

The case of
Mexico City, Mexico

by *Priscilla Connolly*

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I. INTRODUCTION: THE CITY

A. URBAN CONTEXT

1. National Overview

Some time in 2001 Mexico's total population exceeded one hundred million, of which at least two-thirds are considered to be urban by virtue of inhabiting localities with more than 15,000 inhabitants (**Figure 1**). The urbanisation process has taken place at great speed, mainly in the latter half of the twentieth century. Thirty three million Mexicans now live in cities with over a million inhabitants, another 20.6 million live in medium cities of between 100,000 and one million, while a further 15 million live in the smaller towns and cities. The remaining third of the total population living in localities of less than 15,000 inhabitants is considered to be "rural", although the distinction between "urban" and "rural" is often inappropriate, beyond the rather arbitrary delimitation of census localities. In some parts of Mexico, so-called "rural" localities are physically urbanised, if not actually integrated into urban areas. Yet rural localities do include a large contingent of marginalized poor, including many indigenous communities and others involved in subsistence agriculture. And the poorest of these –approximately 10 million people– are dispersed in localities of less than 500, two-third of which are completely isolated from urban areas¹.

The persistence of extreme rural poverty contrasts with Mexico's dubious distinction of also becoming in 2001 the world's ninth largest economy² (measured in dollars) having ousted Brazil from that position on the strength of an over-valued peso. Relative to its population, the Mexican economy is less impressive, ranking in sixty-ninth place among the developing nations, with a per capita GDP of US \$5,070 in 2000³. Almost a third of GDP is now generated by exports, of which 37.5 per cent are manufactured goods and a further 43.8 per cent is bonded industrial production. Tertiary activities have always played an important role, but it is industry that has been the driving force of Mexico's urbanisation, at least until recently (**Table 1**). A first wave of industrialisation occurred during the latter half of the nineteenth century and beginning of the twentieth, when the basic infrastructure was introduced: railways, roads, ports, electricity. At the same time, the major cities acquired the essential items of contemporary urbanisation: paved roads, water and drainage, public parks and civic centres, street lighting and tramways.

The Revolutionary struggles of the second decade of the century prevented Mexico from fully reaping the fruits of this investment until the favourable conditions

Table 1: Mexico: distribution of GDP 1990-1998 by economic sector

	1990	1940	1970	1980	1988	1998
Primary sector	23.5%	15.4%	9.2%	6.8%	6.9%	5.8%
Secondary sector	14.4%	19.9%	26.1%	27.5%	26.4%	28.8%
Tertiary sector	52.1%	64.7%	64.7%	65.7%	66.7%	65.4%

Source: Sobrino, J. (2001) 'Participación económica'. In G Garza (coord.) *La Ciudad de México en el Fin del Segundo Milenio*. Gobierno del Distrito Federal/ El Colegio de México, México DF. P.163

Table 2: Mexico: income distribution by decile 1963 to 1992

Deciles of Households	% of Income			
	1977	1984	1989	1992
I	1.1	1.4	1.7	2.1
II	2.3	2.6	3.1	3.1
III	3.3	3.6	3.8	3.9
IV	4.5	4.8	4.7	4.7
V	6	6	5.9	5.8
VI	7.6	7.6	7.2	7.2
VII	9.6	9.5	8.9	8.5
VIII	12.5	12.5	11.8	10.8
IX	17.6	17.3	15.6	15.4
X	35.5	34.6	38	38.5

Source: 1977 y 1984, Cortés, F and R Ma. Ruvalcaba (1991), based on *Encuesta Nacional de Ingresos y Gastos de los Hogares*, of respective years; 1989 and 1992: INEGI (1992, 251; 1994, 261), *Encuesta Nacional Ingreso-Gasto de los Hogares*, 1989 and 1992.

