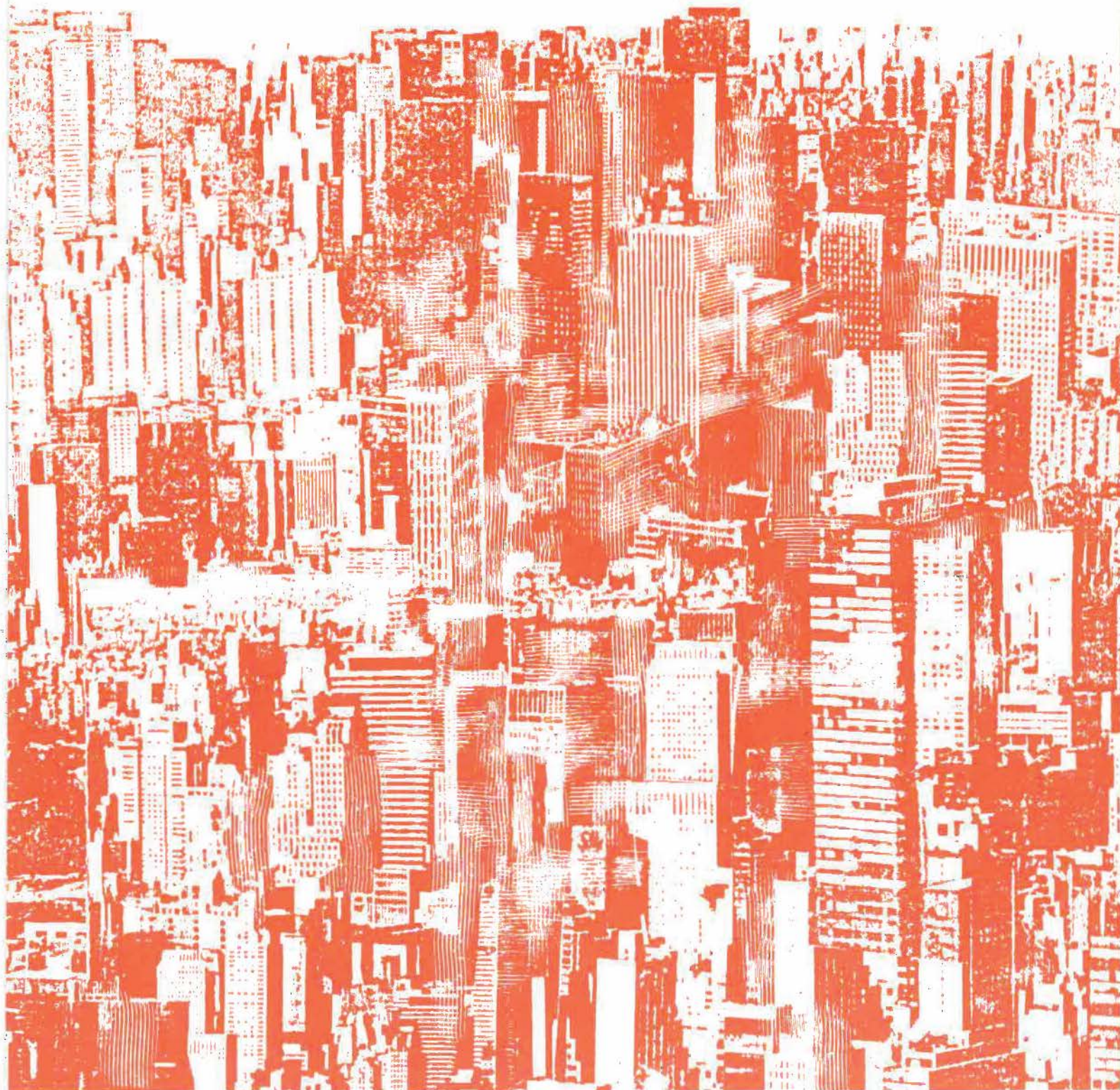




United Nations

Population Growth and Policies in Mega-Cities

MEXICO CITY



Department of International Economic and Social Affairs

POPULATION POLICY PAPER NO. 32

Population Growth and Policies in Mega-Cities

MEXICO CITY



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NOTE

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PREFACE

The present publication is one in a series of studies being prepared by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat which focus on the population policies and plans of a number of mega-cities in developing countries. In order to yield a set of cities with adequate representation of the major geographical regions, a cutoff figure of 8 million inhabitants by the year 2000 was chosen for the cities to be included in the initial phase of the mega-city series.

The object of the series is to examine the formulation, implementation and evaluation of the population policies of mega-cities from a broad perspective, emphasizing the reciprocal links between population and development in the spirit of the World Population Plan of Action.¹ The development of population policies to improve the standard of living and the quality of life of the inhabitants of the world's largest cities is a highly complex and multifaceted activity. It involves, for example, not only the analysis of migration trends, the preparation of population projections and the formulation of population distribution strategies but also the provision of cost-effective urban infrastructure (e.g., housing, water, sewerage, transportation and health and educational facilities), the monitoring and creation of employment, the assembly of urban land for development projects, the improvement of municipal revenue-raising mechanisms and the establishment of effective institutional arrangements for planning and managing urban growth.

Each of the technical papers in the series follows a common format consisting of five major sections. Section I provides basic information on demographic trends and reviews the use of demographic data in planning for rapidly growing urban populations. Section II presents background information on the city's economic base, the spatial structure of the metropolitan region and the sectoral and spatial distribution of jobs, all of which are crucial to a proper understanding of how population distribution strategies operate. Section III reviews early

decentralization strategies and how they were evaluated and revised by local planners and then examines current population distribution strategies for the metropolitan region. Section IV deals with a number of key issues and sectors—the labour market, urban land, housing, water supply and so on—from the perspective of planning for rapidly growing urban populations and managing urban growth. Wherever possible, attention is given in that section to the extent to which various sectoral policies may have served as implicit spatial policies that reinforced or perhaps counteracted explicit spatial goals. Finally, section V examines the sectoral distribution of public investment and how that investment has influenced the achievement of spatial goals, how individual cities have generated revenue for municipal projects and what types of institutional arrangements have been established to plan for and manage urban growth.

To date, reports issued in the *Population Growth and Policies in Mega-Cities* series are:

BANGKOK	(ST/ESA/SER.R/72)
BOMBAY	(ST/ESA/SER.R/67)
CAIRO	(ST/ESA/SER.R/103)
CALCUTTA	(ST/ESA/SER.R/61)
DELHI	(ST/ESA/SER.R/68)
DHAKA	(ST/ESA/SER.R/69)
JAKARTA	(ST/ESA/SER.R/86)
KARACHI	(ST/ESA/SER.R/77)
MADRAS	(ST/ESA/SER.R/75)
METRO MANILA	(ST/ESA/SER.R/65)
SEOUL	(ST/ESA/SER.R/64)

NOTES

¹ See *Report of the United Nations World Population Conference, 1974, Bucharest, 19-30 August 1974* (United Nations publication, Sales No. E.75.XIII.3), chap. 1, and *Report of the International Conference on Population, 1984, Mexico City, 6-14 August 1984* (United Nations publication, Sales No. E.84.XIII.8 and Corr. 1 and 3), chap. I, sect. B.

CONTENTS

	<i>Page</i>
Preface	iii
Explanatory notes/Abbreviations	vi
INTRODUCTION	1
<i>Chapter</i>	
I. DEMOGRAPHIC CHARACTERISTICS	
A. Population growth	3
B. Migration	5
C. Population projections	7
II. THE ECONOMY	
A. Historical background and development of the city's economic base	9
B. Recent performance of the economy	9
C. Spatial structure of the metropolitan region	10
D. The sectoral and spatial distribution of jobs	11
E. The city in the regional and national urban context	13
III. DECENTRALIZATION AND LOCATION	
A. The evolution of spatial strategies	14
B. Current spatial strategies	16
IV. ISSUES AND SECTORS	
A. The labour market	18
B. Urban land	18
C. Housing	20
D. Water supply and environmental problems	21
E. Power	24
F. Health and education	25
G. Transport	25
V. RESOURCES AND MANAGEMENT	
A. Public investment	28
B. Resource generation	28
C. The institutional context	29
CONCLUSION	31
REFERENCES	33

LIST OF TABLES

<i>No.</i>	<i>Page</i>
1. Mexico City Metropolitan Zone: total population and growth rates by successive rings, 1940-1980	4
2. Crude birth rates and crude death rates, 1950-1980	6
3. Mexico City Metropolitan Zone: persons employed in the Federal District and contiguous municipalities in the State of Mexico, by industrial group, 1975 and 1985	12

MAP

Mexico City Metropolitan Zone	2
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Explanatory notes

Symbols of United Nations documents are composed of capital letters combined with figures.

Reference to "dollars" (\$) indicates United States dollars, unless otherwise stated.

The term "billion" signifies a thousand million.

Annual rates of growth or change refer to annual compound rates, unless otherwise stated.

A hyphen between years (e.g., 1984-1985) indicates the full period involved, including the beginning and end years; a slash (e.g., 1984/85) indicates a financial year, school year or crop year.

A point (.) is used to indicate decimals.

The following symbols have been used in the tables:

Two dots (..) indicate that data are not available or are not separately reported.

A dash (--) indicates that the amount is nil or negligible.

A hyphen (-) indicates that the item is not applicable.

A minus sign (-) before a number indicates a deficit or decrease, except as indicated.

Details and percentages in tables do not necessarily add to totals because of rounding.

The following abbreviations have been used in this report:

AIDS	acquired immunodeficiency syndrome
AURIS	Institute for Urban Action and Social Integration
BANOBRAS	National Bank of Public Works and Services
CELADE	Centro Latinoamericano de Demografia (Latin American Demographic Centre)
CONAPO	Consejo Nacional de Poblacion (National Population Council)
COPLADES	State Development Planning Councils
DDF	Department of the Federal District
FIFAPA	Financial Investment Fund for Drinking Water and Sewerage
FONHAPO	Low Cost Housing Fund
FOVI	Housing Operations Fund
FOVISSSTE	Housing Fund of the Social Security Institute for State Employees
GATT	General Agreement on Tariffs and Trade
GDP	gross domestic product
IMF	International Monetary Fund
IMSS	Mexican Social Security Institute
INEGI	National Statistical Institute
INFONAVIT	Workers' Housing Fund
ISSSTE	Social Security Institute for State Employees
MCMZ	Mexico City Metropolitan Zone
PEMEX	Petroleos Mexicanos
RHP	Popular Housing Renewal Agency
SEDUE	Ministry of Urban Development and Ecology
SPP	Ministry of Programmes and Budgeting
UNAM	National Autonomous University of Mexico
UNEP	United Nations Environment Programme
WHO	World Health Organization

INTRODUCTION

With a population of some 18 million inhabitants in 1986, Mexico City is currently the world's largest city. It has been growing at a rate of 4.4 per cent per annum and is expected to reach 25 to 27 million inhabitants by the end of the century. Mexico City frequently has been cited by journalists throughout the world as an example of urban pathology, or of what the future may hold for other cities in developing countries that fail to control rapid urban growth. Certainly, Mexico City has many complex problems. Crude population densities are high in Mexico City relative to other world cities, being slightly higher than Tokyo, double that of metropolitan New York, triple that of Paris and four times that of London (Ward, 1990). The city has been receiving roughly 500,000 migrants per annum in recent years, leading to the spawning of new and almost totally unserviced squatter settlements on the periphery (described as the "urban stain"). Between 1940 and 1970 the built-up area of the city grew almost seven times. As the city has spread continuously outward, enveloping neighbouring municipalities in the State of Mexico, thousands of hectares of agricultural and forest land have been consumed each year. In 1989 the built-up area extended over an area of approximately 1,250 square kilometres (see map).

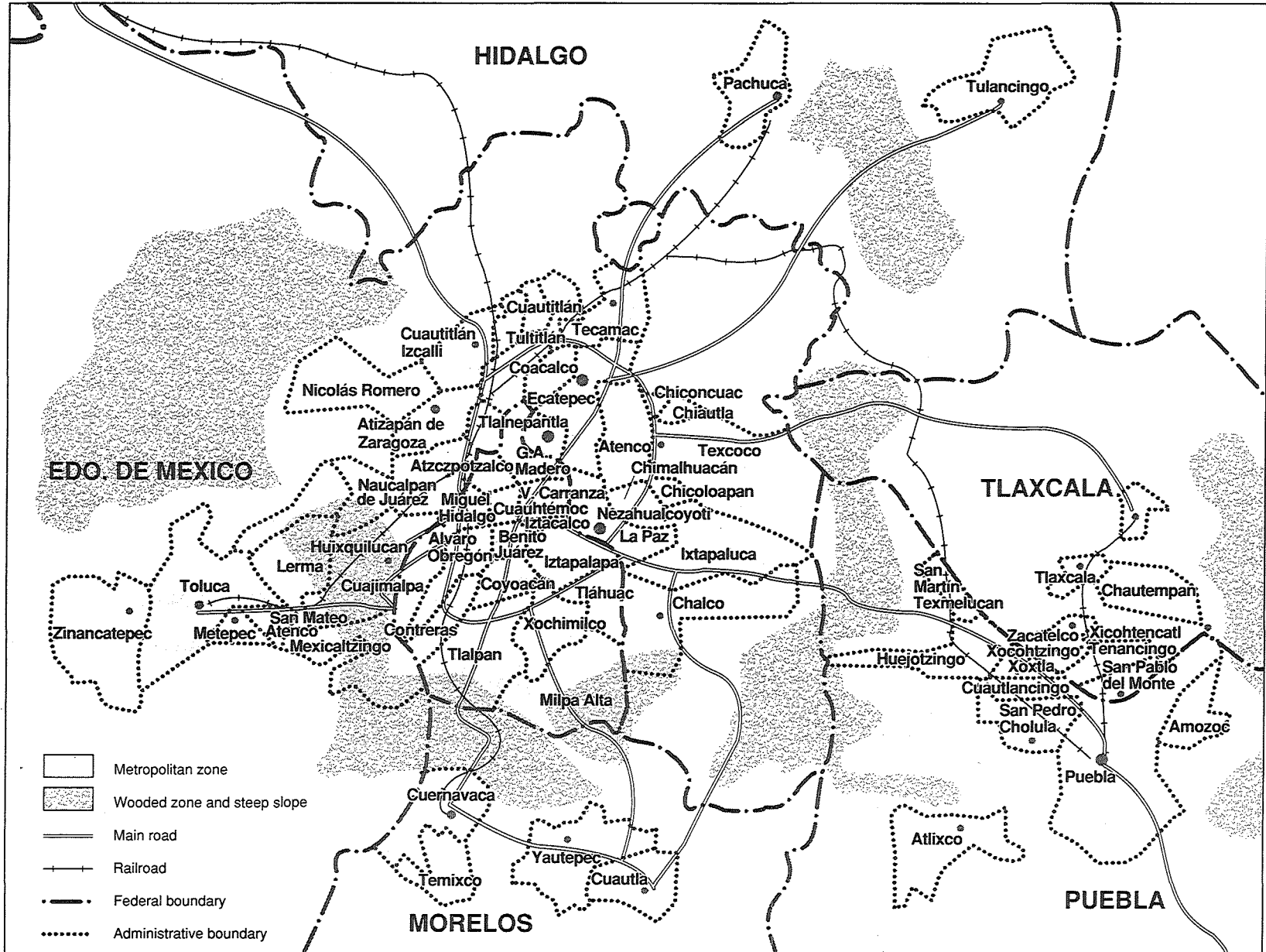
Mexico City lies in a water-short high mountain valley whose natural hydraulic system has been irreversibly altered. What little water can be pumped from the earth has caused the city to sink at a rapid rate. Mexico City's population growth long ago passed the city's ability to process sewage, and the 1985 earthquake made the situation even worse by damaging some sections of the system. While the city is generally clean relative to other developing country mega-cities, inefficiencies in the system lead to wastes accumulating in back streets or at clandestine tips. Indeed, it is estimated that at least one quarter of the more than 10,000 tons of solid waste generated daily is dumped illegally or remains in the streets.

