF-DGSU * ⁵			742.1	987.9
3.1 Administration			641.2	935.3
3.2 Development			100.9	52.6
Development Budget Share (%)			13.5	5.3
4. Delegations			739.8	572.5
4.1 Administration			667.1	557.2
4.2 Development			72.7	15.3

*¹ Source: IMF, *IFS* for 1995 and Banco de México, *Mexican Economy 1998* for 1996-1997

*² Source: *Cuenta Pública del DF* de los años 1990-1996

*³ Source: *Cuenta Pública del DF 1996*, tomo I p.101

*⁴ Source: *Cuaderno Estadístico Básico de las Finanzas Públicas del Distrito Federal, 1997*,

*⁵ Source: *Estrategia Programática Sectorial 1996* for 1996, DGSU data for 1997-1998.

2.4.1.2 Public Debt of DF Government

Further concern over the District's sound management of public finance would be its external borrowing and associated financial obligation to cover the debt services. Volatility in sector growth would depend on this factor outside the control of the DF government and would place greater pressure on its financial maneuverability in the years to come.

As of the end of fiscal year 1997, the aggregate amount of external debt of DF government was P.11,786 million which was equivalent to around 0.36 percent of GDP. In a bid to round out the fiscal gap in 1998, the Congress of the Union authorized DF, as per the Article No.2 of the Income Law for the Federation and the Income Law for the District of Federal (DF), to exercise a net borrowing of P. 7.5 billion at maximum.¹⁶ With this, the consolidated debt has since the end of 1997 grew by 1.97 percent reaching to a total figure of P.12,019.9 million, or would be 0.35 percent of GDP¹⁷. Of this, borrowings for DF administrative bodies and semi-state entities account for 77.3 percent and the remaining 22.7 percent, respectively. Difference in aggregate debt over the two period in time is made in line with the new

¹⁶ Reference: Instituto Nacional de Estadística, Geografía, e Informática (INEGI), Report on the status of public debt of the Federal District government is to be submitted to the Congress of the Union three times a year in compliance with what is set forth in article No. 73 sections VIII and 122, Letter C of the second base, and Letter F of the Constitution of the United Mexican States; in article 67, section XV of the Statute of the Government of District of Federal; in article 23 of the General Law on Public Debts of the DF Government. Also, SHCP has a judicial obligation to submit a report, inter alia, *Informes sobre la Situación Económica, las Finanzas Públicas y la Deuda Pública*, to Congress for review on the evolution of the economy, public finance and public debts that contains statistics regarding income and expenditures taken place over the quarter within 45 days after the end of a quarter. Annual report of public account (*Cuenta de la Hacienda Pública Federal*) is also due for review by Congress.

¹⁷ Assuming 5 percent of GDP growth in 1998 in nominal terms.

borrowing of P. 317 million and amortization of P. 83.8 million, with the net borrowing of P. 233.2 million.

2.4.1.3 Debt Service Ratio

Financial healthiness of entities is a function of an expense accrued each year but also the share of debt services out of the funds generated in a year. Viewed in this light, debt service ratio (*DSR*) is highlighted as a proxy index to represent soundness in financial management. Numerically defined, *DSR* is as follows.

$$DSR_t = \frac{(AnnualDebtService)}{Revenue}$$

$$DSR_t = \frac{(AnnualDebtService)}{Own\ Revenue} \quad \text{where } t \text{ denotes any year during the project period.}$$

With P. 2,609.4 million of debt service authorized by Congress for the year 1998¹⁸, *DSR* in terms of the whole revenue and own revenue worked out 6.7 percent and 12.2 percent, respectively. Of the authorized debt service, P. 1,907.9 million¹⁹, equivalent to 73.1 percent of the aggregate, is set forth to meet interest payments in the year.

Over the first quarter period of time in 1998, the total debt service borne out by DF government was P. 507.5 million, with amortization and interest payment of P. 83.8 million and P. 423.7 million respectively. This accounts for 83.9 percent and 19.4 percent of the programmed amount for the first trimester and the authorized for the year 1998.

Consolidated Balance of Public Debt as of March 31, 1998, and debt service as of 31 March 1998 are given in Table 2-17 and Table 2-18, herewith.

Table 2-17: Consolidated Balance of Public Debt as of March 31, 1998

(P. million)					
CONCEPT	Balance 31 Dec 1997	Positions	Amortization	Net borrowing	Balance 31 March 1998
TOTAL DEBT	11,786.7	317.0	83.8	233.2	12,019.9
CENTRAL SECTOR	9,133.6	230.3	78.2	152.1	9,285.7
BANOBRAS - French protocol	407.9		20.9	-20.9	387.0
BANOBRAS - BIRF 2824 - ME	8.6				8.6
BANOBRAS - IDB	122.2				122.2
BANOBRAS - OECF	336.7	24.6		24.6	361.3
BANOBRAS - BCH - CAF	747.6		44.0	-44.0	703.6
BANOBRAS - LINE "B" 8027	439.3				439.3
BANOBRAS - Public investments	73.0				73.0
BANOBRAS - UDI 8028 re-structuring	470.0				470.0
BANOBRAS - UDI 8032 re-structuring	470.0				470.0
BANOBRAS - UDI 8030 re-structuring	371.7				371.7
BANOBRAS - UDI 8031 re-structuring	464.8		13.3	-13.3	451.5
BANOBRAS - UDI 8037 re-structuring	500.1				500.1
BANCO BILBAO VIZCAYA	530.0				530.0