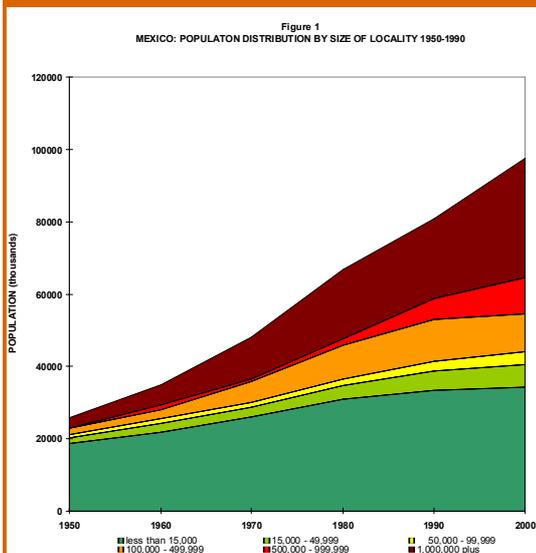


Figure 1: Mexico: Population distribution by size of locality 1950-1990

provided by World War II precipitated rapid industrialisation based on import substitution. The “*Mexican miracle*” of unabated economic growth lasted till the mid 1970’s (Fig. 2), after which a sequence of crises, followed by a ruthless opening up of the economy by trade liberalisation, privatisation and increased foreign investment, has produced uneven results in macroeconomic terms (Fig. 3) and extreme social impacts, especially unemployment. In spite of constant growth of the working population, the total number of formal private sector employees (defined by the social security register) actually dropped in three distinct periods: 1982 to 1984, 1992 to 1997 and again in 2000 (Figure 4). Correspondingly, income distribution at a national level has remained extremely unequal (Table 2). The gap between the rich and the poor is enormous, both within regions and across regions. Essentially the country remains divided between a richer, urban and agricultural, “North” and a poor, rural, South (Map 1). Dominating both Mexicos from the heart of the central highlands, the nation’s capital and undisputed solar plexus combines the lowest level of relative poverty with the highest concentrations of urban poor.

2. Mexico City: origins and metropolitan growth

Mexico –land of the Mexica- takes its name from its capital, rather than vice versa. Just before the Spanish conquest and the destruction of the city in 1521, Tenochtitlan and environs, the religious, military and economic centre of the Mexica or Aztec empire, had a population of between 200,000 and 300,000, maybe more: perhaps the largest city in the world². After Cortés adopted the ruins of Tenochtitlan as the capital of New Spain, the territorial domination of México, as the colonial city was named, extended over a vast hinterland stretching from the Central America to Oregon. The military, tributary and religious domination adapted from the Aztec system was reinforced by the trade monopoly between Mexico City and Cadiz, imposed by the Spanish until the Borbonic reforms in the late eighteenth century. After independence from Spain in 1810 and the subsequent years of civil strife, the economic and political pre-eminence of Mexico City was enhanced, particularly during the Porfirian dictatorship from 1870 to 1910, which endowed the nation’s capital with strong advantages in terms of social and physical infrastructure. It was, however, in the aftermath of the 1910-17 Revolution when the city population began its decisive upsurge; since then it has grown exponentially to become the archetypical Latin American primate city (Table 3 and Fig. 5).

The territorial dimension of this growth may be appreciated in Map 2: the city having expanded from around 23 sq. km. in 1900 to about 683 sq. km. in

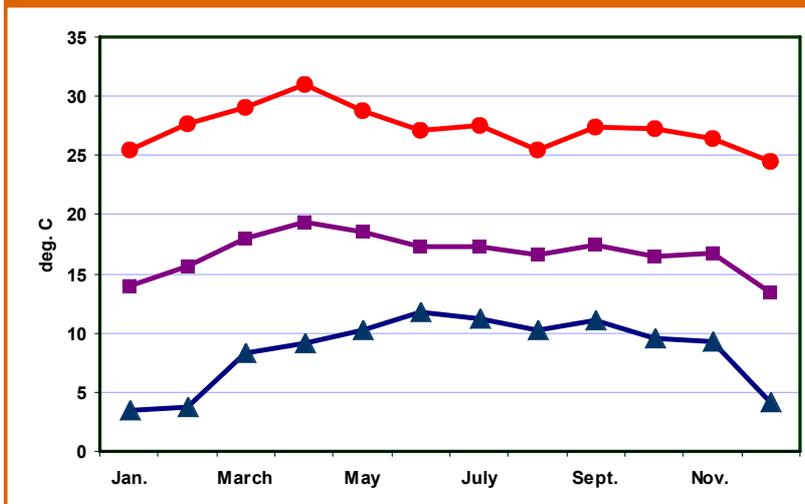
1970, and again duplicating to 1,295 km². in 1990. Densities have remained stable over 500 years, oscillating around 120 persons per hectare as the city grows cyclically, in accordance to the macroeconomic and social processes governing urban development. As a general rule, the city expands horizontally in times of recession, when land is cheap, and consolidates in times of economic growth when credit for building is available.