Traffic congestion is one of Mexico City's most intractable problems, resulting in a substantial loss of economic productivity. Little capacity remains for traffic growth in the inner city, yet the population and car ownership continues to rise. Traffic growth is even faster outside the Federal District, where much of the expansion is taking place and where there is no metro.

Mexico City's most serious environmental problem is atmospheric pollution, which is estimated to have increased by 150 per cent over the past 10 years. Motor vehicle emissions—which are a more serious problem at high altitudes because the thin air makes automobile engines produce about twice as much carbon monoxide—are a major contributor to air pollution. Pollution from the city's some 35,000 factories is also significant. In fact, some would argue that the whole of the Mexico City Metropolitan Zone constitutes a negative externality, such is the generalized way in which everyone is affected by the problems associated with living in conditions of high levels of atmospheric pollution, the lack of adequate servicing for many, small amounts of green space, long journeys to work, and so forth (Ward, 1990).

The Government of Mexico, although faced with severe economic problems, has identified the problem of reversing the historical tendency towards concentration of population and economic activity in Mexico City as one of the most important national problems to be resolved. Although Mexico is a country with a long history of spatial planning, a major problem has been the fact that each administration prepared its own plans, often with a lack of continuity. Spatial policy instruments generally have been weak. Moreover, long-standing high levels of subsidies have served as implicit spatial policies, counteracting the goals of the Government's explicit spatial policies.

MAP 1. Mexico City Metropolitan Zone



I. DEMOGRAPHIC CHARACTERISTICS

A. POPULATION GROWTH

With a population of some 60,000 inhabitants on the eve of the Spanish conquest, México-Tenochtitlán experienced a devastating smallpox epidemic in 1520 and began its existence as a colonial city with only about 30,000 inhabitants, including Spanish settlers. Mexico City grew very slowly, reaching 50,000 inhabitants in 1689 and 105,000 in 1790, doubling its population in a little more than a hundred years. By 1900, nearly four centuries after the Spanish conquest, the city had a population of only 344,000 inhabitants (Moreno Toscano, 1973).

The spectacular growth of Mexico City¹ during the twentieth century took place in a context of rapid national population growth, in which the doubling time of Mexico's population was reduced from 50 to about 20 years. Migration was more important than natural increase, however, in fuelling Mexico City's population growth. It is estimated that between 1940 and 1970 some 6.2 million persons moved out of rural areas of Mexico, with about half of them migrating to Mexico City (Ibarra and others, 1986). From 1.6 million inhabitants in 1940, Mexico City's population increased to 2.9 million in 1950, 5.2 million in 1960, 8.9 million in 1970, 14.4 million in 1980, and to about 18 million in 1986, while that of the larger Mexico City Metropolitan Zone (MCMZ) increased to 18.6 million (Departamento del Distrito Federal, 1987b). In the process, the urbanized area of MCMZ spread steadily outward, encompassing successive municipalities in the State of Mexico. Whereas in 1970 Mexico City consisted of the Federal District plus eight municipalities in the State of Mexico, by 1980 it encompassed 12 municipalities in the State of Mexico. In 1986 it included 17 municipalities in the latter state.

Although Mexico City has had steadily larger annual increments to its population, the rate of population growth has been declining. Having grown by over 5 per cent per annum for more than half a century (by 5.6 per cent per annum between 1940 and 1950, 5.2 per cent between 1950 and 1960, 5.6 per cent between 1960 and 1970, and by around 5 per cent between 1970 and 1980), the city is currently estimated to be growing at a rate of 4.4 per cent per annum. It is estimated that about 80 per cent of the

decline in Mexico City's population growth is attributable to a decline in natural increase and 20 per cent to a decline in net migration (CONAPO, 1984a).

Aggregate growth rates are somewhat misleading, however, for the different parts of the metropolitan area have been growing at very different rates (table 1). The average annual rate of growth of the Federal District declined from around 4.6 per cent during 1950-1960 to 3.4 per cent during 1960-1970 and to 2.2 per cent during 1970-1980. In contrast, the 17 contiguous municipalities in the State of Mexico that make up part of MCMZ grew by 8.1 per cent during 1950-1960, 12.2 per cent during 1960-1970 and by 8.3 per cent during 1970-1980. The magnitude of their growth is quite astounding. Whereas the contiguous municipalities had a total population of only about 500,000 in 1960, they had grown to more than 5 million inhabitants by 1980. As a result, there has been a significant shift in the relative weight of the different parts of the metropolitan area. Whereas 90 per cent of the population of the metropolitan area resided in the Federal District in 1960, the proportion had fallen to 64 per cent by 1980. Currently, only 55 per cent of the population of the metropolitan area (10.3 million inhabitants) reside in the Federal District. The remaining 45 per cent, or 8.4 million inhabitants, reside in the contiguous municipalities in the State of Mexico. By the end of the century, the contiguous municipalities are expected to surpass the share of the Federal District.

In regard to other demographic parameters, average life expectancy at birth has increased substantially. Between 1940 and 1980, life expectancy in the Federal District increased from 41 to 66 years for males and from 47 to 72 years for females (Departamento del Distrito Federal, 1984). The crude death rate for the Federal District declined by 5.2 per thousand between 1950 and 1980—from 12.6 to 7.4 per thousand (table 2). However, 12 of the delegations in the Federal District experienced steeper declines than the average, probably reflecting the benefit of their more recent integration into the health-care system (Partida, 1987). The contiguous municipalities in the State of Mexico experienced a decline of 10 per thousand between 1950 and 1980—from 17.2 to 7.2 per thousand. Once again, six municipalities that experienced particularly high mortality during the 1950s had even more significant

TABLE 1. MEXICO CITY METROPOLITAN ZONE: TOTAL POPULATION AND GROWTH RATES BY SUCCESSIVE RINGS, 1940-1980

Territorial unit	Total population					Growth rates			
	1940	1950	1960	1970	1980	1940-1950	1950-1960	1960-1970	1970-1980
<i>Metropolitan Zone</i>	1 644 921	3 135 673	5 381 153	9 210 853	14 420 454	6.7	5.6	5.5	4.6
<i>Central city</i>	1 448 422	2 249 221	2 829 756	3 002 984	2 686 499	4.5	2.3	0.6	-1.1
<i>First ring</i>	183 340	32 107	2 199 556	4 874 557	7 636 474	15.8	10.2	8.3	4.6
<i>Delegations in FD</i>	183 340	832 107	2 107 626	3 835 501	5 480 163	--	--	--	--
Alvaro Obregón	32 313	133 200	291 272	525 521	664 256	--	--	--	--
Azcapotzalco	63 000	199 732	394 381	568 599	623 433	--	--	--	--
Coyoacán	35 248	73 020	165 918	334 874	621 193	--	--	--	--
Gustavo A. Madero	41 567	308 002	743 043	1 282 280	1 569 714	--	--	--	--
Iztacalco	11 212	39 529	211 964	503 066	591 445	--	--	--	--
Iztapalapa	--	78 624	280 625	582 197	1 315 063	--	--	--	--
Cuajimalpa	--	--	20 423	38 964	95 059	--	--	--	--
<i>Municipalities in State of Mexico</i>	--	--	91 930	1 039 056	2 156 311	--	--	--	--
Naucalpan	--	--	91 930	428 788	759 457	--	--	--	--
Nezahualcóyotl	--	--	--	610 268	1 396 854	--	--	--	--
<i>Second ring</i>	13 159	54 345	351 841	1 321 813	3 295 903	15.2	20.5	14.1	9.6
<i>Delegations in FD</i>	13 159	23 343	183 132	453 155	943 868	--	--	--	--
Magdalena Contreras	13 159	23 343	43 306	104 591	179 986	--	--	--	--
Tlalpan	--	--	65 080	156 377	384 613	--	--	--	--
Xochimilco	--	--	74 746	124 694	226 208	--	--	--	--
Tláhuac	--	--	--	67 493	153 061	--	--	--	--
<i>Municipalities in State of Mexico</i>	--	31 002	168 709	868 658	2 352 535	--	--	--	--
Tlalnepantla	--	31 002	112 769	407 290	809 967	--	--	--	--
Chimalhuacán	--	--	12 176	21 485	64 510	--	--	--	--
Ecatepec	--	--	43 764	244 647	819 478	--	--	--	--
Atizapán de Zaragoza	--	--	--	50 183	211 624	--	--	--	--
Coacalco	--	--	--	14 617	102 204	--	--	--	--
Huixquilucan	--	--	--	36 380	81 395	--	--	--	--
La Paz	--	--	--	36 059	103 765	--	--	--	--
Tultitlán	--	--	--	57 997	142 625	--	--	--	--
Atenco	--	--	--	--	16 467	--	--	--	--
Cuautitlán Izcalli	--	--	--	--	179 920	--	--	--	--
<i>Third ring</i>	--	--	--	11 499	801 578	--	--	--	--
<i>Delegation in FD</i>	--	--	--	--	55 706	--	--	--	--
Milpa Alta	--	--	--	--	55 706	--	--	--	--
<i>Municipalities in State of Mexico</i>	--	--	--	11 499	745 872	--	--	--	--
Cuautitlán de R. Rubio	--	--	--	11 499	41 296	--	--	--	--
Chalco	--	--	--	--	81 532	--	--	--	--
Chiautla	--	--	--	--	10 646	--	--	--	--
Chicoloapan	--	--	--	--	28 548	--	--	--	--
Chiconcuac	--	--	--	--	11 395	--	--	--	--
Ixtapaluca	--	--	--	--	81 043	--	--	--	--
Nicolás Romero	--	--	--	--	117 338	--	--	--	--
Tecámac	--	--	--	--	87 954	--	--	--	--
Texcoco	--	--	--	--	106 200	--	--	--	--

Source: *Atlas de la ciudad de México*, Gustavo Garza, ed. (México, D.F., Departamento del Distrito Federal y El Colegio de México, 1987), p. 128, table 4.10.

declines. Infant mortality declined from 132.3 to 74.5 per thousand live births between 1950 and 1970 (Ibarra and others, 1986).

In the mid-1970s the principal causes of death in Mexico City were heart ailments, followed by accidents and malignant tumours (Departamento del Distrito Federal, 1987a). Whereas causes of death in Mexico City increasingly resemble the pattern in developed countries, morbidity is largely attributable to preventable diseases, e.g., to respiratory infections and diarrhoeal diseases. As of January 1989, Mexico City had 1,750 registered cases of acquired immunodeficiency syndrome (AIDS).

There are significant mortality differentials within the metropolitan area. The residents of the eastern low-income settlements such as Nezahualc6yotl are especially prone to intestinal infections brought about by poor sanitation and unsafe water. Residents of working-class neighbourhoods in the central city suffer from especially high rates of respiratory diseases due to cramped housing conditions and high levels of pollution (Ward, 1990).

Whereas the crude birth rate in MCMZ remained nearly constant up to the 1960s—at around 45 per thousand—it subsequently declined, reaching 37 per thousand during 1970-1980. Once again, there are significant differentials within the metropolitan area. Of the 33 units (16 delegations and 17 municipalities) that comprise the metropolitan area, 12 had fertility levels during the 1970s that were higher than the national average—indicating that they were at an earlier stage in the demographic transition (Partida, 1987). In the Federal District, three of the four central delegations (Cuauht6moc, Benito Ju6rez and Miguel Hidalgo) had the lowest crude birth rates (table 2). In the State of Mexico, Naucalpan, which was the first municipality to be integrated into the metropolitan area, had the lowest crude birth rate, whereas the most recently incorporated municipalities (Cuautil6n, Huixquilucan and Tec6mac) had the highest. In 1979 the total fertility rate for the Federal District was 2.75, not much above replacement level, which is 2.2, given Mexico's mortality conditions (World Bank, 1984). Comparable information is not available at present for the entire urban area.

Mexico City's youthful age structure has been growing younger as a result of continuing in-migration of young adults. During 1980-1985 nearly 70 per cent of the population was under the age of 30, compared to 65 per cent in 1960 (Departa-

mento del Distrito Federal, 1987). Four per cent of the population was over 65—up from 3.4 per cent in 1960.

B. MIGRATION

Mexico City has been a magnet for migrants since around 1940. According to the 1980 census, some 2.53 million persons, or 29 per cent of the total population of the Federal District, had been born outside the Federal District. About 1.89 million persons were recorded as having changed their state of residence (7 per cent within the previous year, 17 per cent within one to four years, and 70 per cent within five years or longer, with 6 per cent unclassified) and therefore were classified as migrants. Taking into account migrants whose previous place of residence could be determined (about 85 per cent of the total), a clear pattern emerged with regard to the major sending areas. More than a third of migrants (36 per cent) came from six states in the central region, a region that is among the poorest in the nation (11.5 per cent were from the State of Mexico, 8.5 per cent from Puebla, 7 per cent from Hidalgo, 5 per cent from Morelos, and 2 per cent each from Tlaxcala and Quer6taro). The four other important sending states, which together accounted for nearly 30 per cent of the total, were two relatively poor states in the south of Mexico—Veracruz (8 per cent) and Oaxaca (7 per cent), as well as Guanajuato and Michoac6n (7 and 6 per cent, respectively).