¹⁸ Source: HACIENDA, *Informes sobre la Situacion Economica, las Finanzas Publica y Deuda Publica, Acciones y Resultados del Primer Trimestre de 1998*, May 1998

¹⁹ Source: *Cuenta Publica del DF 1998*

CONCEPT	Balance 31 Dec 1997	Positions	Amortization	Net borrowing	Balance 31 March 1998
BANCOMER - Public safety	606.4				606.4
BANCOMER - ATT. GRAL.'S JUSTICE OFF.	602.1				602.1
BANCOMER - Water metering program	421.5				421.5
BANCA PROMEX					249.0
BANCA IXE	249.0 199.4				199.4
BANCOMER - Public investments	1,724.5				1,724.5
BANOBRAS-Line "B" civil & electromech. Works	332.0	205.7		205.7	537.7
BANOBRAS - Cleansing Program	1.0				1.0
NACIONAL FINANCIERA - Eximbank	32.0				32.0
NACIONAL FINANCIERA - BIRF	23.8				23.8
COORDINATED BODIES	2,653.1	86.7	5.6	81.1	2,734.2
Public Transportation System	1,885.2	50.7	5.6	45.1	1,930.3
Electric Transportation Service	66.4	36.0		36.0	102.4
Passengers' Urban Car Transportation System	701.5				701.5

Source: Report of the Government of the Federal District.

Table 2-18: Consolidated Public Debt Service as of March 31, 1998

(P. million)

Concept	Authorized	Programmed for March	March so far
Central sector	1,893.0	487.3	459.3
Amortization	393.0	90.0	78.2
Interests, commissions and expenses	1,500.0	397.3	381.1
Bodies and enterprises	716.4	116.9	48.2
Amortization	208.5	16.6	5.6
Interests, commissions and expenses	407.9	100.3	42.6
TOTAL	2,609.4	604.2	507.5

Source: Report of the Government of the Federal District.

2.4.2 Taxation System and Public Utilities Charge Collection System

a. Taxation System - Outline View

A range of taxes assigned and budgetary expenditures accrued to each level of the governments is given in Table 2-19, whereas the revenue structure of DF government over the period of 1995 through 1998 and at each of the governments in administrative order in 1994 are respectively provided in Table 2-20 and Table 2-21, as attached.

Table 2-19: Federal and Local Government Expenditure and Taxes

Federal government taxes	Federal government expenditures
Corporate income tax Personal income tax Tax on assets of enterprises Value-added tax (VAT) Duty on oil extraction (royalties) Oil export tax Tax on production and services (excises) Tax on the new cars ²⁰ Tax on the ownership or use of vehicles Real estate transfer tax ²¹ Import duties Miscellaneous	Federal administration Service of domestic and foreign debt Defense Post and telecommunications External affairs Irrigation Foreign trade Railways, highways, airways and shipping Federal and border police
Shared taxes	Shared expenditures
Income taxes Value-added tax Excises Oil export duties ²² Import duties Tax on the ownership or use of vehicles Tax on new cars	Health Education Specific purpose grant program Solidarity Single development agreements, (Convenios Unicos de Desarrollo) Special police National parks
State government taxes	State government expenditures
State payroll tax Real estate transfer tax Tax on motor vehicles older than 10 years Tax on the use of land Education tax Indirect taxes on industry and commerce Fees and licenses for some public services	State administration State infrastructures State public order and safety Sanitation and water supply Service of domestic debt Public libraries
Municipal government taxes	Municipal government expenditures
Local property tax Real estate transfer tax Water fees Other local fees and licenses Indirect taxes on agriculture, industry, and commerce Residential development	Local administration Local public order and safety Local transportation Local infrastructure including water supply and sanitation Local transit Waste disposal and street lighting Slaughterhouses, cemeteries, and parks

Source: Teresa Ter-Minassioan, *Fiscal Federalism in Theory and Practice*, IMF, 1997, pp. 572-573.

²⁰ This tax was suspended for one year on January 1, 1996.

²¹ This tax was abolished on January 1, 1996.