Mexico City, as the republic's capital, has historically been located in the Federal District. From the mid 1940's, spurred by the prohibition of new development here, industrial and urban growth to the north spilled over into municipalities belonging to the neighbouring state, confusingly called "State of Mexico". By 1970, 11 municipalities were totally or partially incorporated into what was defined as the Mexico City Metropolitan Area, or Mexico City Metropolitan Zone³. The process has continued to embrace an ever-increasing number of municipalities as city growth becomes more dispersed. At no time, however, has there been a single official, functional or jurisdictional definition for what will be referred to here as "Metropolitan Mexico City"⁴.

Different academic studies and government departments apply their own criteria to define -often not explicitly- the metropolitan area at any moment in time. In fact, the inclusion of more or less municipalities does not make much difference to the total population, 95% of which is concentrated in the Federal District and 21 municipalities (Map 3)⁵.

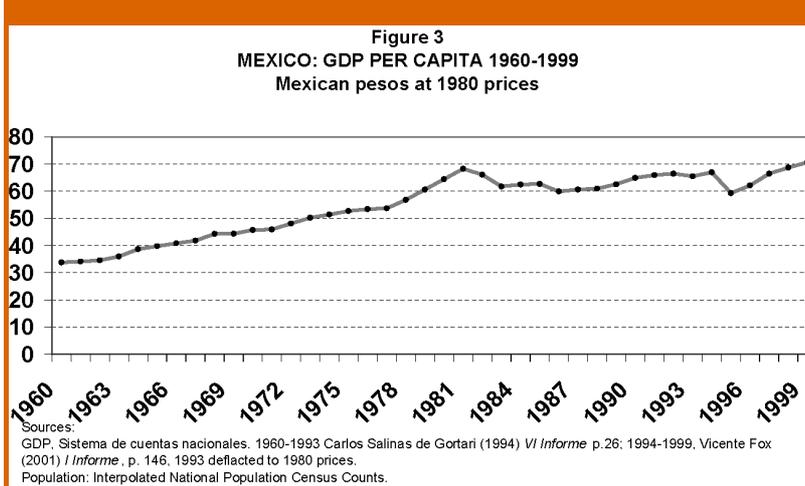
At present, the broadest definition of what is often called the "Mexico Valley Metropolitan Zone" embraces the Federal District plus 58 municipalities in the State of Mexico and one more in the State of Hidalgo. Unless otherwise stated, all further statistics are based on this definition, as illustrated in Map 4 and Table 4. The total population of Metropolitan Mexico City, thus defined, reported in the 2000 census was 18,396,677, giving a mean annual growth rate between 1995 and

Figure 2: Mexico: gross national product per capita 1900-1970. Mexican pesos at 1970 prices



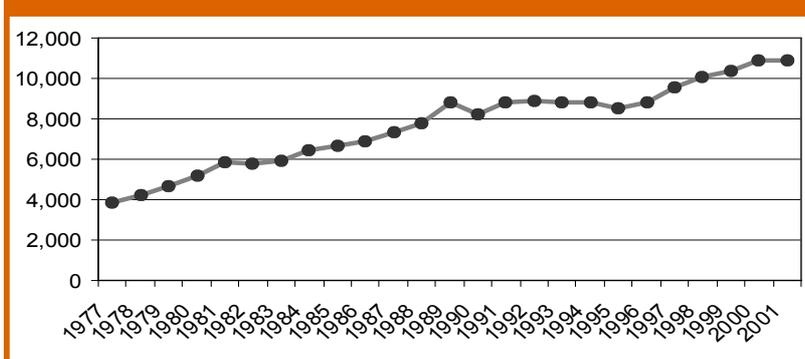
Source: INEGI (1994) Estadísticas Historicas, vol.Im Mexico, pp. 401-2

Figure 3: Mexico: GDP per capita 1960-1999 Mexican pesos at 1980 prices



Sources: GDP, Sistema de cuentas nacionales. 1960-1993 Carlos Salinas de Gortari (1994) VI Informe p.26; 1994-1999, Vicente Fox (2001) I Informe, p. 146, 1993 deflated to 1980 prices. Population: Interpolated National Population Census Counts.