While the states encircling the Federal District have continued to be important sending areas, they have grown in importance as receiving areas. In addition to a significant amount of interregional migration, there has been a stepped-up deconcentration of population from the Federal District towards the periphery of MCMZ. The rapid suburbanization of the population of Mexico City initially surprised Mexican demographers. Whereas the total population of the Federal District was estimated to be 9.37 million in 1980, when the 1980 census results were tabulated the population of the Federal District was found to be 8.83 million, about 540,000 less than estimated (CONAPO, 1984a).² Some of the discrepancy was explained by a more rapid than anticipated decline in natural increase. However, the remainder was explained by the fact that there had been significant out-migration over the decade to outer areas of MCMZ. According to the 1980 census, a total of 1.2 million persons in the 12 municipalities in the State

TABLE 2. CRUDE BIRTH RATES AND CRUDE DEATH RATES, 1950-1980

Territorial unit	Crude birth rate			Crude death rate		
	1950-1960	1960-1970	1970-1980	1950-1960	1960-1970	1970-1980
Alvaro Obregon	46.7	43.0	37.5	11.0	7.0	5.5
Azcapotzalco	48.0	44.5	38.8	13.0	9.6	7.7
Benito Juárez	39.9	37.5	32.6	11.9	10.5	8.3
Coyoacán	44.9	41.9	36.5	11.1	7.2	5.7
Cuajimalpa	52.8	49.2	42.9	17.4	12.2	9.7
Cuauhtémoc	40.7	35.8	31.1	12.5	11.4	9.0
Gustavo A. Madero	47.9	44.9	39.1	12.9	9.5	7.6
Iztacalco	47.9	43.9	38.2	12.4	7.4	5.9
Iztapalapa	45.7	46.1	40.2	12.9	7.7	6.1
Magdalena Contreras	50.8	47.9	41.7	17.3	12.0	9.5
Miguel Hidalgo	41.4	40.3	35.1	12.2	10.9	8.6
Milpa Alta	45.7	42.9	37.4	17.7	12.7	10.1
Tiáhuac	50.9	44.4	38.7	16.6	11.2	8.9
Tlalpan	42.8	41.0	35.7	11.1	7.4	5.9
Venustiano Carranza	47.4	42.4	36.9	13.1	9.8	7.8
Xochimilco	45.0	41.9	36.5	13.3	8.5	6.7
Federal District	44.4	41.7	36.9	12.6	9.6	7.4
Atizapán de Zaragoza	47.6	37.9	35.4	15.3	11.1	7.9
Coacalco	47.9	42.0	39.3	21.6	11.6	8.3
Cuautitlán/Cuautitlán Izcalli	52.6	46.4	43.4	20.4	11.3	8.1
Chalco	45.8	37.4	35.0	15.5	9.1	6.5
Chicoloapan	45.8	37.4	35.0	15.5	9.1	6.5
Chimalhuacán/Nezahualcóyotl	45.8	37.4	35.0	15.5	9.1	6.5
Ecatepec	51.7	41.1	38.5	15.8	9.2	6.6
Huixquilucan	54.6	47.7	44.6	20.3	14.6	10.4
Ixtapaluca	45.8	37.4	35.0	15.5	9.1	6.5
Naucalpan	43.8	38.2	35.7	14.4	10.5	7.5
Nicolás Romero	47.6	37.9	35.4	15.3	11.1	7.9
La Paz	45.8	37.3	35.0	15.5	9.1	6.5
Tecámac	52.6	46.4	43.4	20.4	11.3	8.1
Tlalnepantla	45.5	41.8	39.1	19.6	10.6	7.6
Tultitlán	51.1	43.6	40.8	21.5	11.5	8.2
Contiguous municipalities	47.4	39.7	37.2	17.2	10.1	7.2
MCMZ	44.7	41.4	37.0	12.9	9.7	7.3

Source: *Atlas de la ciudad de México*, Gustavo Garza, ed. (México, D.F., Departamento del Distrito Federal y El Colegio de México, 1987), p. 129, table 4.11.

of Mexico that then constituted part of Mexico City were classified as migrants. Of that number, more than half had resided previously in the Federal District.

Regarding the sex selectivity of migrants, a recent World Bank study noted that the scanty data available suggested that two opposite flows were occurring: one, dominated by women, towards the centre of the region; the other, consisting largely of families, moving out from the centre. Although it is not clear what lies behind these migration differences by sex, the World Bank report noted that the data suggested that a national policy of creating jobs outside the central region to divert migrants away from it should concentrate on those industries and occupations that employ mostly women (World Bank, 1984).

C. POPULATION PROJECTIONS

There was considerable variation in the magnitude of population projections prepared during the 1970s—with projections made by Mexican demographers tending to be on the low side and those made by demographers in international organizations tending to be somewhat on the high side. One report noted that, assuming a 50 per cent reduction in migration compared to the previous decade, Mexico City's population was likely to be 35 million by the year 2000, representing 26 per cent of the country's projected population, and even that might be a conservative estimate (World Bank, 1977). The United Nations (1979) projected a population of 31 million by the year 2000. In recent years, however, projections of Mexico City's population have converged, with most now assuming a population of 25 to 27 million by the end of the century.

In 1984 the National Population Council (CONAPO) prepared three alternative population projections (CONAPO, 1984a). The high variant assumed a continuation of the present trend and the low variant anticipated at least partial success of the Government's decentralization policies. More specifically, assuming a continuation of the trend of 5 per cent average annual growth observed during 1970-1980, the high variant projected a population of 35 million in MCMZ by the year 2000. As for the Federal District, the high variant assumed an average annual rate of growth of 3 per cent by 1988, declining to 2.6 per cent by the end of the century, and resulting in a population of about 17 million by the year 2000.

CONAPO's low-variant projection was based upon the assumption that the Government's Development Programme for the Mexico City Metropolitan Zone and the Central Region (1983) would gradually induce decentralization, and that the National Population Programme would bring about a further decline in natural increase. Extrapolating from CONAPO's target of 2.5 per cent annual population growth at the national level,³ the low-variant projection assumed a rate of growth of 2.6 per cent for MCMZ by 1988, which would decline to 1.6 per cent by the year 2000, resulting in a population of 23.4 million, or 35 per cent less than the population projected in the high variant. The corresponding projection for the Federal District was 13.7 million. In the medium variant, which assumed that natural increase would decline as in the low variant, but that there would be no significant decline in net migration, the population of MCMZ was projected to reach 26.9 million by the end of the century and that of the Federal District to reach 14.8 million (CONAPO, 1984a).

In 1985 CONAPO prepared a series of revised population projections. Its so-called "policy" projection (i.e., something hoped for)—which was based on observed demographic trends up to 1985 and national demographic targets thereafter (of 1.9 per cent per annum by 1988 and of about 1 per cent by the year 2000)—forecast a population of around 11 million for the Federal District and of about 23 million for Mexico City in the year 2000. In the alternative "tendency" (i.e., extrapolated) projection, which was based on slightly higher fertility assumptions, the population of the Federal District was projected to reach 11.5 million (Martínez García, 1985).

The Department of the Federal District (DDF) prepared its own series of population projections in 1986. Although there were periodic consultations between demographers at CONAPO and officials in the Department, the two organizations decided to stand behind their respective population forecasts. Assuming a rate of population growth of 1.5 per cent per annum for the Federal District, and of 4.8 per cent for the surrounding municipalities in the State of Mexico, Mexico City's population was projected to reach 27.3 million in the year 2000, with 12.7 million inhabitants residing in the Federal District and 14.6 million in the municipalities in the State of Mexico.

According to projections of MCMZ—as defined in the Development Programme for the Mexico City Metropolitan Zone and the Central Region to include the Federal District, 53 municipalities in the State of Mexico and one in the State of Hidalgo—

MCMZ is projected to have a population of 23.5 million in the year 2000 and 26.7 million in 2010. The Federal District is projected to have a population of 12.1 million in the year 2000 and 13.3 million in 2010 (Partida, 1987). These projections are based on CONAPO's assumptions of a sharp decline in fertility and lower in-migration. The Plan for the Regional Ordering of the Metropolitan Area of the State of Mexico (1988) projected a population of 31 million for the year 2010 (12.2 million in the Federal District, 15.6 million in the 17 contiguous municipalities, and 3.3 million in the non-contiguous municipalities in the State of Mexico).

In planning for one of the world's largest mega-cities, a major problem has been the absence of a data base for the metropolitan zone. Currently, MCMZ exists only as a ghost region. Although officials at the National Statistical Institute and at the Ministry of Programmes and Budgeting (SPP) have long been aware of the need to construct a data base for the metropolitan zone and the central region, data for the Federal District and for the 17 municipalities in the State of Mexico that constitute part of Mexico City remain disaggregated.

II. THE ECONOMY

A. HISTORICAL BACKGROUND AND DEVELOPMENT OF THE CITY'S ECONOMIC BASE

Built on an island in Lake Texcoco in the early fourteenth century, the Aztec city of Tenochtitlán was the largest city in the Americas. Rebuilt after the Spanish conquest, Mexico City served as the political, administrative and financial centre of a major part of Spain's colonial empire.

During the third quarter of the nineteenth century, Mexico City underwent a rapid process of modernization, spurred by a massive influx of foreign capital. The city's industrial development was facilitated by the fact that it had the country's best infrastructure, largest consumer market, a concentration of the few existing industries, and a relatively well-trained labour force. Moreover, the broadening of geographic markets through the expansion of the rail network, for which Mexico City served as the primary hub, greatly stimulated the city's manufacturing sector.

Mexico's industrial development was disrupted during the revolutionary period (1911-1920), but by the late 1930s it began a period of sustained growth. Partly because of post-revolutionary ideology, there was a reversal of the previous emphasis on external trade and a drive to develop a sufficiently large domestic market to absorb the output of domestic industry. This internalization of Mexico's development process had profound effects on the growth of Mexico City, which offered the greatest potential for the location of new manufacturing activity.

After 1940 the Government's policies for the agricultural sector, which strongly favoured large-scale irrigation agriculture, accelerated the break-up of small-holding agriculture throughout rural Mexico, releasing scores of thousands of agricultural labourers who migrated to Mexico City (Arizpe, 1981).

Between 1940 and 1970, Mexico's economy grew by more than 6 per cent per annum, largely based on expansion of the private sector. This Mexican "miracle" was the outcome of an exchange rate policy and a national economic development strategy that greatly favoured investment conditions in manufacturing—a sector that grew by more than 8 per cent per annum (Ward, 1990). The impact of national economic growth was felt disproportionately in Mexico City. Public policy acted to further concentrate industrial production in Mexico City

throughout this period. The city was especially favoured in its access to electricity generation, oil and other power sources, the provision of water and drainage facilities, and was the focus of major road investment programmes (Ward, 1990).

The number of industrial units in Mexico City increased from 3,180 in 1930 to 34,543 in 1973, rising from 3.8 per cent to 29 per cent of the country's total (Schteingart, 1989). The most important industrial activities undertaken in the city include the manufacture of clothing, furniture and repairs, publishing activities, production of rubber, plastic and metal goods, as well as the assembly and repair of electrical goods. The city also generates a large number of transformation industries oriented towards the local market—consumer durables such as food, beverages, shoes, petrol and gas refining. Most of this production is for a national and local market rather than oriented towards global markets (Ward, 1990). Although the Federal District still contains the country's largest industrial plant, new industrial enterprises are gradually suburbanizing, through the deconcentration of new establishments and formal sector jobs away from the central city to the outer fringes.

B. RECENT PERFORMANCE OF THE ECONOMY

Mexico began to experience severe balance of payments problems in 1976. Aided by increasing oil production and prices, economic activity rebounded during 1978-1981. However, high growth in government expenditure, an economic slowdown in the industrial countries, and higher international interest rates combined to produce a large deterioration in the fiscal and balance of payments accounts by 1981 (Kalter and Khor, 1990). The situation deteriorated further in 1982, to the point that the Government announced its inability to service fully the country's external debt. In late 1982, a new administration under President Miguel de la Madrid adopted an adjustment programme.

During the period 1983-1988, the Government undertook a number of bold changes in Mexico's economic structure, mainly in the direction of opening up the economy. Foreign investment rules were somewhat relaxed, permitting more than 51 per cent foreign ownership on a case-by-case basis. In

the fall of 1985 the Government became a Party to the General Agreement on Tariffs and Trade (GATT)—a step that was seen as gradually lowering Mexico's trade barriers and opening its vast internal market to foreign companies. The Government also stepped up efforts to sell off some of its large network of unprofitable businesses and industries to the private sector. By mid-1986 the number of Government-owned companies had been cut from 1,150 to 690 through sales to the private sector, transfers to state governments, or outright closures. The Government also reduced capital expenditure, mainly on highways, hospitals and housing, and began phasing out subsidies on gasoline, electricity, mass transportation and basic foodstuffs (e.g., tortillas).

Despite these measures, Mexico continued to suffer from inflation and recession. The collapse of crude oil prices brought a sharp reduction in Mexico's foreign exchange earnings, thereby increasing the deficit, which became an even more powerful inflationary force. The rate of inflation was 81 per cent in 1983, 59 per cent in 1984, 64 per cent in 1985, 106 per cent in 1986 and 160 per cent in 1987 (Comisión de Conurbación del Centro del País, 1988b). The earthquake of September 1985 cost an estimated \$US 4 billion in damage and severely affected the tourist industry, which is the country's third largest source of foreign exchange.

In October 1986 Mexico received a large infusion of capital when foreign commercial banks agreed to lend it some \$US 6 billion, in addition to the \$6 billion in loans approved by the World Bank and the International Monetary Fund in July 1986. In an unusual step, the agreement also called for banks to provide \$1.7 billion in additional loans if Mexico's economy should falter. Moreover, the Government persuaded the bankers to reduce their interest rates, to extend the repayment period, and to allow Mexico's debt service costs to vary from year to year based on the price received for crude oil.

These efforts, aided by an increase in oil prices, led to a sizeable improvement in the balance of payments, allowing Mexico to enjoy a period of moderate economic growth in 1987. A generalized freeze through the end of 1988 was placed on wages and prices of a wide range of goods and services, as well as on the exchange rate. These measures dramatically reduced the 12-month inflation rate from 160 per cent at the end of 1987 to 52 per cent at the end of 1988 (Kalter and Khor, 1990).

The new administration under President Carlos Salinas de Gortari introduced a more comprehensive strategy in December 1988 to overcome the country's remaining economic problems, including the achievement of a medium-term solution to Mexico's debt problem. The International Monetary Fund (IMF) approved a three-year extended arrangement with Mexico in May 1989 for the amount of \$3.6 billion. Subsequently, the Paris Club creditors agreed to reschedule \$2.6 billion of Mexico's debt-service obligations. In support of its growth-oriented adjustment programme, the Government pressed for a multi-year financing package with commercial banks, which would involve debt and debt-service reduction operations sufficient to produce a substantial decline in the country's external debt.

As noted in a recent World Bank assessment (Kalter and Khor, 1990, p. 25):

"The results to date of the Government's efforts have been encouraging. Real GDP grew by almost 3 per cent in 1989, with indications of a similar growth rate for 1990. Correspondingly, private investment grew markedly in 1989, reflecting increased domestic savings and the inflow of private foreign capital. Inflation was reduced to less than 20 per cent during 1989, and a further reduction is expected in the medium term. Fiscal performance was strong in 1989, with the overall deficit declining in one year from 13 to 6 per cent of GDP. Mexico's overall balance of payments deficit in 1989 amounted to \$1 billion, after a deficit of almost \$7 billion in 1988."

C. SPATIAL STRUCTURE OF THE METROPOLITAN REGION

Partly surrounded by volcanic mountain ranges, Mexico City is located at an altitude of 2,240 metres in a sheltered mountain valley, which opens only to the north and south-east. Throughout the colonial period, Mexico City's spatial structure was roughly patterned on the original Aztec city of Tenochtitlán. It changed very little up to the middle of the nineteenth century. Following the divestment of the massive landholdings of the Catholic Church in 1856, and the consequent development of a real estate market, there were widespread changes in the city's spatial structure (Garza and Schteingart, 1978). During the last quarter of the nineteenth century, the city gradually became segregated into upper and lower class residential neighbourhoods. The newly opened zones to the north and east were settled

mainly by artisans and factory workers, while more affluent households moved to new subdivisions in the west.

During the 1940s new industries were established, mainly in the north, and attracted large numbers of rural migrants. In the 1950s the city began to grow beyond the limits of the Federal District into the State of Mexico. This process accelerated during the 1960s as the poor invaded large sections of the dried-up Texcoco lake bed. The most dramatic example of this process was the growth of Nezahualc6yotl, an illegal subdivision whose population grew from perhaps 65,000 in 1960 (its population was not recorded in the 1960 census) to around 600,000 in 1970 (Schteingart, 1989).