²² Some federal government tax revenues (oil production and export of hydrocarbons) are not included in the computation of the revenue-sharing fund

Table 2-20: DF Revenue by Source, 1995-1998

	1995	1996	1997	1998
REVENUE SOURCES (In millions of pesos)			(Thousands)	(Thousands)
Own Revenue				
I. TAXES	4,384.7	5,673.60	6,904,116.0	8,114,644.0
Land property tax	1,994.7	2,787.1	3,310,000.0	3,839,435.0
Acquisition of real estate	589.4	696.5	736,893.0	761,168.0
On public spectacles	50.3	54.5	73,101.0	101,117.0
On lotteries, raffles, etc.	74.4	30.5	119,712.0	76,762.0
Payroll tax	1,543.3	1,910.5	2,428,006.0	3,026,646.0
Tenure and use of vehicles	110.20	120.90	164,991.0	231,904.0
Acquisition of used vehicles	22.70	25.70	23,513.0	26,204.0
For rendering lodging services	0.00	47.90	47,900.0	51,048.0

(P. million)

	1995		1996		1997		1998	
	Amount	Share	Amount	Share	Amount	Share	Amount	Share
I. TAXES	4,384.7	24.2%	5,673.6	22.6%	6,904.1	22.2%	8,114.6	21.0%
II. CONTRIBUTIONS FOR IMPROVEMENTS	174.6	1.0%	182.4	0.7%	200.2	0.6%	172.1	0.4%
III. SERVICE FEES	1,700.7	9.4%	2,302.1	9.2%	2,895.2	9.3%	3,538.3	9.1%
IV. CONTRIB. NOT INCLUDED IN PREVIOUS SECTIONS, OF PREVIOUS FISCAL YEARS, NOT PAID OFF	0.1	0.0%	0.1	0.0%	0.0	0.0%	0.0	0.0%
V. AUXILIARY ITEMS OF CONTRIBUTIONS	195.0	1.1%	331.4	1.3%	673.0	2.2%	614.5	1.6%
VI. PRODUCTS	1,446.2	8.0%	2,044.1	8.1%	2,652.0	8.5%	3,551.0	9.2%
VII. GOOD USE	361.5	2.0%	554.7	2.2%	619.7	2.0%	554.3	1.4%
VIII. SHARE DUE TO COORDINATION ACTIVITIES		0.0%		0.0%	1,970.1	6.3%	2,964.8	7.7%
IX. FEDERAL TAX SHARE	6,839.3	37.7%	10,602.9	42.2%	11,201.9	36.0%	13,495.9	34.9%
X. DEBTS FROM PREVIOUS FISCAL YEARS	300.0	1.7%	400.0	1.6%	500.0	1.6%	600.0	1.5%
XI. OTHER REVENUES	2,751.5	15.2%	3,006.0	12.0%	3,489.2	11.2%	5,106.3	13.2%
TOTAL	18,153.6	100.0%	25,097.3	100.0%	31,105.4	100.0%	38,712.0	100.0%

(P. million)

	1995	1996	1997	1998	Share 1998	Growth Rate 95-98
Expenditures of all bodies of the GDF	17,682.7	16,970.7	19,588.4	25,784.1	60.6%	13.4%
Expenditures of all bodies of the GDF	12,291.3	16,970.7	19,588.4	25,784.1	60.6%	28.0%
of which Department of Works and Services	3,693.2	5,967.2	6,888.6	8,890.4	20.9%	34.0%
Expenditures for the delegations	3,395.5	4,641.4	6,087.2	6,629.7	15.6%	25.0%
Expenditures for semi-state entities	4,178.5	6,052.1	7,891.0	10,160.6	23.9%	34.5%
Total	19,865.3	27,664.2	33,566.6	42,574.4	100.0%	28.9%
Minus						
Contributions included in the Central Adm. expenditure	2,182.6					
Expenditures financed with own resources	2,037.1					
Plus						
Chamber of Representatives DF Assembly	117.5	196.2	255.0	310.0		
Major Accounting Office of the Assembly of Representatives DF		60.0	60.0	71.9		
Supreme Court of Justice	213.9	350.5	447.0	930.7		
Supreme Court's Judicature		25.5	25.1	30.7		
Human Rights Commission	40.0	50.0	50.0	61.9		
Prerogatives of Federal District's Federal Electoral Inst.				200.0		
Electoral Process			360.0			
Citizen councils	32.0	40.0				
Service of the debt of the Central Sector	220.7	1,489.9	1,860.4	1,500.0		
Interests and Commissions of Semi-State Companies	1.2	109.5				
Deficits from Previous Fiscal Year	250.0	300.0	400.0	500.0		
A1 Delegations' improvement program		500.0				
A2 Infrastructure development program		464.8				
A3 Urban zone re-generation program		475.0				
Total	18,557.9	30,197.3	37,055.4	46,212.0		