Figure 4: Number of permanently private sector employees with social security coverage (excludes temporary workers and self-employed)



Sources: GDP, Sistema de cuentas nacionales. 1960-1993 Carlos Salinas de Gortari (1994) VI Informe p.26; 1994-1999, Vicente Fox (2001) I Informe, p. 146, 1993 deflated to 1980 prices. Population: Interpolated National Population Census Counts.

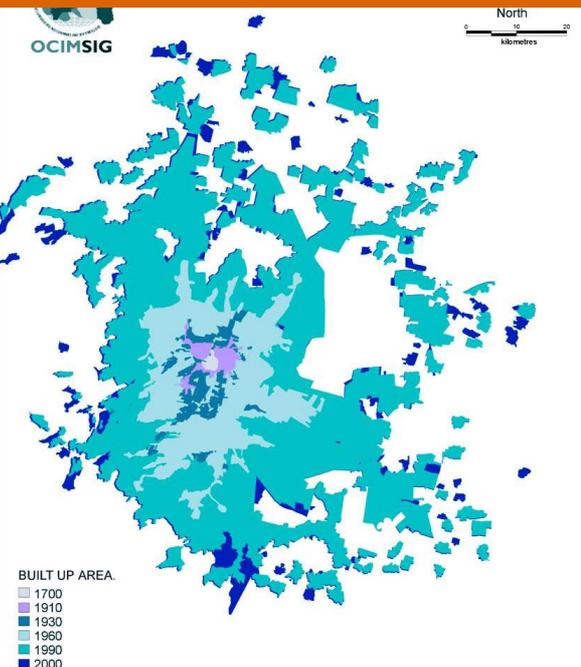
Map 1: Mexico: localities with very high marginality levels



Fuente: Consejo Nacional de Población

Source: CONAPO (2000), Indices de Marginación, 1995 (Compact disk) / Consejo Nacional de Población

Map 2: City growth 1500 to 2000



OCIM-SIG Project Universidad Autónoma Metropolitana-Azcapotzalco/CENVI
Source: National Population Census 2000

**METROPOLITAN MEXICO CITY
MEXICO CITY GROWTH 1700, 1910, 1930, 1960,
1990 Y 2000**

Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; Consejo Nacional de Población

3. The Physical City

Mexico City has most of the poverty and wealth-related environmental problems and hazards to be found in all metropolises. Many of these, however, are made worse by the city's unique geographical position. First, it is one of the few cities of the world that has no natural drainage outlet, being located in a closed basin on the flat bed of what was once a series of lakes (Map 5). These were of varying depth depending on rainfall, most of which is concentrated in the five months between May and September and is highly variable from year to year (Table 5). Rain and spring water running off the elevated slopes to the West and South of the valley collect in the lowest part of the system, lake Texcoco, whose vestiges remain to the East of central Mexico City. The water here is saline due to the intense evaporation caused by high temperatures and insolation during the dry season (Figure 7). The Mexica chose their island location for strategic reasons (and no doubt for its agreeable climate), but their expanding city was completely flooded on various occasions, while fresh water needed to be brought in via aqueduct. This paradox of too much and too little water has characterised Mexico City's growth throughout its history and has been a major factor in urban segregation and the location of slums. While the higher areas to the West and South of the city are relatively safe from flooding and have enjoyed more immediate access to water supplies, the saline flat lands to the East are more prone to flooding when it rains and dust storms in the dry season. Until the end of the nineteenth century, flooding was considered to be the main environmental hazard, exacerbated by deforestation, urban growth and the destruction by the Spaniards of the original hydraulic defence system built by the Aztecs. The solution adopted was to drain the city artificially, first achieved partially under the Colonial administration in the eighteenth century and, finally, in 1900, by means of a 40 kilometre-long canal which drains the Texcoco Lake to the North East and out of the basin through a tunnel under the mountains. Under normal conditions, sewage and storm water are pumped through this system and out of the valley, while 30 per cent of the city's drinking water is pumped in from sources over 100 kilometres away. The remaining 70 percent comes from artesian wells within the basin.