Since the 1970s the central city (comprised of the delegations of Benito Ju6rez, Cuauht6moc, Miguel Hidalgo and Venustiano Carranza) has experienced negative growth. Whereas the major concentration of non-residential activities (commerce, public administration, banking, higher education and health facilities) is in the central delegation of Cuauht6moc, other sub-centres of commercial and service activities have grown up in other areas of the Federal District. Large industrial plants, medium-sized factories and cottage industries are interspersed throughout the urban fabric.

Income groups continue to be segregated spatially within the metropolitan area. The urban poor are crowded into 500 *ciudades perdidas* ("lost cities") or scattered throughout some 50 *colonias populares* (low-income districts), mainly in the centre and to the north and east. The relatively affluent are mostly located in the southern and western sectors. The southern area of the Federal District remains largely rural and has been designated an ecological conservation zone.

Beyond the Federal District, a number of neighbouring municipalities in the State of Mexico have experienced extremely rapid population growth, mainly as a result of in-migration. The population of the 17 neighbouring municipalities as a whole increased from a total of around 500,000 inhabitants in 1960 to 5.4 million in 1988, increasing their share of the state's total population from 27.5 to nearly 70 per cent. Nezahualc6yotl's population grew to 1.34 million in 1980 and is now unofficially estimated to have more than 2 million inhabitants. Three other municipalities (Ecatepec, Tlanepantla and Naucalpan) had recorded populations of around 750,000 in the 1980 census, and are now considerably larger. Since the 1980s the wave of growth has run into the

more distant municipalities of Cuautitl6n, Tec6mac and Chalco. It is predicted that the population of Tec6mac will grow from around 156,000 in 1987 to over 1 million by the turn of the century (Ward, 1990).

Urban expansion at the periphery of the metropolitan region is incorporating well-established *pueblo* (town) cores (moving clockwise and starting in the north: Tepetzotlan, Coacalco, Chiconcuac, Chalco and Milpa Alta). As Ward (1990) notes, sub-centres in the city often built around old town centres have become important foci in people's daily lives, offering a large number of service functions that used to be concentrated almost exclusively in the old historic core. The city has become multi-centred, and people have adjusted to its growth by relating increasingly to a relatively small part.

The pattern of growth that has been occurring in MCMZ has involved extremely rapid growth of the order of 200 to 300 per cent over a decade, following which areas become saturated and then experience slower growth. The first ring around the central core grew at more than 8 per cent per annum during 1960-1970, slowing to 5 per cent during 1970-1980 (table 1). The second ring increased its rate of growth over the period 1960-1980 from 8 to more than 11 per cent per annum, whereas growth of the third ring increased from around 5 to 7 per cent per annum (Garza, 1986a). This pattern suggests that the next wave of explosive urban growth could jump the mountain valleys that surround Mexico City and engulf the outlying metropolitan areas. Indeed, since 1980 Mexico City has been gradually coalescing with the Toluca metropolitan area to the west. Whereas growth towards the north was impeded over the years by Lake Texcoco, the lake has been drying up, allowing urban-industrial expansion in a northward direction. During 1990-2000 it is expected that MCMZ will engulf the Cuernavaca-Cuautla and Puebla-Tlaxcala axes to the south and east. By 2010 it is even possible that Quer6taro could become part of a vastly expanded megalopolis (Garza, 1986a).

D. SECTORAL AND SPATIAL DISTRIBUTION OF JOBS

The National Survey of Urban Employment (Encuesta Nacional de Empleo Urbano, 1986) found that 42.5 per cent of workers in MCMZ were employed in services. The largest proportion of service workers were engaged in health care and educational activities, followed by financial services,

TABLE 3. MEXICO CITY METROPOLITAN ZONE: PERSONS EMPLOYED IN THE FEDERAL DISTRICT AND CONTIGUOUS MUNICIPALITIES IN THE STATE OF MEXICO, BY INDUSTRIAL GROUP*, 1975 AND 1985

	Total						Per cent					
	Federal District		State of Mexico		Total MCMZ		Federal District		State of Mexico		Total MCMZ	
	1975	1985	1975	1985	1975	1985	1975	1985	1975	1985	1975	1985
1.	60 163	78 690	15 723	27 488	75 886	106 178	12.2	12.8	6.8	8.5	10.5	11.3
2.	19 386	27 093	1 255	3 763	20 641	30 856	3.9	4.4	0.5	1.2	2.9	3.3
3.	1 511	1 344	0	0	1 511	1 344	0.3	0.2	0.0	0.0	0.2	0.1
4.	28 651	40 551	26 034	31 054	54 685	71 605	5.8	6.6	11.3	9.6	7.6	7.7
5.	57 674	55 308	9 563	13 511	67 237	68 819	11.7	9.0	4.1	4.2	9.3	7.4
6.	4 019	3 722	1 203	2 802	5 222	6 524	0.8	0.6	0.5	0.9	0.7	0.7
7.	13 511	17 512	4 213	6 306	17 724	23 818	2.7	2.9	1.8	2.0	2.5	2.5
8.	11 216	15 438	12 082	13 827	23 298	29 265	2.3	2.5	5.2	4.3	3.2	3.1
9.	31 749	41 507	3 207	4 910	34 956	46 417	6.4	6.8	1.4	1.5	4.8	5.0
10.	3 826	3 272	1 116	669	4 942	3 941	0.8	0.5	0.5	0.2	0.7	0.4
11.	8 104	10 600	4 065	6 798	12 169	17 398	1.6	1.7	1.8	2.1	1.7	1.9
12.	68 568	101 027	32 360	52 626	100 928	153 653	13.9	16.5	14.0	16.3	13.9	16.4
13.	545	2 958	786	996	1 331	3 954	0.1	0.5	0.3	0.3	0.2	0.4
14.	16 896	17 514	16 466	18 556	33 362	36 070	3.4	2.9	7.1	5.7	4.6	3.9
15.	17 009	15 394	12 153	23 533	29 162	38 927	3.5	2.5	5.3	7.3	4.0	4.2
16.	53 938	51 662	20 724	26 675	74 662	78 337	10.9	8.4	9.0	8.3	10.3	8.4
17.	22 928	29 648	14 795	22 371	37 723	52 019	4.7	4.8	6.4	6.9	5.2	5.6
18.	33 812	44 045	28 459	30 015	62 271	74 060	6.9	7.2	12.3	9.3	8.6	7.9
19.	23 123	35 634	21 604	31 396	44 727	67 030	4.7	5.8	9.4	9.7	6.2	7.2
20.	16 692	20 322	5 183	6 087	21 875	26 409	3.4	3.3	2.2	1.9	3.0	2.8
TOTAL	493 321	613 241	230 991	323 383	724 312	936 624	100.0	100.0	100.0	100.0	100.0	100.0

Source: J. V. Tovar, "Zona metropolitana de la ciudad de México: localización y estructura de la actividad industrial 1975-1985", *Estructura territorial de la ciudad de México*, Oscar Terrazas and Eduardo Preciat, eds, (Mexico, D.F. Plaza y Valdés, 1988), pp. 171 and 172, tables 3 and 4.

* Key to the industrial groups: 1. Production of foodstuffs; 2. Production of beverages; 3. Processing and manufacture of tobacco products; 4. Textile manufacture; 5. Manufacture of shoes and articles of clothing; 6. Wood and cork industry and production; 7. Manufacture of furniture and fixtures, except metal; 8. Manufacture of cardboard, paper, paperboard and products thereof; 9. Publishing, printing and allied industries; 10. Hides and skins industry and products and substitutes; 11. Manufacture and repair of rubber products; 12. Manufacture of chemical substances and products; 13. Manufacture of petroleum and coal by-products; 14. Manufacture of other products from non-metallic minerals; 15. Basic metals industries; 16. Manufacture of metal products; 17. Manufacture and assembly of machinery and equipment, except electrical; 18. Manufacture of electrical machinery and equipment; 19. Construction and assembly of processing equipment and materials; 20. Other manufacturing industries.

transport, and domestic service. Nearly one quarter (24 per cent) were employed in manufacturing; 19.3 per cent in commerce, 9.0 per cent in Government, and 3.2 per cent in construction (Pacheco Gómez M., 1988). Less than 1 per cent of workers surveyed were employed in agriculture.

With regard to occupational groups, the largest number of workers were employed as artisans and labourers, followed by office workers and indepen-

dent vendors. These occupations accounted for slightly more than half of total employment (table 3). They were followed in importance by service workers, transport operators, domestic workers, technicians and specialized personnel, itinerant vendors, professionals, teachers, workers' assistants, managers, security guards, supervisors and foremen, and artists.

In addition to the tertiarization of employment, there has been significant deconcentration of

industrial employment within MCMZ. Of the 936,600 persons employed in industry in MCMZ as of 1985, 25.5 per cent were employed in the central city—down from 30.6 per cent in 1975. Manufacturing establishments in the central city specialized in food processing, beverages, textiles, shoes and clothing, printing and publishing, leather goods, rubber goods, and petroleum products. The first ring, which slightly increased its share of industrial employment—from 55.8 to 57.4 per cent between 1975 and 1985—specialized in food processing, tobacco, wood products, furniture, petroleum products, chemicals, basic metals, metal products, machinery, and other manufacturing (Villegas Tovar, 1988). The second ring, which was the major gainer, increased its share of industrial jobs from 12 to 20.3 per cent between 1975 and 1985. Manufacturing establishments in the second ring specialized in the production of paper products, rubber goods, chemicals, mineral products, basic metals, metal products and the assembly of machinery. The third ring, with only 1.3 per cent of wage employment in 1985, specialized in the production of beverages, textiles, wood products, paper products, mineral products, metal products, and machinery and electrical equipment.

E. THE CITY IN THE REGIONAL AND NATIONAL URBAN CONTEXT

Mexico City is the dominant urban centre for the whole of the central region, an area that encompasses the States of Mexico, Hidalgo, Morelos, Tlaxcala, Puebla and Querétaro. Although the central region covers less than 8 per cent of the national territory, it contains 35 per cent of Mexico's total population. A densely populated region that was nearly 65 per cent urban in 1980, the central region accounts for more than half of all manufacturing employment in the nation and an even larger share of tertiary employment. It contains one city of more than 1 million inhabitants (Puebla, pop. 1,136,900 in 1980), one in the 500,000-1,000,000 range (Toluca, pop. 597,350), one in the 100,000-500,000 range (Cuernavaca, pop. 232,355), and one in the 50,000-100,000 range (Tlaxcala, pop. 76,880). Despite the region's largely urban character, agriculture remains the major source of livelihood for much of its population, accounting for half or more of total employment in

Hidalgo, Guanajuato, Puebla and Tlaxcala. Although agricultural productivity in the region is generally high, there is a very unequal pattern of land distribution, as well as pockets of rural poverty. Because of this, the rural areas of the central region have been major sending areas for migration to MCMZ. Indeed, the area is currently estimated to account for 70 per cent of all interstate migration.

In regard to Mexico's national urban structure, large-scale urban growth did not begin in Mexico until the twentieth century. During the Presidency of Porfirio Díaz (1876-1910), railroad development played a major role in selective urban growth, contributing to the growth of some cities and to the decline of others. Mexico City, Guadalajara, Monterrey and Puebla, for example, were relatively accessible to the railroad network and grew rapidly, whereas cities that were less accessible grew less rapidly or even lost population. During 1910-1940, as the system improved, cities located at strategic nodes began to exploit their comparative advantages and to become regionally dominant centres (Scott, 1982). During 1940-1970 the places which improved most, in relative as well as in absolute terms, were those with the highest degree of initial transport advantage at the beginning of the period. Although there were other (for the most part local) factors which influenced the growth of cities, accessibility was crucial.

After 1940, large cities developed for the first time outside the central core. Most of them were in the north, and several were on the Mexico-United States frontier. Whereas there were only 13 cities with between 100,000 to 1 million inhabitants in 1950, there were 48 in 1980. Important regional systems of cities have been developing, e.g., along the U.S. border, the Pacific coast, the west, the north-east, and the central Gulf. With the exception of cities that form part of the Mexico City and Monterrey subsystems, and a few cities in the south-east, most systems of cities have lost their demographic momentum.

Whereas Government policies seek to promote systems of medium-sized cities, the Government's policy for the central zone aims at strengthening states and cities in the Mexico City subsystem that are already experiencing very rapid growth. The result could be to accelerate the development of a vast megalopolis.

III. DECENTRALIZATION AND LOCATION

A. THE EVOLUTION OF SPATIAL STRATEGIES

During the period 1940-1970 the Mexican Government was primarily concerned with maximizing economic growth, mainly through industrial development. The Government formulated very few explicit spatial policies, and these were largely offset by the effects of various macro and sectoral policies. For example, the net effect of the Government's rural development policies was to accelerate migration to the Federal District and to certain areas of high agricultural productivity. Likewise, its industrial location policies unintentionally led to further concentration in the major metropolitan areas.

The administration of President Luis Echeverría (1970-1976) marked something of a break with previous administrations, at least in terms of its expressed goals. In a number of official statements, the President indicated a growing concern over the rising economic, political and social costs associated with Mexico's pattern of concentrated urbanization, and over questions of interpersonal equity, and stressed the importance of restructuring the national economic space, mainly by decentralizing industry and giving greater support to the country's rural areas. This rather sudden focus on the negative aspects of Mexico's urban growth paralleled the Government's growing concern over Mexico's high aggregate levels of fertility and population growth, although perhaps it was more of a reflection of the President's own ideology (Brennan, 1983). In any event, for the first time, Mexico's pattern of urban growth was officially identified as having serious negative consequences for the country's development, and explicit policies were formulated at the highest level to bring about a change.

For example, during the Echeverría administration an increasing number of tax exemptions were made available to industries that were willing to locate outside Mexico City and the two other metropolitan areas. These incentives were generally too small, however, to affect most locational decisions, and they were made available to plants locating in several highly urbanized, rapidly growing areas, as well as in more backward areas. In fact, the main effect of the incentives may well have been to increase profits for firms that would in any case have located in the growing areas. In any event, data reveal continuing concentration in the Federal District. For example,

of the 918 firms located in the Federal District that changed their location during 1970-1975, 882 moved to another location within the Federal District, 24 to the State of Mexico, and only 12 to other areas; conversely, of the 341 firms outside the Federal District that changed location during the same period, 193 transferred their operations to the Federal District (Scott, 1982).

The promotion of industrial parks and industrial complexes, known as *conjuntos* (a group of industries located in a single geographical area and engaged in complementary activities), also received new impetus and they were termed "an instrument with which to reshape the economic geography of the nation" (Brennan, 1983). Although the Government named 45 cities that would be beneficiaries of the industrial parks, only 16 projects were actually completed during 1970-1976. These had limited decentralizing impacts, mainly because they were not co-ordinated with similar complexes being built by the states and the private sector, and because the main subsidy provided—physical infrastructure—was not sufficient to attract most firms, and particularly the larger ones, to the relatively unfavourable locations chosen for many of the sites. The *conjuntos* had some favourable impacts at the local level, although they were not a powerful instrument for decentralization either, since some of the more prosperous states were the main beneficiaries (Scott, 1982).

The administration of President José López Portillo (1976-1982) marked a departure from the policies of the preceding administration, partly as a result of the economic crisis that it inherited—namely, the first currency devaluation in 22 years, preceded by a slump in investment and a huge flight of capital. In contrast to the preceding administration, which spent heavily on social welfare and rural development, the López Portillo administration's emphasis on the capital-intensive oil, steel and petrochemical sectors gave industrialization priority over agriculture.