Sources: Gaceta Oficial del Distrito Federal, 1994-1997

Table 2-21: Structure of Government by Administrative Order, 1994²³

	Federal Government	State Government	Municipal Government	General Government
(In millions of new pesos)				
Total revenue	215,301	53,793	14,761	283,855
Taxes	160,317	2,028	3,253	165,598
Non-tax revenue ²⁴	54,984	24,827	3,060	82,871
Net revenue sharing	-----	26,938	8,448	35,386
Total expenditure	221,202	49,955	16,233	287,390
Administration	111,006	28,546	10,306	149,858
Transfers	74,792	8,396	1,101	84,289
Investment	30,422	12,508	4,337	47,267
Deferred outlays	4,982	505	489	5,976
Budgetary balance	-5,901	3,838	-1,472	-3,535
Change in third-party account	-4,027	5,847	292	2,112
Overall balance	-9,927	-2,009	-1,764	-13,700
Financing (net)	9,927	2,009	1,764	13,700
External	-6,595	-----	-----	-6,595
Domestic	16,522	2,009	1,764	20,295
(In percent of GDP)				
Total revenue	16.9	4.2	1.2	22.3
Taxes	12.6	0.2	0.3	13.0
Non-tax revenue	4.3	1.9	0.2	6.5
Net revenue sharing	-----	2.1	0.7	2.8
Total expenditure	17.4	3.9	1.2	22.6
Administration	8.7	2.2	0.8	11.8
Transfer	5.9	0.7	0.1	6.6
Investment	2.4	1.0	0.3	3.7
Deferred outlays	0.4	-----	-----	0.5
Budgetary balance	0.5	-0.3	-0.1	-0.3
Change in third-party account	-0.3	0.5	-----	0.2
Overall balance	0.8	-0.2	-0.1	-1.1
Financing (net)	-0.8	0.2	0.1	1.1
External	-0.5	-----	-----	-0.5
Domestic	1.3	0.2	0.1	1.6

Sources: Secretariat of Finance and Public Credit and Instituto Nacional de Estadística, Geografía e Informática (1996c).

b. Payment System for Public Services in the DF

The main public services provided by the Government of the Federal District are water supply and distribution, drainage, solid waste collection, public roads sweeping and conservation of parks, squares and public areas. The entities, within the DF, which have the legal, technical and administrative duty to provide these services are the Political Delegations. Concerning primary roads cleansing and collection of waste accumulated in public roads, however, the duty for these is shared with the General Direction for Urban Services (DGSU).

The population in general officially pays for water supply every two month through a bill sent by mail by the Water Commission of the Federal District which is dependent

²³ Excludes operations of the social security funds.

²⁴ Includes hydrocarbon royalties.

on the Secretariat of Works and Services. The population of the Federal District also pays to the GDF for the drainage system, rehabilitation and maintenance of monuments, public parks ornament works, schools, libraries, and social service, culture and sports centers which the DF is in charge of, as well as construction, rehabilitation and maintenance of public markets, secondary roads, gutter and sidewalk in general, bridges and pedestrian bridges for secondary roads through a charge called "*Boleta Predial*" (*Circulation Bill*). This '*Boleta Predial*' is paid annually; the amount is established by the location of the urban area and constructed surface of real property. Payments are done at the different branches of the Government Treasury of the Federal District.

There is also a Tax called "*Uso del Suelo*" (Land Use) which is paid by those who intend to settle in urban areas designated for commercial, service activities or others. This state is interesting because this type of tax can serve as a mechanism to charge for urban cleansing services.

The Treasury of the GDF under the Finance Secretariat operates as a Taxation Entity which is responsible for the administration and collection of those incomes, as well as federal contributions which are established by the Federal Executive.

The collection and reception of solid waste provided by the Federal District should be paid for by mercantile, industrial and similar establishments, as well as federal and local entities and dependents in accordance with the following quotas:

- I. For the collection service per each 10 kg or fraction: 4.20 pesos.
- II. For the reception service at transfer stations per each 10 kg or fraction: 1.40 pesos.
- III. For the reception service at final disposal sites per each 10 kg or fraction: 0.50 pesos.

In addition to the previously stated, the **Cleansing Service Regulation** states that collection service will be provided for free if waste generation does not exceed 200 kg/day.

Consequently, it is concluded that for residential sectors the service is free; meanwhile for other type of sources, a quota or fee should be applied as the following figure shows:

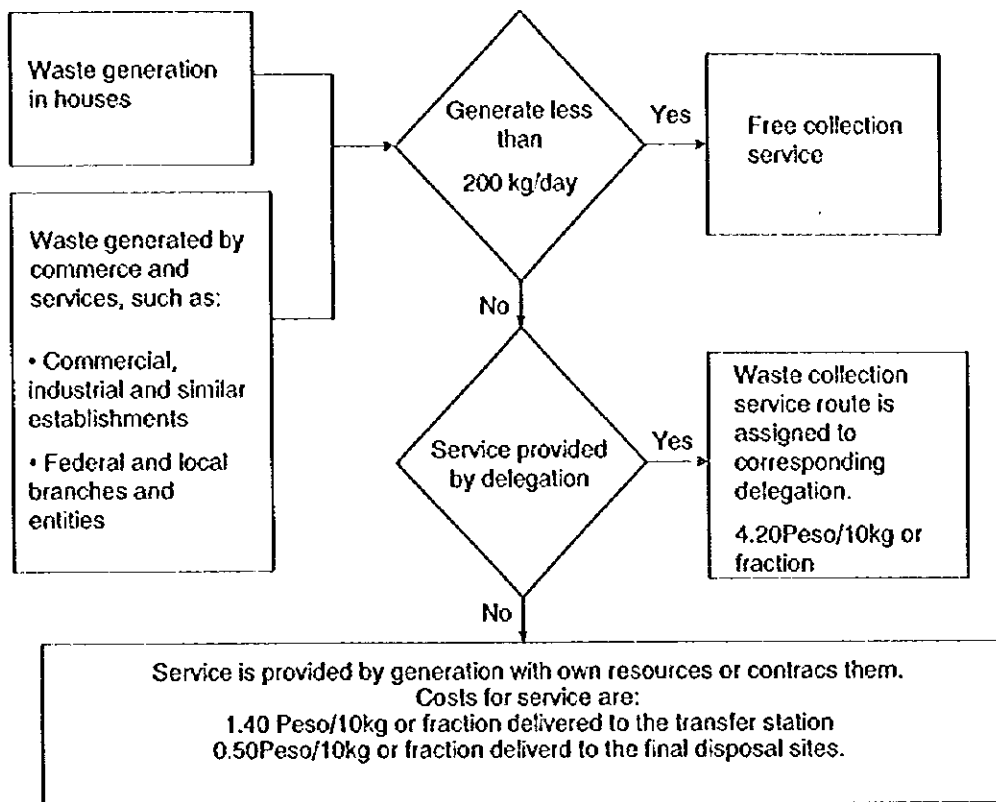


Figure 2-8: Identification of Generations of Municipal Solid Waste Who should Pay for Services for Urban Cleansing

2.5 Environmental Policy

2.5.1 General Review

Mexico City is a mega-city of the world with about 9.3 % of the Mexico's total population and nearly one third of the industrial production of the whole country. Consequently the city has been suffered with huge environmental stress.

The first incorporation of environmental protection into the Constitution was in 1983, when an undersecretariat for ecology was created. Environmental policy, however, was not systematically executed until the present legal basis, General Law of Ecological Balance and Environmental Protection (LGEEPA; *Ley General de Equilibrio Ecológico y la Protección al Ambiente*), was issued. The effort to run the practical and effective environmental management had been continued, leading to the 1990-94 National Program for Environmental Protection in which the sustainable development appeared. Sustainable development is now an ultimate political goal set by the new LGEEPA amended in 1996.

2.5.2 Organizations Concerned

a. SEMARNAP

The Ministry of Environment, Natural Resources and Fisheries (SEMARNAP) is the national body in charge of the protection of natural resources and the promotion of sustainable development. It was established in 1994 by combining sections relevant to environment in the Ministry of Social Development (SEDESOL) and Ministry of Agriculture and Water Resources in order to integrate the environmental policy of the country. With its staff of about 40,000, its responsibilities are, among others, as follows:

- foster the protection, restoration and conservation of natural properties.
- formulate and introduce national policies in regard to natural resources, ecology, environmental sanitation, water, and environmental regulation for urban and fishery development.
- administrate, regulate and promote the sustainable use of natural resources which are to be taken care of by the federation.²⁵
- establish Mexican Official Norms (NOM; Normas Oficiales Mexicanos) for the protection and restoration of environmental quality; natural ecosystems; sustainable use of natural resources and wildlife; and hazardous materials and solid wastes with participation of other authorities.
- monitor and encourage the implementation of laws, NOMs and programs related to the environment and also impose proper sanctions within its jurisdiction.
- evaluate and comment environmental impact assessment report of development projects in public, social and private sectors and resolve environmental risks.
- coordinate and execute projects of program formation and capacity building for institutions to develop human resources and promote social communication tools for environmental protection activities.
- design and operate, with participation of other ministries and organizations, the adoption of economic instruments for the protection, restoration and conservation of environment.
- foster ecological land use planning in co-ordination with other federal, state and municipal authorities and with the involvement of individual citizens.

SEMARNAP has another 7,700 staff who works for 32 federal delegations in the states and the DF to act as branch offices and to coordinate and assist local administrations.

SEMARNAP also supervises the activities and policies of five affiliated organizations: the National Water Commission (CNA), the National Institute of Ecology (INE), the Office of the Federal Attorney for Environmental Protection

²⁵ excluding petroleum, other hydrocarboneous resources and radioactive minerals.

(PROFEPA), the National Institute of Fisheries (INP) and the Mexican Institute of Water Technology (IMTA).

As seen in Table 2-22, SEMARNAP itself receives only sixth or seventh of its total budgets: the rest is distributed to these subordinate entities and local states. The transferred budget to states are used for collaborative projects with SEMARNAP and states and/or municipal governments. The reason for a large budget allocated to the CNA is that investment in hydraulic works such as irrigation and water supply distribution is included.