The over exploitation of the aquifer has caused severe subsidence in central Mexico City, which both exacerbates the risk of flooding and damages the water and drainage network, causing leakage and contamination of the water supply. When heavy rains threaten flooding, a gravity-fed deep tunnel built in 1975 drains off excess water to the North West. Mexico City's current paradoxical hydrological balance is quantified in Table 6. Water is undoubtedly the major environmental problem facing the city, as a whole; and the lack of sufficient clean water is one of the major component factors defining slum housing.

2000 of 1.45 per cent. Figure 6 shows the distribution of population growth between the Federal District and the State of Mexico.

Table 3: Mexico City: Population growth and participation in national population 1900 - 2000 (in Thousands)

	1900	1910	1921	1930	1940	1950	1960	1970	1980	1990	2000
Population	345	471	662	1,049	1,645	2,952	5,125	8,623	12,995	15,274	17,946
Population as % of total national	2.5%	3.1%	4.6%	6.3%	8.4%	11.5%	14.7%	17.9%	19.4%	18.8%	18.4%
Mean annual growth rate		3.2%	3.1%	5.6%	4.7%	5.9%	5.7%	5.5%	4.0%	1.7%	1.4%

Note: from 1950 onwards, the population refers to Mexico City Metropolitan Area, comprising the Federal Capital and a variable number of municipalities belong to the surrounding State of Mexico (see Table 5).

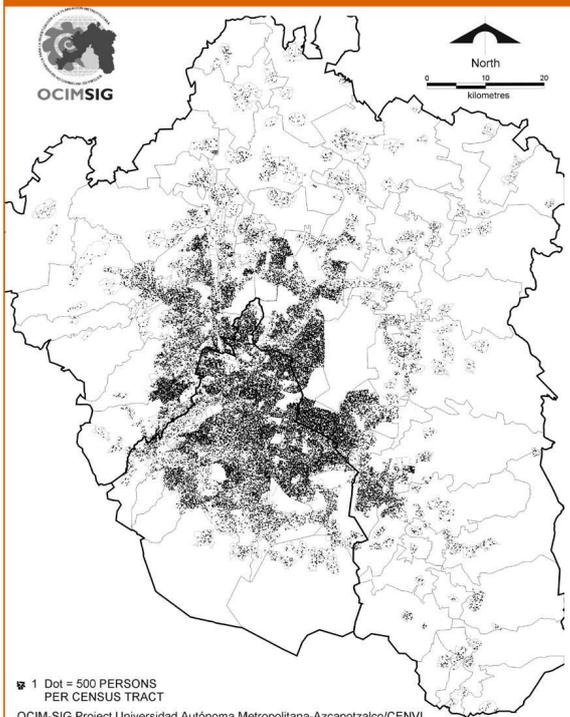
Apart from the complex hydrological situation, the Mexico City basin's geological origins affect the location and conditions of slum housing in other ways. The steep slopes surrounding the extinct lakes are undesirable for most conventional building uses, and have provided a cheap alternative for unauthorised settlement. Some of these hills have been mined for building materials, compounding subsoil collapse to the existing hazard of high gradients and permanent lack of services. These areas are, however, relatively immune to risk from Earthquakes, unlike all the inhabitants of the lakebed, with its highly compressible subsoil. **Map 6** shows the built-up area in relation to Mexico City's topography, while **Map 7** shows population density distribution by

census tract in 2000. In general, higher densities correspond to lower income population, often situated in areas, which are vulnerable for one or other of the reasons mentioned.