Another major difference had to do with planning. Even before the discovery of oil deposits, which made long-term planning still more important, the President began talking about the final quarter of the twentieth century as a single development period and, in a sense, violating the political convention that Mexican presidents do not influence events beyond

their single terms (Brennan, 1983). This carried over into the area of spatial planning, for legislation was adopted and a number of urban and industrial plans were formulated that at least in theory constituted a co-ordinated spatial strategy.

One of the first major pieces of legislation was the General Law of Human Settlements (1976). The objectives of this law (stated in article 3) included such goals as achieving a more equitable distribution of wealth, promoting balanced urban-rural development, developing medium-sized cities and promoting the deconcentration of the largest cities, increasing public participation, and controlling the urban land market. Although the law was not specific about how it would be converted into measures, it did provide an institutional framework within which to develop spatial plans at the Federal, state and municipal levels.

The Government also established a Ministry of Human Settlements, which was assigned the task of drafting a National Plan for Urban Development, in co-operation with the National Population Council (CONAPO). This plan, which was approved in 1978, together with the National Plan for Industrial Development (1979) and CONAPO's Regional Demographic Policy (1978), constituted a framework for policy action as well as a vision of Mexico's spatial development to the end of the century. Basically, in macro-spatial terms, the national urban plan aimed at reversing historical patterns of population distribution by reducing the concentration of population in the north-west, north-east and the Mexico City metropolitan region, and by increasing the population of lagging regions—e.g., the south, south-east, west and centre-north, and particularly the regions along the Gulf and southern Pacific coast.

One of the major policy instruments identified in the national urban plan was the Programme of Incentives for Territorial Deconcentration of Industrial Activity, which was embodied in three presidential decrees published between December 1978 and March 1979, and which was closely related to the National Industrial Plan. One of the programme's major features was the establishment of three geographical zones for industrial location. Zone I, that of "preferential incentives", consisted of areas with strong comparative advantages that would serve as alternative sites for industrial location. Zone II, which would offer weaker incentives than the areas which comprised Zone I, and which was not yet specifically defined, consisted of areas that would be selected by the State governments as priority zones. Finally, Zone III, the "regulation zone", was

one in which industrial growth was to be restricted. Subzone III-A, consisting of MCMZ, was to be subject to a policy of strict control, while subzone III-B, consisting of the ring of cities surrounding the metropolitan core (i.e., the cities of Toluca, Cuernavaca, Cuantla, Puebla, Tlaxcala, Pachuca and Cuautitlán-Izcalli), was to be subject to a policy of consolidation and would offer no incentives for the location of new industry. A related measure was the National Plan for Industrial Development, which stipulated that small industries would receive a tax credit of up to 25 per cent for locating in Zones I or II, and for improving existing plants in any area outside of MCMZ. The Plan offered fiscal incentives for the creation of new industrial employment in any part of the country except MCMZ. As a disincentive, the Plan stipulated that industries locating in any of the industrial cities in subzone III-B would receive a 40 per cent smaller credit than those locating in Zone II.

One of the major problems with the plans described above is that they focused on inducing growth in many places at the same time—in the hope of reducing the dominance of Mexico City. The National Urban Plan, for example, proposed developing 11 medium-sized urban centres, based on their ability to generate employment and to absorb growth. The National Industrial Plan advocated developing 16 additional centres—mainly located on the country's gas distribution network or in coastal or frontier zones. In addition to these 27 urban centres, according to the Programme of Incentives for Territorial Deconcentration of Industrial Activity, the states were to be allowed to choose their own growth centres. Clearly, this represented a case of spreading limited investment resources too thinly. In any event, the plans were not implemented.

As for additional proposed decentralization measures, beginning in the 1970s, the Government became interested in promoting administrative decentralization. A policy instrument with a double purpose, administrative decentralization aimed not only at physically relocating scores of thousands of government workers from the Federal District, but also at influencing companies' decisions regarding industrial location (in which proximity of government offices has been judged to be an important factor). However, although Nacional Financiera opened a number of regional offices and the Ministry of Agriculture moved its headquarters to the State of Querétaro, there was considerable resistance to these early administrative decentralization efforts, both

from industrialists who preferred to be close to the market and from politicians who wanted to remain close to power.

B. CURRENT SPATIAL STRATEGIES

The National Development Plan (1983-1988) outlined a series of policies that would break the momentum of growth of MCMZ and begin to decrease its weight in the national economy. Decentralization of industry was a high priority. The plan proposed decentralizing groups of industries that were highly concentrated in MCMZ (e.g., heavy metals, traditional consumer goods, food processing), prohibiting the expansion of state-run companies, and encouraging the relocation of polluting and water-intensive industries. It also re-formulated the policy of administrative decentralization, linking it more closely to the decentralization of decision-making and of resources. In addition, the plan proposed reducing migration to the metropolis by means of rural development in expulsion zones, consolidating systems of cities at the regional level, and particularly in the west and on the Gulf of Mexico, and strictly restricting the location of manufacturing and of tertiary activity.

Within this overall framework, one of the Government's major initiatives was the elaboration of a detailed plan for the central region, the Development Programme for the Mexico City Metropolitan Zone and the Central Region (1983), which aimed at developing states in the central region in order to retain potential migrants to MCMZ and perhaps siphon off a portion of its population growth. Specifically, the programme sought to improve conditions in rural areas of states in the central region, mainly through programmes of small-scale irrigation, development of agro-industries, promotion of labour-intensive activities, and development of small and medium-sized cities. Development of the central region was also considered to be important for ecological reasons (e.g., from the point of view of restricting settlement in the head-waters of major rivers, and of preventing soil erosion).

A related initiative was the Programme for Urban Reordering and Ecological Protection of the Federal District (1984). The Programme contained a number of scenarios and proposals. By inducing jobless migrants to relocate in cities in the central region, which offered greater employment opportunities, it was expected that unemployment and underemployment in MCMZ could be reduced. The environment

would improve as a result of the relocation of polluting industries, the use of electric vehicles, and the encouragement of bicycles as a transportation mode, as well as the creation of ecological preserves and the reforestation of wooded areas. Finally, the Programme suggested that many of the city's most serious problems could be resolved if the population were grouped into eight relatively autonomous sub-centres that would facilitate easier access to employment, basic services and communal/recreational space. As an additional benefit, the creation of employment near residential areas would reduce long journeys to work and thereby alleviate traffic congestion and reduce pollution from automobile emissions.

Following the earthquake of September 1985, which destroyed many small industries, Government offices, and homes, there was a greater sense of urgency about decentralizing population and economic activity from MCMZ. Moreover, the adoption of lower height restrictions (a maximum of four stories) and the recommendation of lower population densities in areas of seismic risk⁴ meant that the existing urbanized area had a very limited capacity to absorb future population growth (planners determined that it could only absorb an additional 1.6 million inhabitants). In response, the Department of the Federal District prepared a new plan—the General Programme for the Urban Development of the Federal District (1987-1988). A physical plan, which was intended to be implemented mainly through zoning laws, the General Programme divided the Federal District into two planning areas: an urban development area, consisting of the existing urbanized area plus nearly 8,000 hectares of vacant land to be set aside for future urban development, and an ecological conservation area. Although the conservation area currently contains less than 2 per cent of the population of the Federal District (on 57 per cent of the land area), the small population centres within the conservation area have been growing at nearly 6 per cent per annum. Moreover, there have been invasions of land in the area and continuing fragmentation of cultivable land.

The Government's strategy for the conservation area was to control its growth and to initiate a process of de-urbanization. This would involve consolidating its character as a nature preserve by encouraging only tourism and recreational activities in addition to agriculture and stock raising. As for disincentives, the Government announced that it would not regularize irregular settlements in the conservation area, nor would it provide transportation or educational facilities for its residents. The

boundaries of the conservation area would be delineated by an ecological conservation line—a green belt some 122 kilometres long stretching along the southern perimeter of the urbanized area. The Government intended to construct billboards to announce its goal of conserving the area and to set up control posts to prevent illegal encroachments.

The General Programme reiterated an earlier proposal for the creation of eight so-called urban sectors—relatively autonomous sub-centres that would provide easier access to employment, basic services and communal/recreational space. Ranging in area from 72 to 169 hectares, the urban sectors would be strategic points for the provision of services. Containing housing and non-contaminating industrial activity, they would be located near metro stations and transfer points for suburban transport. In addition to the urban sectors, during 1987-1988 the Government planned to improve or consolidate 28 sub-centres. The DDF also identified a number of special programmes, including preservation of the historic urban centre, reconstruction of *barrios* damaged by the 1985 earthquake, and control of development in hazardous areas (e.g., in the vicinity of the 18th of May oil refinery).

In order to ensure adherence to zoning regulations, the DDF prepared a series of Partial Development Programmes—detailed, easy-to-comprehend zoning maps for each delegation in the Federal District. Sold to the general public, they were intended to inform the public concerning zoning restrictions and future guidelines for urban development.

In regard to policy instruments, some decentralization of public administration was achieved during the 1980s. A number of operational activities (e.g., in such areas as basic education and health) were transferred to the state governments. Moreover, the public health system and several other minor Government departments and institutes were decentralized; for example, parts of the National Statistical Institute (INEGI) were moved to Aguascalientes. As Ward (1990) notes, however, genuine devolution of power in Mexico has been resisted, and the main purpose and effects of the Government's decentralization policies was the establishment of a system that is decentralized administratively but remains centralized politically.

IV. ISSUES AND SECTORS

A. THE LABOUR MARKET

Mexico City constitutes the largest single labour market in the world, with over 7 million economically active people (Ward, 1990). The labour force participation rate remained nearly constant between 1950 and 1986—at around 51 per cent.⁵ Whereas the female participation rate increased from 28 to 35 per cent during 1960-1986, the male participation rate declined from 81 to 70 per cent (Pacheco Gómez M., 1988). There have been significant changes in the composition of Mexico City's labour force. During the 1940s and 1950s, industry absorbed a large proportion of the labour force. Gradually, however, industry's absorptive capacity began to slow and a surplus work force developed, which helped to maintain salaries at a low level. According to a 1980 study, 41.4 per cent of the labour force was employed in industry and 53.7 per cent in services (Oliveira and García, 1987). In 1986, according to the National Survey of Urban Employment (Encuesta Nacional de Empleo Urbano), the figures were 23.7 and 61.8 per cent, respectively. Between 1980 and 1986 the tertiarization of Mexico City's labour force was even more pronounced among women. The percentage of women employed in commerce and sales increased from 9.8 to 21.3 per cent between 1980 and 1986, whereas the percentage of men increased from 10.4 to 16.3 per cent (Pacheco Gómez M., 1988).

Changes in employment and unemployment reflect closely Mexico's national economic fortunes. Within the Federal District the cycles of unemployment associated with economic decline are quite clearly enunciated. Unemployment reached its height in 1977 and dropped regularly thereafter to less than 5 per cent by mid-1980; it rose again in 1982 and 1983 (Ward, 1990). According to official figures, the unemployment rate in urban areas was only 4.5 per cent in January 1987. However, a variety of independent analysts (e.g., the Wharton Center for Econometric Investigation of Mexico) reported that the real unemployment rate reached at least 11.5 per cent during 1986; some estimates ran as high as 17.5 per cent (*The New York Times*, 9 June 1987).

Informal sector activities have developed to the extent of possibly providing as many jobs in Mexico City as the formal sector (World Bank, 1984). There is a clear trend of interrelated expansion and contraction of the two sectors, with the formal sector

growing at the expense of the informal sector during times of economic growth and buoyancy (e.g., 1978-1981) and the latter picking up the slack in the labour market during 1983-1987. The proportion of workers employed in the informal sector grew from a low of around 34 per cent in 1981 (when there was actually a labour shortage in unskilled labour for construction, cleaning services and even in some manufacturing industries) to almost 40 per cent in 1987 (Ward, 1990).

According to a 1985 study by the Mexican Labour Congress, 56 per cent of the residents of Mexico City who were employed earned less than the minimum wage, which was \$2.85 a day in the capital, and only 13 per cent earned salaries above the minimum. Moreover, because inflation outpaced salary increases and erased gains made during the 1970s, the purchasing power of workers fell by more than 50 per cent during the administration of President Miguel de la Madrid. Finding employment has also become more difficult. Thousands of factories and other businesses laid off employees or filed for bankruptcy during the early 1980s. Furthermore, the middle class, which traditionally has hired independent craftsmen, has also been retrenching.

B. URBAN LAND

Land in Mexico City is being urbanized at a rapid rate. The Mexico City Metropolitan Zone absorbed four municipalities in the State of Mexico during 1970-1980 and is expected to absorb 15 more by 1990, and at least 20 more by the year 2000 (CONAPO, 1984a). In the process, an average of 1,000 hectares of forest land and 700 hectares of agricultural land have been urbanized each year, leading to further deterioration of the ecosystem.

Mexico's Constitution of 1917 put forward the concept of land as a social right, establishing large areas of communal and *ejidal* land. As noted in a World Bank report, this system, which was conceived during the Revolution to suit the demands of a predominantly rural society, is ill matched to modern regulatory and market conditions in a rapidly urbanizing area (World Bank, 1984). In practice, the cumbersome procedures of legal transfer have been bypassed on a massive scale. Indeed, over the past four decades, at least one quarter of the expansion of

the urban area has taken place on *ejidal* lands. Although some of this land was used for public facilities or collective infrastructure, much of it—perhaps four fifths—was returned to the private land market.

The process has operated as follows. Because of the unprofitability of subsistence agriculture on the periphery, small farmers cultivating *ejidal* or communal land have been induced to sell their property to clandestine subdividers, who typically have divided the land into plots and then resold it. Other low-income families—who sometimes have settled so quickly that they are known in popular language as "parachutists"—have invaded State-owned land in arid, inhospitable areas on the periphery (e.g., the dried-up bed of Lake Texcoco). Public authorities have tolerated and even legitimized this process, concentrating on programmes of massive *ex post* regularization, whereby low-income families who invaded land or purchased lots in irregular developments were able to make payments to the Government and eventually receive title to the land.

It has been argued by some Mexican scholars that the Government's regularization programme has had many unintended (and sometimes harmful) effects. For example, in spite of official pronouncements seeking to control urban growth, the Government's regularization programme actually may have fostered the spread of urban growth. Once land has been regularized and infrastructure has been introduced, land and housing prices have risen rapidly, forcing lower-income residents to sell out and move to cheaper, unserved areas farther out on the periphery, where the process will once again be repeated. In this manner, the creation of irregular settlements has essentially become the "normal" pattern of urban growth.

It has also been argued that the Government's regularization policy has served as a substitute for a meaningful land and housing policy, and as a means of winning political support from families that would otherwise be incapable of finding shelter. It is interesting to note that in the State of Mexico, where an opposition political party is currently in power, there has been a growing effort to stop the spread of irregular settlements and to maintain a stricter policy *vis-à-vis* the regularization process.

Currently, Mexico City's real estate market is controlled by the private sector, which is the principal agent for land sales, development and finance. Given the buoyancy of this largely unregulated market, large capital resources are frozen in land speculation (World Bank, 1984). In an effort to counter the

present pattern of distorted occupation of urban land, the Government has attempted to establish public reserves of developable areas. Resource constraints have restricted public land acquisition, however, to those areas needed for immediate action programmes, such as housing schemes, regularization of subdivisions and rights of way. Moreover, most of the land already in the possession of public agencies has been either acquired at prices that make its utilization in low-cost shelter programmes uneconomical or else is unsuitable for development because of its remoteness, difficult topography or high infrastructure costs (World Bank, 1984). A further issue is that it is difficult to formulate an effective land policy in the absence of updated information on densities, vacant lots, tenure patterns, land prices and cadastral records.