Table 2-22: Distribution of SEMARNAP's Budget

(Million Nuevo Pesos)

	1995	1996	1997
Ministry <i>per se</i>	742	929	1,053
Subordinate entities	4,064	5,482	5,775
INP	49	60	59
CNA	3,595	4,952	5,304
IMTA	99	108	66
INE	137	170	155
PROFEPA	185	193	192
Transfers to States	3,229	3,487	3,860
Total	8,035	9,899	10,688

At 1995 prices, adjusted by Government Consumption Deflator

Source: OECD, "Environmental Performance Review: Mexico", 1998

INE and PROFEPA are the main body which leads Mexico's environmental policies. They are further introduced below.

a.1 INE

INE is in the center of environmental administration of the country with its principal responsibility to assure the conservation and restoration of ecosystems and their sustainable utilization and development. For this purpose, INE evaluates national environmental policy; formulates legislation in regard to such issues as natural resources, ecology, environmental sanitation, and hazardous wastes; promotes the establishment of environmental information system including monitoring and making inventories of wildlife; evaluates and appraises EIA reports; and implements ecology restoration programs.

a.2 PROFEPA

PROFEPA is responsible for the enforcement of environmental legislation by such activities as inspecting stationary pollution generators, giving orders to polluters to improve their facilities, and penalizing them in the case of violation.

A new trend of environmental control is seen in eco-auditing which is conducted through voluntary agreements between industrial sectors and PROFEPA. About 800 audits were carried out during 1992 to 1997. By doing so, it is expected to establish action plans to improve industry's environmental performance and lead enterprises to comply with ISO 14000.

b. Environmental Organizations in States and Municipalities

One of the major objectives of the amendments to LGEEPA in 1996 was to introduce decentralization more definitely by allotting responsibilities of environmental management among the Federation, states and municipalities.

b.1 Environmental Organizations in States

The environmental policies at national level give significant influence on those at the state level. The delegation's administrative structure, however, varies reflecting the characteristics of each state.

Each state is obliged to enforce its own environmental law based on the local environmental conditions and characteristics within its jurisdiction, as the LGEEPA stipulates (see Section 2.5.3). It is also incumbent on the states to establish natural protection areas and to monitor the fulfillment of Mexican Official Norms. As for SWM, the states are obliged to regulate the systems of collection, storage, transport, handling, treatment and final disposal of solid and non-hazardous industrial wastes, following the NOMs of the Federation on site selection, design, construction and operation of final disposal for municipal wastes (LGEEPA Article 137). The other important role of them is to evaluate the environmental impact given by the projects which are not specified in the federal regulations in regard to EIA.

Each state has its own secretariat to deal with environmental issues. In the state of Mexico, it is the Secretariat of Ecology. The interpretation of "environment" looked after by this secretariat ranges from natural environment to living environment, including solid waste issues.

b.2 Environmental Organizations in Municipalities

As in the case of the states, municipalities are also eligible to set their own environmental legislation within its jurisdiction. In addition, they are taking the responsibilities of urban infrastructure services such as potable water supply, sewerage as well as waste management in a sense of waste collection. The shortage of human and financial resources in most municipalities, however, makes it difficult to play a sufficient role in environmental management. A lack of continuity of the policy due to the re-elected administrations every three years is another impediment to run efficient policy.

b.3 Environmental Administration of GDF

The Secretariat of Environment of the GDF (Secretaria del Medio Ambiente) supervises environmental matters within Mexico City. Their responsibilities are a combination of those of states and municipalities, specifically the formulation of regulations on air pollution, water contamination and wastes, research and development, pollution control and management, application of environmental impact assessment, introduction of monitoring system for polluting substances, and the promotion of environmental education. It should be noted that, according to the legislation, it also bears responsibilities to promote and control the reduction, recycling, treatment and final disposal of solid wastes in cooperation with the Secretariat of Public Works. In fact, however, the Secretariat of Environment is not vested with concrete authority: the Secretariat of Public Works, through the DGSU, holds the practical responsibility of SWM, as already described earlier.

OECD reports that environmental expenditure represents about 8 % of the budget of the GDF.

b.4 Regional Organizations

There are four regional consultative councils which involve government, the private sector, community organizations and people from the academic. The councils cover:

- national, state and municipal legislation and strategies;
- education, training, science, technology and dissemination of information;
- protected natural areas; and
- poverty and sustainable development.

As for the metropolitan area, the Metropolitan Environment Commission (CAM; Comisión Ambiental Metropolitana) was established in 1996 to coordinate environmental cross-boundary issues among national government (SEMARNAP), Government of the State of Mexico and the GDF. The members include, from the central government, Ministries of Internal Affairs; Credit and Finance; Social Development; SEMARNAP; Energy; Commercial and Industrial Promotion; Agriculture, Livestock and Rural Development; Communication and Transport; Administrative Control and Development; Education; and Health. Governor of the state and Secretary General of the State Government from Mexico State, and the governor of the DF from the GDF also take part in the commission. Besides, there are some other private participants such as Mexican Petroleum, Mexican Institute of Petroleum, Central Federal Commission of Electricity, Refinery Division of PEMEX, Gas Division of PEMEX, and Basic Petrochemical (*Petroquímica Básica*). The commission has several sections which work on specific issues, one of which is waste management.

The practical activities of the CAM are carried out by the working groups of individual topics as below.

- Planning of environment and ecology conservation.
- Environmental education and capacity development.
- Air quality.
- Water quality.
- Quality of soil and subsoil and waste management.
- Natural resources and protected areas.
- Noise, vibration, thermal energy, light and odor.