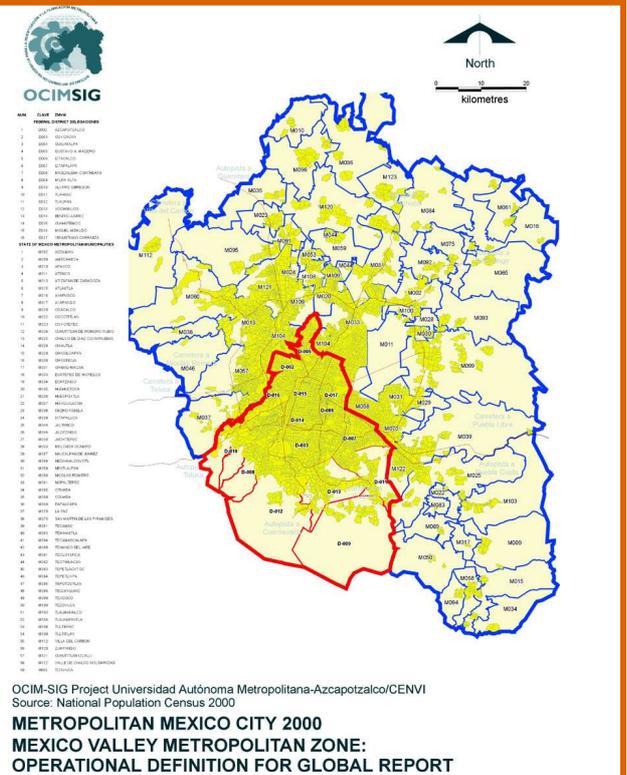
4. Demographics, Population Distribution and Social Segregation.

While basic pattern of urban segregation determined by historical and physical factors remains unaltered, recent demographic and economic changes are transforming the social structure of the city. First and foremost, a revolution in vital statistics: the drastic reduction in the fertility due to family planning policies imple-

Map 3. Metropolitan Mexico City: Distribution of population by census tract 2000



Map 4. Metropolitan Mexico City/Mexico Valle Metropolitan Zone: Operational definition for Global Report



Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; Consejo Nacional de Poblacion

Table 4. Metropolitan Mexico City (zona metropolitana del Valle de México): Population by delegation y Municipality 1990 to 2000

NO.	DELEGACIÓN/ MUNICIPALITY	TOTAL POPULATION			POPULATION INCREASE			MEAN ANNUAL GROWTH RATE		
		1990	1995	2000	1990-95	1995-2000	1990-2000	1990-95	1995-2000	1990-2000
	Total Metropolitan Mexico city	15,563,795	7,297,535	18,396,677	1,733,740	1,076,003	2,809,743	1.9	1.4	1.7
	Total Federal District	8,235,744	8,489,007	8,605,239	53,263	2116,232	369,495	0.54	0.32	0.44
1	Azcapotzalco	474,688	455,131	441,008	-19,557	-14,123	-33,680	-0.74	-0.73	-0.74
2	Coyoacán	640,066	653,489	640,423	13,423	-13,066	357	0.37	-0.47	0.01
3	Cuajimalpa	119,669	136,873	151,222	17,204	14,349	31,553	2.40	2.36	2.39
4	Gustavo A. Madero	1,268,068	1,256,913	1,235,542	-11,155	-21,371	-32,526	-0.16	-0.40	-0.26
5	Iztacalco	448,322	418,982	411,321	-29,340	-7,661	-37,001	-1.19	-0.43	-0.86
6	Iztapalapa	1,490,499	1,696,609	1,773,343	206,110	76,734		2.32	1.04	1.77
7	Magdalena Contreras	195,041	211,898	222,050	16,857	10,152	282,844	1.48	1.10	1.32
8	Milpa Alta	63,654	81,102	96,773	17,448	15,671	27,009	4.38	4.21	4.31
9	Alvaro Obregón	642,753	676,930	687,020	34,177	10,090	33,119	0.92	0.35	0.67
10	Tláhuac	206,700	255,891	302,790	49,191	46,899	44,267	3.85	4.01	3.92
11	Tlalpan	484,866	552,516	581,781	67,650	29,265	96,090	2.34	1.21	1.85
12	Xochimilco	271,151	332,314	369,787	61,163	37,473	96,915	3.66	2.53	3.18
13	Benito Juárez	407,811	369,956	360,478	-37,855	-9,478	98,636	-1.71	-0.60	-1.24
14	Cuahutemoc	595,960	540,382	516,255	-55,578	-24,127	-47,333	-1.72	-1.06	-1.44
15	Miguel Hidalgo	406,868	364,398	352,640	-42,470	-11,758	-79,705	-1.93	-0.76	-1.43
16	Venustiano Carranza	519,628	485,623	462,806	-34,005	-22,817	-54,228	-1.19	-1.12	-1.16
	Total Metropolitan Municipalities	7,328,051	8,808,528	9,791,438	1,480,477	982,910	-56,822	3.31	2.50	2.96
1	Acolman	43,276	54,468	61,250	11,192	6,782	17,974	4.15	2.78	3.56
2	Amecameca	36,321	41,671	45,255	5,350	3,584	8,934	2.46	1.95	2.24
3	Apaxco	18,500	21,134	23,734	2,634	2,600	5,234	2.38	2.75	2.54
4	Atenco	21,219	27,988	34,435	6,769	6,447	13,216	5.02	4.96	5.0
5	Atizapan de Zaragoza	315,192	427,444	467,886	112,252	40,442	152,694	5.54	2.13	4.06