In recent years, public authorities have begun to address these problems. One of the major aims of the Development Programme for the Mexico City Metropolitan Zone and the Central Region (1983) was to prevent further horizontal urban growth and to protect the ecosystem through stricter implementation of land use controls and public intervention in the land market. The Government noted that, as a first step, and in co-ordination with state and local authorities, a land-use plan for the entire metropolitan region, as well as a cadastral survey, was to be prepared. By the end of the de la Madrid administration, firm decisions were to be made regarding sites for reserve areas and for future large-scale infrastructure projects (e.g., the new international airport). Moreover, the Government reported that it would identify annual targets and impose strict controls on further urban development. For example, land designated for development could not have any agricultural potential, its conversion had to be approved by local municipalities, and it had to be developed without unreasonable delay—in order to prevent the practice of opening up large new subdivisions and then waiting years for their completion. In a further effort to limit horizontal growth, the Government reported that it would demarcate the limits of the urbanized area by creating green belts at the edges of new settlements.

In recent years, the Government has also addressed the issue of urban land from an ecological perspective. Responding to the fact that the Federal District has only 2.7 metres of green space per inhabitant—far less than the minimum of 9 square metres recommended by the World Health Organization (WHO)—the Government's Programme for Urban Reordering and Ecological Protection of the

Federal District (which was formulated in 1984 but is no longer in effect) aimed at limiting sprawling urban growth, maintaining ecological preserves in wooded and in sparsely populated areas, and creating new parks and recreational areas. Ironically, the earthquake of September 1985 made this partly possible, in that many of the cleared lots in the central city were used for parks, monuments, and recreational facilities.

C. HOUSING

Housing conditions in Mexico City have improved over the past several decades. The proportion of houses with piped inside water increased from 35 to 67 per cent, whereas those with indoor plumbing increased from 33 to 81 per cent (Ibarra and others, 1986). Generally, housing conditions are somewhat poorer in peripheral areas of MCMZ. Indeed, whereas the average number of persons per room was 1.5 in central areas of the Federal District and 2.1 in Mexico City as a whole, it was 2.2 in contiguous municipalities in the State of Mexico. Eighty-two per cent of houses in the Federal District had piped inside water and 93 per cent had indoor plumbing; the proportions in the municipalities in the State of Mexico were 62 and 74 per cent, respectively (Ibarra and others, 1986).

More than half of Mexico City's housing has been built and financed directly by low-income groups, mainly on land of uncertain tenure. As the World Bank noted in a 1984 report:

"The self-construction of dwelling units by the informal sector involves no immediate public outlay, but these unregulated developments are expensive for other reasons: they result in poor land use patterns and subtract land from official taxation; sooner or later the political pressure of squatter neighbourhoods forces the public administration to provide basic services with little if any recovery of investment costs; to lay water and sewerage pipes in these settlements is often more expensive than for planned ones; some sites remain virtually inaccessible by road or cannot be reached by standard water pressure; programs to regularize land tenure *ex post* and to introduce real estate taxation prove difficult and costly, and often result in displacement of the current occupants." (World Bank, 1984, p. 7)

Public sector intervention in the housing sector has generally taken two forms in Mexico City: financing and construction of finished housing through mandatory saving schemes (5 per cent payroll withholding for all registered workers) and mortgage financing or direct transfers through special purpose "housing funds". The standards of "formal" housing developments financed through the banking system have generally been too high, catering to the needs of a privileged few (World Bank, 1984). As noted in a World Bank report, "the proliferation of sector agencies, inadequate pricing schemes, highly subsidized interest rates, unrealistic construction standards, the heavy incidence of land and building costs, the questionable management, allocation and pricing practices, all account for the rapid decapitalization of the agencies, their limited output, and the lack of replicability of the current schemes" (World Bank, 1984, p. 7). The World Bank further noted that the de la Madrid administration was addressing the need for a total reorganization of the sector, aiming at a more cost-effective use of resources, the introduction of new financial mechanisms, the promotion of alternative standards and technologies and organized population participation in the production and maintenance of housing.

This new approach to the housing problem was tested after the earthquake of September 1985, which destroyed or badly damaged some 70,000 housing units in 70 low-income areas, bringing the total deficit in the Federal District to around 463,800 units (Departamento del Distrito Federal, 1987b). Following the earthquake, the Government established a Popular Housing Renewal Agency (RHP) to oversee the reconstruction of the most badly affected low-income neighbourhoods. The Government quickly expropriated more than 3,600 parcels containing some 44,500 dwelling units, reimbursing landlords based on tax records. Because most of the affected areas had been under rent control since the 1940s, and landlords were receiving negligible rents, there was little resistance to the expropriations. From the beginning, area residents actively participated in the planning process; for example, many residents emphasized that they wanted separate entrances for each cluster of housing units, in order to preserve the tradition of living in separate units (World Bank, 1986). Then RHP began constructing three-storey multiple family condominiums, with the aim of allowing families to remain in their old neighbourhoods. In the interim, RHP supplied temporary housing on nearby public property, including streets and sidewalks. In the end, some 48,000 high-standard

units—many of which had work-spaces at street level—were built or rehabilitated. Traditional elements of Mexican architecture (e.g., strong vivid colours, central patios, large entrance archways) were incorporated very successfully into the designs. The project, which was financed by a loan from the World Bank combined with financial aid from various Mexican financial institutions, aimed at achieving 50 per cent cost recovery. The new owners received mortgage financing from the Low Cost Housing Fund (FONHAPO), the state low-income housing agency; mortgages were scheduled to be repaid within eight years, with most payments amounting to about 30 per cent of the minimum wage (World Bank, 1986).

It is interesting to note that, despite its strong public commitment to a decentralization policy, the Government opted for the politically more acceptable solution of rehousing the population affected by the earthquake *in situ*, rather than undertaking reconstruction outside of Mexico City and relocating those people who had lost their homes (Ward, 1990). Moreover, the financial terms on which rehousing households affected by the earthquake was undertaken represented another major subsidy. Ward (1990) notes that "this particular experience also sheds light on how a major government programme can come subsequently to shape people's aesthetic tastes in housing. The brightly coloured and reasonably sensitively designed apartment blocks are what people throughout Mexico now claim they want: completed housing (rather than self-help), and bold bright colours."

D. WATER SUPPLY AND ENVIRONMENTAL PROBLEMS

Situated at 2,240 metres above sea level in a closed mountain valley, with relatively scarce precipitation, Mexico City has had to ensure an adequate supply of water by pumping an ever larger volume, at escalating costs, from remote supply sources at lower altitudes. Costly projects such as the Cutzamala River Project have enabled the Government to increase the supply of water steadily—from 20 cubic metres per second in 1960 to 42 per second in 1976 and to 60 per second in 1983, even though rising demand has reduced per capita consumption. Fifty-three per cent of the present consumption is attributed to domestic uses, with industry accounting for only 11 per cent, commerce and services for 12 per cent, public uses for 10 per cent, and agriculture for 14 per cent (World Bank, 1984).

Whereas supplies have increased, the city lacks an efficient distribution system. Systems losses are estimated at over 30 per cent. One report noted that leakages and unaccounted for water may explain the relatively generous provision of more than 300 litres per capita per day, which approaches United States design standards. Compared to other large cities, this is already high and might increase with the gradual expansion of the distribution system, which does not reach large segments of the population. Currently, of the 10 million inhabitants of the Federal District, 82 per cent have piped inside water; the remainder obtain water from public hydrants or from unknown sources (Departamento del Distrito Federal, 1987b). The situation is worse in the municipalities in the State of Mexico, where nearly 40 per cent of households do not have piped inside water. An additional problem is the fact that the pipes carrying the capital's drinking water are deteriorating, exposing Mexico City residents to increasing health hazards.

The Government estimated that it would require 74 cubic metres per second by 1988 to meet the demand of an estimated 19 million inhabitants. However, given the country's financial crisis, there has been growing recognition that the large subsidies involved in transporting water over long distances cannot be borne by the Government over the longer term. The Government's water strategy, which aims at ensuring adequate supplies at a more reasonable cost and improving the distribution network, is outlined in the Development Programme for the Mexico City Metropolitan Zone and the Central Region (1983). Although the Government aims at reducing dependence on pumped water from distant sources, it proceeded with the second and subsequent stages of the Cutzamala River Project, partly because in the short and medium term it seeks to reduce dependence on over-exploited sources in the Valley of Mexico and the Alto Lerma. Basically, the Government's strategy for the water supply sector involves making better use of supplies within the Valley of Mexico, mainly by restricting urbanization near the head-waters of major rivers and in remote and difficult-to-service areas; encouraging the re-use of waste water for agricultural and industrial purposes; repairing and maintaining the water distribution network; conducting surveys of consumption patterns; and educating the public about conservation measures.

A fundamental policy change has been the imposition of differential water tariffs. The Government estimates currently that 9 per cent of users, consisting mainly of industrial users, consume 75 per cent of the total supply. The low cost of heavily subsidized water has served over the years as an implicit spatial policy, in the sense that industries that consume large amounts of water were not deterred from locating in the Valley of Mexico. The Government has recently moved to a policy of cost recovery, raising household water rates by 80 per cent and industrial rates by 220 per cent (Departamento del Distrito Federal 1987b).

Mexico City's population growth long ago passed the city's ability to process sewage, and the 1985 earthquake made the situation even worse by damaging some sections of the system. Although around 80 per cent of the population has piped inside plumbing, an estimated 3 million residents in peripheral areas are not hooked up to the sewerage network. In these areas raw sewage is discharged into river beds or seeps into the ground, polluting the underground aquifers. Although the city has nine sewage treatment plants, they have been working at only 37 per cent of installed capacity, mainly because of insufficient storage facilities (Departamento del Distrito Federal, 1987b). Since relatively little domestic and industrial waste-water treatment is practised, the majority of flows pass to the north for use as irrigation water. In these northern areas the principal environmental effects are felt in terms of eutrophic and malodorous conditions in storage lagoons, and potential risk to crops, soil, aquifers, field workers and livestock (Dagh Watson, 1985).

Surface runoff and extensive flooding have created serious drainage problems in many areas of Mexico City. The city lacks natural outlets for surface waters arising within the valley. Moreover, excess extraction of ground water has caused dramatic subsidence of the valley floor (as much as 8-10 metres in central areas) and created countergradients which require sizeable energy consumption for pumping during the rainy season (World Bank, 1984).

Regarding solid waste disposal, a recent report prepared for a project on waste management and resource recovery in Mexico City, funded by the United Nations Development Programme, noted that "the authorities ... are doing a commendable job given their limited resources and operational constraints" (Dagh Watson, 1985). However, while Mexico's capital is generally a clean city relative to most developing country mega-cities, inefficiencies in the system lead to wastes accumulating in back streets or at clandestine tips. Indeed, it is estimated that at

least one quarter of the more than 10,000 tons of solid waste generated daily is dumped illegally or remains in the streets. Although the Government closed some 12,000 illegal dumping sites, its efforts have met with considerable resistance from the some 20,000 persons (including dependants) within the metropolitan area who support themselves by scavenging. Most of the refuse collected by the Federal District's some 10,000 sanitation workers is sent to three new sanitary landfill sites. Waste recovery and composting operations are conducted at San Juan de Aragón, where an incineration plant is also used for destruction of hospital and other medical wastes. There are also disposal sites in the State of Mexico, generally one per municipality.

As for the disposal of industrial wastes, although industrial activity in the metropolitan area is both extensive and diverse, full control of liquid and solid industrial waste disposal is limited by the lack of comprehensive legislation. The principal ordinance in the solid waste field dates back to 1941; whereas some modifications were introduced in 1976 and 1979, the fines that can be legally imposed bear no relation to current monetary values (Dagh Watson, 1985).

Mexico City's most serious environmental problem is air pollution. A recent study on motor vehicle emissions in Mexico prepared for the World Bank summarized the situation:

"If one was asked to design a city with characteristics conducive to high air pollution, one could not do a much better job than has been done in the Valley of Mexico. The metropolitan area of Mexico City lies ... at an altitude of 2,240 metres above sea level (high altitude conditions which tend to significantly increase the emissions of fine particles, HC and CO pollution from vehicles, and to make people more susceptible to certain of its effects). The basin is surrounded by mountains, with a pattern of winds blowing from the north-west and the north-east and is characterized by abundant sunlight (one of the key elements of photochemical smog).

Besides geography, Mexico City has climatic effects going against it. As a result of the city's elevation and the mountains which surround it, winds rarely blow with enough force to clear Mexico City's air. In addition, thermal inversions⁶ that trap pollution are common, particularly during the winter months, from November to April" (Walsh, 1989).

Mexico City's air pollution is estimated to have increased by 150 per cent over the past 10 years. Indeed, a study conducted by the United Nations Environment Programme (UNEP) concluded that ozone levels tripled in Mexico City between 1986 and 1988, reaching a median level that was 60 per cent higher than WHO standards of 0.11 parts per million. In 1988, 90 per cent of all air samples taken in the city registered above such limits, and the number of hours each month in which readings exceeded international norms of ozone tolerance was seven times greater in 1988 than in 1986. Motor vehicle emissions—which are a more serious problem at high altitudes because the thin air makes automobile engines produce about twice as much carbon monoxide—now account for about 98 per cent of the carbon monoxide and 63 per cent of non-methane hydrocarbons, which are the two main elements of ozone. Fewer than half the cars on the road in Mexico City are fitted with even modest pollution control devices, and virtually none have state-of-the-art devices. The degree to which the existing vehicle stock is in need of maintenance is reflected by the results of the voluntary emission testing programme conducted during 1986-1988; of over 600,000 vehicles tested, 70 per cent failed the gasoline vehicle standards and 85 per cent failed the diesel standards (Walsh, 1989).

Important secondary sources of air pollution are an oil refinery, two power plants and two cement plants. Pollution from the city's some 35,000 factories is also significant. A study conducted by the Mexican Government with technical assistance from the Government of Japan analysed some 500 factories which were regarded as highly contaminating, finding that more than 80 per cent of sulphur dioxide came from this source. Mexico City also has high levels of lead and nitrogen dioxide. Growing deforestation on the outskirts of the capital has led to frequent dust storms. Moreover, the winds carry the deposited body wastes of about 6 million people and 2 million dogs. As a result, the UNEP study found that the number of colonies of micro-organisms per cubic metre of air was uncountable. A partial list of the pathogenic organisms found in the air included streptococcus, diplococcus, staphylococcus, salmonella, shingalla and amoeba.

The Government's strategy to alleviate environmental pollution gained momentum during the 1980s. Early in that decade the strategy focused on encouraging a voluntary reduction in the use of private automobiles, promoting the use of public transportation (and especially the metro, which is less polluting than above-ground transport), removing old

and poorly serviced buses, and purchasing new non-polluting buses. During 1986 the Government announced the intention of putting into effect nearly two dozen anti-pollution measures, ranging from the introduction of gasoline with lower lead content to having the army plant 12 million trees. Additional measures involved putting 800 new non-polluting buses into service, extending line #6 of the metro by 4.7 kilometres and the electric trolley line by 111 kilometres, and relocating polluting industries affected by the earthquake.