Each of these working groups has an coordinator who is appointed by the Technical Secretariat of the CAM and who supervise the group's activities. Nevertheless, as a whole commission, achievements so far are rather biased to environmental issues in a narrow sense not giving a high priority on the waste problems.

2.5.3 Legislation

a. Constitution

The Constitution, issued in 1917 and amended in 1987, gives a foundation of Mexico's environmental policies. It states that the country has a right to control development in order to protect natural resources. It also approves that the Federal Government, State Governments and Municipal Governments establish legislation, within their jurisdiction, with defining their competence for a purpose of environment protection and preservation and restoration of an ecosystem by locally appropriate means.

b. General Law of Ecological Balance and Environmental Protection

The principal environmental statute is given by the General Law of Ecological Balance and Environmental Protection (LGEEPA). It introduced several key elements into Mexico's environmental policy including environmental impact assessment. LGEEPA was first adopted in 1988 replacing the Law of Environmental Protection of 1982, and largely amended in December 1996 in order to further devolve environmental responsibilities to the states and municipalities, establish the right of access to environmental information, and modernize environmental regulation by, for example, introducing information technology and creating an emission inventory.

With regard to SWM, LGEEPA gives the base for it by presenting the definitions of waste and hazardous waste as follows.

Waste: any material which is generated by the process of extraction, benefiting, processing, production, consumption, utilization, control or treatment and whose quality does not allow another new use at the point of generation.

Hazardous waste: any waste which, regardless to its physical state, because of its corrosive, explosive, toxic, inflammable or biologically-infectious nature, presents a risk for ecological balance and environment.

c. Mexican Official Norms

Mexican Official Norms (NOMs: Normas Oficiales Mexicanas) are the national norms which have the entire power in Mexico. Any statutory bodies have an obligation to make sure that the NOMs are followed and fulfilled by every individuals and entities. In the environmental field, there are 5 NOMs on laboratory methodology for air monitoring, 11 on stationary air pollution sources, 10 on mobile air pollution source, 9 on solid wastes, 4 on natural resources, 4 on noise, and 2 on water.

c.1 NOMs on Water

Water discharged into a water body which is used for drinking should meet strict standards while less strict standards can be applied to water discharged into a water body to be used for industrial purpose. Consequently, NOM-001-ECOL-1996 determines the maximum permissible limits of contaminants concentration according to the characteristics of the recipient water body. NOM-002-ECOL-1996 specifies the maximum permissible limits of contaminants concentration in water discharged to the urban or municipal drainage and sewer systems. NOM-003-ECOL-1997 sets the

maximum permissible limits of contaminants concentration of treated wastewater which is to be used for public services.

c.2 NOMs on Air

In regard to the air contamination which might be caused by the SWM projects, two things should be noted. First, there are no NOMs that specify the air quality which has to be satisfied throughout the country. All NOMs on air pollution from stationary sources limit only the concentration of contaminants in the emitted air "at the end of the pipe". Second, the air pollution sources that the NOMs are focusing on are almost exclusively industrial ones, such as cement plants and oil refineries. Exceptions are two norms on combustion process, which could be applied to waste incinerators. Consequently, any NOMs can not be used to control air contamination from the other types of SWM facilities, such as final disposal sites and composting plants.

c.3 NOMs on Wastes

Out of nine NOMs on wastes, one is dealing with the final disposal of municipal solid wastes, one with the medical wastes, and the other with hazardous wastes. Therefore, the first and second ones are of particular importance in the present study.

NOM-083-ECOL-1996 establishes the conditions which should be applied to the site for final disposal of municipal solid wastes. The aspects specified here include the following.

- General aspects, such as the distance from public facilities and populated areas
- Hydrology
- Geology
- Hydrogeology

It also describes the study procedure for each aspect above.

NOM-087-ECOL-1995 regulates the requirement for the separation, packing, storage, collection, transport, treatment and final disposal of biologically-infectious hazardous wastes generated from medical institutions. Although the SEMARNAP bears the ultimate responsibility to supervise the fulfillment of this norm, attention should be paid to this norm when the facilities for municipal solid waste accept treated medical wastes.

d. Regulations

LGEEPA is complemented with several regulations on such matters as below.

- Prevention of Water Pollution
- Prevention of Marine Pollution
- Prevention of Noise Pollution
- Environmental Impact Assessment
- Hazardous Wastes

- Prevention of Air Contamination by Vehicles in the Metropolitan Area and Surrounding Municipalities
- Prevention of Air Pollution
- Surface Transportation of Toxic Wastes and Toxic Substances
- International and National Parks

As seen in these, non-hazardous wastes either from households or industries are not regulated by the federal level, although NOM-083-ECOL-1996 gives the national standard for a municipal solid waste disposal site which has to be followed throughout the country.

d.1 Regulation on EIA at Federal Level

d.1.1 Scope and Procedure

LGEEPA and the regulation on EIA define the areas of projects whose EIA are to be reviewed by the INE within the SEMARNAP. Those are, in general, as follows.