(continued)

mented since the 1970's and increased life expectancy have changed the way people live, especially women, thus altering family composition and housing needs. It is also significant that these statistics are converging at a national level: perhaps a better indicator for the spread of urbanisation than the size of census localities. Table 7 compares Mexico City's Federal District, which traditionally shows the lowest fertility and the

highest life expectancy, with the most impoverished states at the other extreme for 1970, 2000 and projections for 2020. These changes have important implications for the city's development. First, the deceleration of population growth has not curbed the expansion of the city because the household formation remains very high, with households becoming smaller and older (Table 8). The ageing of the population is another

Table 4. Metropolitan Mexico City (zona metropolitana del Valle de México): Population by delegation y Municipality 1990 to 2000 (continúe)

No.	DELEGACIÓN/ MUNICIPALITY	TOTAL POPULATION			POPULATION INCREASE			MEAN ANNUAL GROWTH RATE		
		1990	1995	2000	1990-95	1995-2000	1990-2000	1990-95	1995-2000	1990-2000
6	Atlautla	18,993	22,634	25,950	3,641	3,316	6,957	3.15	3.25	3.20
7	Axapusco	15,803	17,848	20,516	2,045	2,668	4,713	2.18	3.31	2.67
8	Ayapango	4,239	4,858	5,947	619	1,089	1,708	2.44	4.84	3.47
9	Coacalco	152,082	204,674	252,555	52,592	47,881	100,473	5.39	5.03	5.24
10	Cocotitlan	8,068	9,290	10,205	1,222	915	2,137	2.53	2.22	2.40
11	Coyotepec	24,451	30,619	35,358	6,168	4,739	10,907	4.06	3.42	3.79
12	Cuautitlan de R. R.	48,858	57,373	75,836	8,515	18,463	26,978	2.88	6.74	4.53
13	Chalco de Díaz de C.	282,940	175,521	217,972	-107,419	42,451	-64,968	-8.10	5.19	-2.59
14	Chiautla	14,764	16,602	19,620	1,838	3,018	4,856	2.10	3.98	2.91
15	Chicoloapan	57,306	71,351	77,579	14,045	6,228	20,273	3.95	1.97	3.10
16	Chiconcuac	14,179	15,448	17,972	1,269	2,524	3,793	1.53	3.60	2.42
17	Chimalhuacán	242,317	412,014	490,772	169,697	78,758	248,455	9.84	4.17	7.37
18	Ecatepec de Morelos	1,218,135	1,457,124	1,622,697	238,989	165,573	404,562	3.22	2.55	2.93
19	Ecatzingo	5,808	6,949	7,916	1,141	967	2,108	3.22	3.09	3.17
20	Huehuetoca	25,529	32,718	38,458	7,189	5,740	12,929	4.49	3.85	4.22
21	Hueyoptla	26,189	31,124	33,343	4,935	2,219	7,154	3.10	1.62	2.46
22	Huixquilucan	131,926	168,221	193,468	36,295	25,247	61,542	4.39	3.32	3.93
23	Isidro Fabela	5,190	5,190	8,168	1,416	1,562	2,978	4.36	5.08	4.68
24	Ixtapaluca	137,357	137,357	297,570	50,333	109,880	160,213	5.68	11.37	8.10
25	Jaltenco	22,803	22,803	31,629	3,435	5,391	8,826	2.51	4.46	3.35
26	Jilotzingo	9,011	9,011	15,086	3,401	2,674	6,075	5.83	4.66	5.33
27	Juchitepec	14,270	14,270	18,968	3,217	1,481	4,698	3.66	1.92	2.91
28	Melchor Ocampo	26,154	26,154	37,716	7,301	4,261	11,562	4.45	2.84	3.76
29	Naucalpan de Juárez	786,551	786,551	858,711	53,172	18,988	72,160	1.16	0.52	0.89
30	Nezahualcoyotl	1,256,115	1,256,115	1,225,972	-22,247	-7,896	-30,143	-0.32	-0.15	-0.24
31	Nextlalpan	10,840	10,840	19,532	4,213	4,479	8,692	5.98	6.28	6.11
32	Nicolás Romero	184,134	184,134	269,546	52,930	32,482	85,412	4.57	3.05	3.91
33	Nopaltepec	5,234	5,234	7,512	1,258	1,020	2,278	3.88	3.47	3.71