In January 1987 the Government adopted a number of stricter policies in regard to automobile emissions. Initially, it was announced that automobiles manufactured between 1977 and 1982 would be required to be inspected periodically with pollution-monitoring equipment. Automobiles manufactured in Mexico after 1988 would be required to have emission control systems and be subject to strict emission standards. In addition, in order to reduce the number of automobiles in central areas of the city and to speed up traffic, the Government announced that, beginning in mid-1987, it would implement a traffic-flow system which would involve the closure of some streets and restricted access for automobiles.

Unfortunately, compliance has been slow. Warning signs of worsening pollution were evident in 1988 after birds began falling from the sky. The situation reached near crisis proportions in January 1989 when levels of harmful ozone led the authorities to announce an eight-point programme, including extension of the school holidays for a one-month period, pulling visibly polluting vehicles off the roads, mandatory emission checks for cargo vehicles, and tightening vehicle inspections. The period for mandatory testing of vehicles manufactured between 1977 and 1982 was extended to 31 May 1989; the deadline for automobiles manufactured in other years was not announced. In 1990 the Government issued a car ban one working day a week according to the displayed colour of each car's license (Ward, 1990).

According to the Government-owned oil company, *Petróleos Mexicanos* (PEMEX), fuels have improved significantly in Mexico City in recent years. The lead content of leaded fuel has been reduced to about 0.15 grams per litre, sulphur levels are down and a grade of unleaded gasoline has been introduced. However, as a recent study noted, no independent agency of the Government such as the Ministry of Urban Development and Ecology (SEDUE) has the authority or the responsibility to assure fuel quality independently. This has raised the fear that proposed improvements in fuel quality such as the elimination of lead might

be done in a manner to worsen environmental problems; indeed, concern has been expressed that the introduction of unleaded fuel may actually have increased ozone levels (Walsh, 1989).

Despite these measures, because the age of the car stock in Mexico City is so old (more than 40 per cent of cars are 12 years old or more), it will be many years before new car standards can have a significant effect on the environment. A recent study on motor vehicle emissions noted that any short-term improvements were dependent on reducing emissions from the existing fleet; indeed, an aggressive retrofit of some of the vehicles (those capable of operating satisfactorily on unleaded gasoline) would have the greatest pollution reduction potential during the 1990s (Walsh, 1989).

An additional problem is the fact that Mexico City is governed by a number of authorities that separately control the emission levels of vehicles based in or passing through their part of the conurbation. To date, most remedial action has been taken in the Federal District. As a recent study noted, it is not practical for one part of a tightly knit conurbation to have an effective emission control policy without similar standards being set in adjacent parts of the conurbation (Walsh, 1989).

With respect to air pollution from industrial sources, SEDUE announced in July 1984 that environmentally polluting industries would be moved out of Mexico City. However, it reversed its position one month later and reported that such a relocation would result in massive unemployment, hence would be economically unfeasible in the short term. Subsequently, the Government adopted a more gradual approach in regard to the transfer of polluting industries. The Government also set up a valley-wide air pollution monitoring network in order to detect dangerous accumulation of contaminants. Currently, pollution levels are monitored by two systems—one manual and the other automated. The manually operated system was installed in 1978 and consists of 16 stations located throughout the city. The automated system, which was installed in 1985, has 25 stations and takes readings once a second, 24 hours a day (Walsh, 1989).

E. POWER

Mexico City, with a land area of less than 1 per cent of the national territory, consumes 25 per cent of Mexico's electricity. Currently, more than 97 per cent of houses in the Federal District have inside

electricity (Ibarra and others, 1986). On the periphery, however, large numbers of households obtain electricity from illegal hook-ups.

Given the growing demand for electricity on the steadily expanding periphery, the growth of the city's commercial areas, the spread of public services (e.g., lighting, the metro), increased demand from new and established industries, and the greater use of domestic electrical appliances, the Government constructed a 150-kilometre 230 kV transmission ring in 1970. To solve the problem of the city's generating plants having been built by different companies over the years and operating at different frequencies, during 1973-1976 the Government undertook a conversion of frequencies—which was at that time the largest such frequency change-over in the world (Balderas and Molero, 1987).

Subsequently, in order to transmit large blocks of energy from distant generating plants, in the late 1970s the Government constructed a 267.5-kilometre 400 kV transmission ring entirely around the metropolitan area. This ring not only permitted the optimal distribution of energy within the metropolitan area, but also served as the connection point for the country's other electrical subsystems. Because energy generated by plants in the country's central system is not sufficient to meet demand, the Government is able to capture surplus energy from the country's eastern system. Among the most pressing future problems in the sector is the need to obtain rights of way, particularly for subterranean substations and transmission lines.

Mexico possesses ample reserves of fossil fuels and an extensive network of oil and natural gas pipelines that connect Mexico City with the extraction fields. However, as noted in a World Bank report (1984), these resources have an opportunity cost that should not be neglected. Currently, more than 70 per cent of the energy consumed in the Mexico City region is generated through the combustion of fossil fuels. Industry is the main consumer, accounting for 45 per cent of total consumption, followed by urban transport, which accounts for about 30 per cent. Of the latter, private automobiles consume 17 per cent, freight traffic 9 per cent, and public transport only 4 per cent (World Bank, 1984). Indeed, it is estimated that the some 2.2 million automobiles in MCMZ consume around one third of the national production of gasoline (World Bank, 1984).

F. HEALTH AND EDUCATION

In Mexico City, health-care services are delivered to the general public through three levels of health care institutions. The first level is that of the public social security institutions, e.g., the Mexican Social Security Institute (IMSS), which is for all blue-collar workers formally in employment as well as for the self-employed, and the Social Security Institute for State Employees (ISSSTE) (Ward, 1990). The second level consists of the Ministry of Health, which provides the main alternative source of health care for the bulk of the population not covered by any of the social security organizations or private medical insurance. The third level consists of the private sector, which includes both the private health care system and private charitable institutions. While about 60 per cent of the population is covered by social security, many low-income households make extensive use of the conveniently located private sector surgeries, especially for consultations (Ward, 1990).

As of 1980 the Federal District had more than 1,000 medical units, 89 per cent of which were out-patient and 11 per cent in-patient. Two thirds of the Federal District's some 17,000 hospital beds were designated for workers covered by health-care plans and one third for the general public. As for medical personnel, 72 per cent of physicians and 77 per cent of paramedical and other health-care personnel were assigned to workers' hospitals; the figures were 28 and 22 per cent, respectively, for general hospitals (Castañón Romo, 1987).

The Ministry of Health oversees Mexico City's six large general hospitals (these are currently being modernized and three new general hospitals are under construction), more than 200 local health centres, and hundreds of private hospitals and clinics. Ironically, the earthquake of September 1985 provided the impetus for the decentralization of health-care services in Mexico City, as well as for the development of a new health-care system based on the stratification of service levels. For example, the 2,600-bed National Medical Centre (operated by the Mexican Social Security Institute) was heavily damaged during the earthquake and is being replaced by a smaller facility with 600 beds. The remaining beds will be dispersed among various new facilities in peripheral areas.

Illiteracy in the Federal District has declined significantly over the past several decades—from 30.4 per cent in 1950 to 6.7 per cent in 1980. In peripheral areas, the rate of illiteracy is estimated to be of the order of 10-15 per cent. As of 1985-1986, the Federal District had a population of nearly 3 million students. The Federal District's educational system served 59 per cent of the population of pre-school age, 98 per cent of the population of primary school age, and 100 per cent of the population of secondary school age. There has been an absolute decline in the number of primary school students in the Federal District in recent years—a phenomenon explained by the spread of the city's population into the State of Mexico. At the same time, both in secondary schools and in institutions of higher learning, more students are enrolled in each level than graduated from the previous educational cycle, indicating the enrolment of pupils from outside the Federal District.

Mexico City has the country's major concentration of institutions of higher education, with 50 public, 144 private and 10 autonomous institutions. The National Autonomous University of Mexico (UNAM) is one of the largest universities in the world, with a student body of more than 300,000.

G. TRANSPORT

Traffic problems currently rank among Mexico City's most serious problems. Traffic congestion results in a significant loss of productivity. According to an origin-destination survey conducted in 1983, the average trip time for the city's 19.5 million daily person-trips was 52 minutes, thereby consuming a total of some 17 million man-hours. A study carried out by the Mexican Labour Congress found that traffic congestion translated into an average daily loss of 1.3 million man-hours of productivity (equivalent to a loss of 110 million *pesos*). Congestion—caused mainly by private cars, which grew by 1,700 per cent between 1960 and 1980—slows down the movement on the roads to 16 kilometres per hour at peak times (Walsh, 1989). The city's 2.6 million private automobiles accounted for 24 per cent of total daily passenger trips as of 1985, but were estimated to be responsible for 50 per cent of traffic congestion and to produce around 80 per cent of air pollution. Private car usage as a proportion of total daily journeys increased from around one fifth to one quarter between 1975 and 1985. Whereas the Government aims to reduce the proportion to 18 per cent by the turn of the century, this is unlikely to occur without the withdrawal of a number of implicit

subsidies, e.g., capital investment in road construction and improvements, relatively low fuel costs, low repair and service costs (Ward, 1990).

The Government's major policy for the transport sector has been the construction of the Mexico City metro, which was initiated in 1969 with 11.5 kilometres of track and currently has some 120 kilometres. With a fleet of more than 2,000 cars as of 1985, the metro accounted for 18.5 per cent of the city's total daily person-trips.

With the metro as the hub of Mexico City's transportation system, the Government has essentially restructured the city's entire transport system over the past decade. As a first step, concessions for the city's privately operated bus fleet were revoked in 1981, and the Route-100 Urban Passenger Transport Company was established. During the early 1980s, the number of bus routes was reduced from over 500 to 76 direct routes on a grid pattern with 47 feeder routes. The fleet of 6,600 Route-100 buses is currently the city's major transportation mode, carrying some 5.3 million passengers daily—or 27 per cent of total daily person-trips as of 1985.

In recent years, there has been spectacular growth in Mexico City in the number of collective taxis, both 10-seaters and 20-seaters, some licensed and many others merely tolerated. As of 1985 Mexico City had some 40,500 collective taxis, accounting for 10.8 per cent of total person-trips. The rapid emergence of this private transport mode within the overall context of increasing governmental control over transport by the public sector is one of the more paradoxical features of the current transport situation in Mexico City. Essentially, the system of collective taxis has grown in response to transport demand on the periphery. The origin-destination survey conducted in 1984 found that 28.5 per cent of all person-trips in the metropolitan area originated in the State of Mexico and that 60 per cent of those trips were destined for the Federal District. Moreover, many of the inter-municipal moves to other destinations in the State of Mexico passed through the Federal District. Clearly, the artificiality of the boundary between the Federal District and the State of Mexico is perhaps nowhere more evident than in the transport sector. The metro is located in the Federal District, with only one line crossing for a short distance into the State of Mexico; Route-100 buses also operate almost entirely within the Federal District. The privately operated suburban buses and collective taxis that serve the State of Mexico are not only insufficient in coverage and capacity, but also charge fares that are on average 3.5 times higher than in the Federal District.

Suburban buses, which accounted for 3.2 million daily person-trips in 1985 (15 per cent of the total), are an important transportation mode. Largely for environmental reasons, when construction of the metro was first started, the authorities decided to keep suburban and long-distance buses out of the central city. To achieve this goal, suburban bus terminals were constructed at the ends of the major metro lines. The first suburban bus terminal, the North Terminal, was constructed in 1973, the South Terminal in 1975, and the East and West Terminals in 1979. Currently 90 per cent of suburban bus trips have one of the eight peripheral metro stations as their final destination.

Regarding other transportation modes, trolleybuses and tram service accounted for less than 3 per cent of total daily person-trips in 1985. Whereas trams were once important, operating on over 300 kilometres of track in 1917, they were gradually phased out and operated on only 43 kilometres of track as of 1983. Currently, Mexican National Railways operates five lines connecting the Federal District to other local cities. Reorganization of the system has been under way, and the construction of a double track between Mexico City and Querétaro has been completed. The passenger load has been increasing gradually in recent years, and the Government has at least expressed the desire to increase the role of the railways in the transport system. As noted in a World Bank report (1984), no population concentration of Mexico City's size has been able to handle its traffic problems without resort to some type of rail facilities.

Regarding some of the major issues to be resolved in the transport sector, transport has been an area where the Government's broader goals of promoting equity have come into conflict with its overall spatial goals. For many years, the metro was heavily subsidized and virtually free, costing 1 *peso* per trip (whereas the operating cost per trip was estimated to be about 30 *pesos*). Buses in the Federal District at 3 *pesos* per trip covered less than a quarter of their cost. One report found that low fares have had a negligible impact on the modal split (those with a car use it, and those without take the metro if it serves their journey, or otherwise a bus or a collective taxi) and therefore cannot be justified by their impact on congestion (World Bank, 1984). Government officials long rejected the idea of raising fares, since low fares were considered to be a "transparent subsidy" that directly benefited the urban poor. Subsidies clearly served as an implicit spatial policy, however, in that the poorest recent rural migrants could afford public transportation. In 1986, following

much debate and public protest, the metro fare was raised to 20 pesos; in 1987 it was increased to 50 pesos.

In regard to Mexico City's road network, there are three main types of roads: access-controlled roads such as the peripheral ring road (*anillo periférico*) and the interior circular highway; vital roads (*ejes viales*) running straight in an east-west and north-south direction; and main roads such as Reforma, Insurgentes and Zaragoza Avenues. Although nearly half of the projected 86.5-kilometre ring road around the metropolitan area has been constructed, the ring

road is used by daily commuters as well as by long-distance traffic and is frequently heavily congested. As the World Bank concluded in a recent study, the official priority accorded to the construction of orbital versus radial transportation links, which was intended to foster interchanges among satellite towns, failed to recognize that development of these towns depends to a major extent upon the flows of labour, services, information, capital and other factors of production to and from the central market of Mexico City (World Bank, 1984).

V. RESOURCES AND MANAGEMENT

A. PUBLIC INVESTMENT

The Federal District receives the predominant share of both total public investment in the central region and investment in the sectors of urban development, housing and ecology. With 14 per cent of the national population, the Federal District received 78 per cent of total public investment in the central region as of 1986. The State of Mexico received around 10 per cent, Hidalgo and Puebla each received 4 per cent, whereas the other states comprising the central region each received under 2 per cent. During 1983-1987 the Mexico City Metropolitan Zone and the central region, with 35.8 per cent of the national population, received 81 per cent of the national share of public investment in urban development, housing and ecology. Regarding the breakdown, the situation was even more skewed in favour of the Federal District. The Federal District received 87.3 per cent of total investment in urban development, housing and ecology, whereas the State of Mexico received only 10 per cent and the other states in the central region each received less than 1 per cent.

The continuing disparity between the Federal District and the State of Mexico is a key issue. Whereas, traditionally, the Federal District received a larger share of investment because of its larger population share, that is no longer justifiable. The Federal District currently accounts for only 55 per cent of the population of MCMZ. The State of Mexico has a larger population—12 million, as opposed to 10.5 million in the Federal District—yet the Federal District receives eight times more investment.