- Public works by the federation.
- Transport works.
- Hydraulic works.
- Oil, gas and coal pipelines.
- Industries of petroleum, petrochemical, chemical, steel, paper, sugar, beverage, cement and electric power.
- Exploration, extraction, treatment and refining of mineral resources.
- Installation of facilities for treatment, confinement and elimination of hazardous wastes as well as radioactive wastes.
- Forest utilization and development.
- Federal tourism development.
- Works whose character and complexity are such that the states or municipal authorities require the participation of the SEMARNAP.
- Activities which potentially have considerable risks.
- Works which might give impact on the environment in more than one federal entities or in international zones.

The regulation does not specify the size of the projects which are subject to the EIA procedure. Instead, it requires project proponents to submit a prevention report (*informe preventivo*) which describes the characteristics of the planned projects. Within 20 days, the INE reviews the prevention report and determines whether or not EIA is required.

EIA under the EIA regulation has three categories, general, moderate and special, according to the nature of the project in question. General EIA is the basic style;

moderate EIA is applied to projects by which severe environmental impacts are likely caused if there is no precaution; special EIA is more specifically employed to the complex projects. After the review of the prevention report, the project proponent will be requested to carry out one of these EIA. There are guidelines issued by the SEMARNAP about how the contents of the EIA report should be for each type of EIA. The EIA report is, then, reviewed by the INE and the decision is to be issued within 60-120 days depending on the complexity of the projects and the necessity for the INE to ask for opinions from other authorities. As a result of the review of general EIA, the INE may further require moderate or specific EIA. In due course, the final decision will be one of the following.

- approval.
- conditional approval.
- rejection.

Very few projects are granted simple approval. Generally speaking, four fifths obtain approval with conditions such as modification of design and the execution of mitigation measures, and the rests are rejected.

As indicated earlier, EIA for projects of non-hazardous solid waste management is not obligatory within the INE's jurisdiction under the EIA regulation. It is not the case, however, if the projects are planned in specially protected areas with particular ecological value and/or the states or municipalities in which the projects are planned require the SEMARNAP to be involved into the EIA procedure. This is simply because any issues regarding the management of solid waste, in terms of either urban services or environmental impact, are to be administered by the states, the municipalities and the DF.

The INE evaluates the EIA reports with taking the following into account.

- Ecology conservation.
- Declarations of nature protected areas.
- Ecological criteria for the protection of wild flora and fauna, rational utilization of natural resources and the protection of environment.
- Ecological regulations of human settlements.
- Other technical and ecological regulations and norms referred to in the LGEEPA

d.1.2 Achievements

Department of Environmental Impact within the INE bears full responsibility to take care of EIA at the national level. They have totally 90 staff, 40-50 of whom are actually in charge of the evaluation of EIA.

The number of activities which are subject to EIA increased by the 1996 amendments to LGEEPA. According to the *Programa de Trabajo 1998* (Program 1998), issued by SEMARNAP, more than 1,000 projects followed the EIA regulation in 1997 (Table 2-23). This means one EIA assessor must handle at least 20 EIA reports in a year.

Table 2-23: The Number of Projects Subject to EIA Regulation in 1997 by Sector

Sector	Numbers of Projects
Pemex/CFE*	191
Industry	283
Mining	83
Fishing	77
Tourism	97
Communications	68
Services	13
Forest	218
Total	1,030

* Pemex: Petroleum of Mexico, CFE: Federal Commission of Electricity

Source: INE

d.1.3 Public Involvement

The project proponents are obliged to publicize the information of their projects through media by the EIA regulation. The regulation also guarantees the right of any person to express his/her opinions or suggestions for proposed projects during the reviewing process. There are several examples that the INE has received protests from the public against the hazardous waste projects. If needed, the INE sets up a public consultation meeting to provide a chance of mutual understanding between the project proponent and the general public. The INE's experience so far implies that the major reason for the people to become suspicious about the environmental compatibility of the project is often attributed to the insufficient delivery of relevant information. Once enough information is disclosed, most conflicts are settled.

d.2 Regulation on EIA at State Level

The LGEEPA ensures that the local environmental authorities can establish their own EIA codes or regulations. The EIA of states tends to be a replica of the federal one, although their EIA execution is often hampered for lack of adequate technical competence, human resources and financial resources. The following describes the EIA system adopted in the State of Mexico as an example of EIA at State level.

The requirement for EIA to development projects proponents is given by the Law of the Environmental Protection for Sustainable Development of the State of Mexico (*Ley de Protección al Ambiente para el Desarrollo Sustentable del Estado de México*). The details of EIA are further established by a regulation under this law in the matter of environmental impact and risk (*Reglamento de Ley de Protección al Ambiente del Estado de México, en Materia de Impacto y Riesgo Ambiental*).

According to this regulation, the Secretariat of Ecology (*Secretaría de Ecología*) of the State of Mexico is responsible for EIA. Projects of the following categories, among others, are subject to the EIA procedure of the state.

- Installation and operation of a confinement or treatment center for medical wastes or industrial wastes within the state's competence.

- Installation and operation of transfer stations, treatment plants and final disposal sites for municipal solid wastes.

During the EIA process, the municipalities may be involved through an agreement of coordination.