B. RESOURCE GENERATION

During the 1950s and 1960s, Mexico City's tax revenues expanded at a rapid rate, mainly because of the turnover and real estate taxes, each of which accounted for about 40 per cent of revenues. The proportional yield of the real estate tax underwent substantial erosion during the 1970s, however, due to delayed assessment and poor enforcement; at the same time, user charges on public services and utilities ceased to keep pace with rapid inflation.

Currently, the resources of state and municipal governments in the central region come from various sources: from Federal Government grants, from their own resources, and from credits channelled through the Commercial Bank and the various development banks and development funds—the National Bank of Public Works and Services (BANOBRAS), the Financial Investment Fund for Drinking Water and Sewerage (FIFAPA), the Workers' Housing Fund (INFONAVIT) and so forth. The Federal District has a clear advantage. Because the country's most important taxes, e.g., the tax on personal incomes and the value added tax, are vested in the Federal Government, more than half (56.5 per cent) of revenues in the Federal District are derived from the Federal Government. One quarter of revenue in the State of Mexico is derived from the Federal Government, whereas the proportion is considerably smaller in the other states in the central region. Given the country's current economic situation, assistance from the Federal Government can be expected to decrease and continue to be concentrated, as before, in the Federal District and the State of Mexico.

Following the revision of article 115 of the Federal Constitution, certain taxes and duties that were formerly vested in the Federal Government are now collected by municipal governments. The property tax, which is the most important of these locally collected taxes, varies greatly in importance—from 39 per cent of total locally collected revenues in the State of Mexico in 1986 to 30 per cent in the Federal District and to only 1.5 per cent in the State of Puebla. Likewise, water tariffs accounted for 13 per cent of local revenues in the Federal District in 1986 but for a much smaller share in the other states in the central region.

Regarding credits authorized by the various development banks and development funds, the Federal District has been the recipient of the largest share of credits designated for urban development, receiving 97 per cent of credits authorized by BANOBRAS in 1986. Regarding housing credits, the Federal District and the State of Mexico were by far the major recipients of credits extended by INFONAVIT, FOVISSSTE (Housing Fund of the Social Security Institute for State Employees), FONHAPO, and FOVI (Housing Operations Fund).

C. THE INSTITUTIONAL CONTEXT

Mexico is a large federal republic with three levels of government—Federal, state and municipal. MCMZ is governed by multiple administrations, including DDF, the governments of the State of Mexico, the State of Hidalgo and the 54 municipalities contained within these entities, as well as numerous sectoral ministries, public enterprises and pressure groups. The complexities of co-ordination and management were clearly noted in a study by the World Bank:

"Operational co-ordination of these different centers of responsibility, each carefully guarding its prerogatives, is not a simple task, despite the relative centralization of political and fiscal authority. As a result, planners, lawyers and administrators are forever engaged in drawing up programs for co-operative action and complex matrices of inter-institutional co-responsibilities. Furthermore, the task of metropolitan management is not helped by the traditional split between the formulation of ambitious long-term objectives and a basically political approach to the rationing of resources." (World Bank, 1984, pp. 19 and 20)

The national President is, in effect, also elected as Governor of the Federal District. The Mayor (*regente*) of the Federal District is appointed by the President of Mexico, as are the 16 local mayors (*delegados*). The National Congress is charged with legislative functions both for the nation and for the Federal District. In 1988, an Assembly of Representatives, whose members were elected by direct secret ballot, was convened for the first time in the Federal District. As Ward (1990) notes, its functions are vague, but in practice it appears to be acting as an important "watchdog" assembly on city hall expenditures and policy.

A process of open consultation was institutionalized for the first time through the planning law of 5 January 1983, which granted greater political and financial autonomy to subnational governments. According to the planning law, within the first three months of a new presidential administration, state, local and national plans are to be formulated and co-ordinated under a Comprehensive Development Agreement (*Convenio Unico de Desarrollo*), which will be in effect for the duration of an administration (World Bank, 1984). In addition, State Development Planning Councils (COPLADES) prepare co-operative agreements among federal institutions

and lower tiers of government, interpreting the demands and aspirations of different social groups (World Bank, 1984).

The institutional framework for planning and urban development in the Federal District and MCMZ is quite complex. The Ministry of Urban Development and Ecology, which is the successor of the former Sub-secretariat of Human Settlements (which was established in conjunction with the United Nations Conference on Human Settlements in 1976), is the national authority for urban development. It is charged with preparing urban development plans for the entire country and expropriating land for major urban projects. Implementation is done by the Ministry in collaboration with individual states. Although based in Mexico City, it has not played a major role in planning for MCMZ—except in the indirect sense that it has promoted the development of small and medium-sized cities that might eventually absorb migrants otherwise drawn to MCMZ. Recently, however, SEDUE has begun to focus on critical areas such as reducing environmental pollution in MCMZ.

During the early 1980s the Federal District had two major planning units, one for economic and one for physical planning. Basically, the economic planning unit was charged with setting goals (in line with the goals of the national plan, statements made in political campaigns, and so forth), presenting alternatives and translating them into investment priorities. The physical planning department was charged with preparing physical plans, which were then sent to the economic planning office and to the consultative councils. Following the 1985 earthquake, however, there was a restructuring of the local planning apparatus and the economic planning unit was abolished.

Faced with the steady expansion of the metropolitan area, the Government of the State of Mexico engaged in planning for the first time in the early 1970s, when it established the Institute for Urban Action and Social Integration (AURIS). Although AURIS was charged with planning for the entire State, much of its activity focused on planning for municipalities in the State of Mexico. In 1982 the General Directorate of Urban Development and Housing was established within the Ministry of Public Works and was charged with undertaking studies and formulating plans and programmes to orient urban growth in the peripheral municipalities.

In regard to planning for the metropolitan area as a whole, as previously noted, one of the innovative mechanisms established under the Law of Human Settlements was the Conurbation Commission, which was designed to facilitate integrated urban development in areas where formerly separate urban areas had coalesced. Headed by the Minister of SEDUE and comprised of the Chief of the Federal District, the Governors of the States of Hidalgo, Mexico,

Morelos, Puebla and Tlaxcala, municipal presidents and delegates, the Conurbation Commission met only once—in October 1977. Although its Technical Secretariat worked up until February 1988 (when it was disbanded), producing numerous planning papers, the Conurbation Commission is widely acknowledged to have had little impact on policy decisions.

CONCLUSION

Mexico City, with a population of around 19 million inhabitants, is currently the world's largest city. Although its natural increase and in-migration have slowed considerably, the city is still expected to reach 25-27 million inhabitants by the end of the century—attaining proportions never experienced before in any city in the world.

Mexico City's demographic expansion will inevitably produce continuing horizontal urban sprawl and will result in growing demands for land, shelter and urban infrastructure, as well as growing consumption of water, food and energy. Given the current outlook for the national economy and the limited possibilities for absorption of labour by the formal sector, a large proportion of Mexico City's population is likely to subsist on low-income, informal sector occupations. Transport congestion, waste disposal and environmental pollution also pose serious threats to the efficiency and welfare of the local economy. Moreover, fiscal pressures to meet these challenges are already serious and will keep the various levels of Government under constant stress.

Land remains a serious issue. For many years, the Government's policy was to regularize land that was illegally invaded or subdivided, a process that frequently pushed up land prices and resulted in displacing lower-income residents. This situation now appears to be changing. Whereas the previous policy served in effect as a system of political patronage, the opposition party currently in power in peripheral areas maintains a more cautious attitude towards large-scale regularizations.

Although housing standards in Mexico City are currently quite high by international standards, the situation begins to deteriorate markedly at the edge of the urbanized area, where there are vast areas of substandard housing, with unpaved roads, illegal electricity hook-ups, and a lack of water, sewerage, and waste collection. With international financial assistance and assistance from lending institutions within Mexico, Mexico City's housing sector made an impressive recovery after the 1985 earthquake. However, by rehousing victims of the earthquake in the same location, the Government lost an important opportunity to further promote its decentralization efforts.

Although average life expectancy has increased significantly over the past several decades, respiratory and gastro-intestinal diseases caused by pollution and unsanitary conditions take a heavy toll on Mexico City's population. Despite some shift of focus towards primary health care, the philosophy of health care in Mexico still concentrates upon individualized health care and treatment rather than on collective programmes to improve general living conditions (Ward, 1990). Education, health, social assistance, family planning and recreational facilities are unevenly available to the residents of the metropolitan area. Facilities such as hospitals, universities, theatres and stadiums, for example, are mostly concentrated in the Federal District. Other public services such as street maintenance, public lighting, fire protection and police protection are rationed mainly along income lines, since the needs of wealthier neighbourhoods, which have greater political influence, tend to be met first (World Bank, 1984).

Whereas construction of the metro led to major changes in the transport sector—e.g., to state control of urban buses in the Federal District, to the construction of terminals on the periphery, and to a significant increase in the numbers of collective taxis—these changes have not had a major impact on reducing Mexico City's extremely serious traffic congestion. The major problem facing the transport sector remains the rapid increase in the number of private automobiles, which are the chief contributors not only to traffic congestion but also to air pollution. Although the Government has begun to develop a coherent commitment to mass transportation, this has not led to a fundamental policy change nor political willingness to reduce indirect subsidies and supports for the private sector, nor to penalize low-capacity vehicles (Ward, 1990).

Pollution is undoubtedly Mexico City's most serious problem. The geographical situation of the basin, its meteorological characteristics, and the emission of air pollutants combine to make it a great natural reservoir in which complex photochemical reactions produce oxidant chemical compounds. Because air pollution of an intensity and duration comparable to Mexico City has never been recorded anywhere else, doctors report that it is difficult to gauge the likely permanent effects of the various forms of pollution on human health (Walsh, 1989). Recently, an increasingly intensive effort has been under way to

develop a comprehensive package of motor vehicle controls, including more stringent new car standards, and inspection and retrofit of some older vehicles. To date, no country in the world has attempted, much less successfully carried out, the type of used vehicle retrofit programme contemplated in Mexico City. As a recent report emphasized, the programme must be attempted because of the large proportion of older vehicles in the fleet, which will dominate the inventory throughout the remainder of this century and into the next (Walsh, 1989). A further problem is that the Government's ability to act *vis-à-vis* pollution is constrained by budget cuts imposed by Mexico's need to repay its foreign debt.

In regard to planning, Mexico is a country with a long history of spatial planning. A major problem has been the fact that each administration prepared its own plans, often with a lack of continuity. Most plans have tended to be mere pronouncements, with little diagnosis and insufficient discussion of how the plans would be implemented. Moreover, successive plans have shown excessive reliance on purely co-ordinative mechanisms (e.g., creating innumerable committees) and normative measures (e.g., industrial development restrictions, zoning subdivisions and building regulations) (World Bank, 1984).

Spatial policy instruments generally have been weak. Whereas the de la Madrid administration finally went ahead forcefully with administrative decentralization (which is a straightforward, relatively easy to implement measure), the total numbers that will be moved are insignificant in light of continuing rural-to-urban migration. Industrial relocation has proven to be far more difficult, largely because the Government has been faced with balancing the need to preserve economic efficiency, to conserve jobs and simultaneously to protect the environment.

A major problem has been the fact that the combined pressures of transportation congestion, environmental decay, land speculation, inadequate public services and unemployment have unleashed strong demographic, political and market forces that operate in both directions, towards the centre and away from it. Their interplay has been traditionally distorted by an unusual degree of Government intervention through direct investments, subsidies, regulations and pricing measures which were not always applied in a consistent way (World Bank, 1984).

In addition, long-standing high levels of subsidies have served as implicit spatial policies, counteracting the goals of the Government's explicit spatial policies. For example, water prices were held down so that consumers paid less than the incremental cost of providing water; the prices of corn, electric power, diesel fuel and public transport were also subsidized from around 1940 to the 1970s (World Bank, 1984). Although some of these subsidies were to benefit the urban poor, substantial parts of the subsidies benefited other groups and served to reduce the cost of locating economic activity in MCMZ.

A major obstacle with regard to decentralization is the fact that Mexico City is much more than Mexico's seat of economic and political power. Households that are drawn to or desire to remain in Mexico City are strongly influenced by numerous social, political, educational and cultural factors, and they often equate living in Mexico City with the image of personal success. It seems unlikely, therefore, that Mexico City's national predominance will change very much during the remainder of this century (Ward, 1990).

Governing Mexico City is an extremely complex task, particularly in light of the constraints posed by its jurisdictional fragmentation, and by division of authority among the national ministries, the Department of the Federal District, the State governments, the municipalities, and the numerous implementing agencies and institutions. Two serious problems remain. First, there is no single metropolitan region authority with responsibility for implementing a comprehensive and integrated strategy of metropolitan development. Events are occurring outside the Federal District which affect both it and the metropolitan area at large, yet the Federal District is currently powerless to respond (Ward, 1990). Second, there are few large cities in the world in which residents have so little say over who governs them, and over local urban policies and expenditure (Ward, 1990).

Finally, one of the most serious problems in planning for MCMZ is the fact that, within a few years, more than half of the population will be located in the State of Mexico. As Ward (1990) notes, most of the focus of government and academic analysts has been towards the past and current weighting of population in the city; they have failed to look adequately at the area where the battle over future city growth will be won or lost—in the State of Mexico. Whereas the Federal District continues to receive the highest level of subsidies and is equipped with superior infrastructure, the residents of the

outlying areas pay higher prices for inferior services. Moreover, as the two entities have different governmental structures and urban development policies, there is little hope of resolving these complex jurisdictional issues in the near future.

NOTES

¹ In this paper, Mexico City refers to the urbanized area of the Mexico City Metropolitan Zone (MCMZ). It is comprised of the 16 delegations of the Federal District plus 17 municipalities in the State of Mexico. The larger MCMZ, as defined in the Government's Development Programme for the Mexico City Metropolitan Zone and the Central Region (1983), encompasses the Federal District plus 53 municipalities in the State of Mexico and one in the State of Hidalgo.

² Preliminary results of the 1990 census, which were issued shortly before the present publication went to press, estimated that the population of the Federal District was around 8.2 million inhabitants—far smaller than the population that was previously estimated.

³ The country's average annual rate of population growth in 1982 was 2.4 per cent, indicating that CONAPO's target was met and even slightly exceeded; however, some Mexican demographers concede that reaching a target of 1 per cent per annum by the year 2000 is unlikely.

⁴ The greatest damage during the earthquake occurred within the old lake bed. Adobe slum structures that were not designed to withstand earthquakes simply fell apart. Adjacent tall buildings girated at different frequencies and bumped into one another, causing smaller buildings to collapse; asymmetrical buildings were twisted owing to uneven distribution of stress, causing structural failure and collapse. Earthquake-proof buildings with foundations resting on rollers suffered little damage. Most of the destroyed buildings were constructed according to a code which, on paper, is one of the strictest in the world. Much was made of the fact that Government-constructed buildings were affected most. Whereas not a single modern privately-built multi-storey building collapsed, the worst affected were a public housing complex in the city centre, two city hospitals, four ministries and more than 200 schools.

⁵ In Mexico City participation rates show both a tendency to increase and to fluctuate between a low of around 47 per cent during times of rapid economic growth and a high of around 53 per cent when times are hard and extra-income earning activities of women, children and the elderly become especially essential to survival (Ward, 1990).

⁶ Surface air temperature inversions tend to occur about 25 per cent of the time in summer, almost every night in autumn, half the time in winter, and five of seven nights in spring. Thermal inversion is significant because it acts as a blanket over the valley, capturing and holding the pollutants near the human breathing zone (Walsh, 1989).

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