implication, creating a disproportionate need for jobs and, progressively, facilities for the elderly. **Figure 8** how the age structure of the city's population has changed in thirty years. Third, as women have to dedicate less time to pregnancy and childcare they are increasingly active economically (**Table 9**). At the same time, there has been a rise in the proportion of female headed households, related both to the longer life expectancy of women and their increased economic

independence, among other reasons (**Table 10**) (Esquivel 2002).

The regional convergence of socio-economic indicators is also a reflection of radical changes in migration patterns. The traditional model of massive immigration of rural peasants to the major cities is no longer valid; rural migrants are now attracted more across the border and to other large and medium cities within Mexico (CONAPO 2001, 95-104). There has also been a rever-

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		1990	1995	2000	1990-95	1995-2000	1990-2000	1990-95	1995-2000	1990-2000
34	Otumba	21,834	25,415	29,097	3,581	3,682	7,263	2.72	3.21	2.94
35	Ozumba	18,052	21,424	23,592	3,372	2,168	5,540	3.07	2.28	2.73
36	Papalotla	2,387	2,998	3,469	611	471	1,082	4.11	3.47	3.84
37	La Paz	134,782	178,538	212,694	43,756	34,156	77,912	5.10	4.18	4.70
38	San Martín de las P.	13,563	16,881	19,694	3,318	2,813	6,131	3.95	3.67	3.83
39	Tecamac	123,218	148,432	172,813	25,214	24,381	49,595	3.35	3.62	3.47
40	Temamatla	5,366	7,720	8,840	2,354	1,120	3,474	6.64	3.22	5.16
41	Temascalapa	19,099	24,440	29,307	5,341	4,867	10,208	4.46	4.33	4.41
42	Tenango del Aire	6,207	7,282	8,486	1,075	1,204	2,279	2.86	3.64	3.20
43	Teoloyucan	41,964	54,454	66,556	12,490	12,102	24,592	4.72	4.80	4.76
44	Teotihuacán	30,486	39,183	44,653	8,697	5,470	14,167	4.54	3.10	3.92
45	Tepetlaoxtoc	16,120	19,380	22,729	3,260	3,349	6,609	3.31	3.79	3.52
46	Tepetlixpa	12,687	15,181	16,863	2,494	1,682	4,176	3.22	2.49	2.91
47	Tepotzotlan	39,647	54,419	62,280	14,772	7,861	22,633	5.76	3.20	4.66
48	Tequixquiac	20,784	24,766	28,067	3,982	3,301	7,283	3.15	2.97	3.07
49	Texcoco	140,368	173,106	204,102	32,738	30,996	63,734	3.78	3.92	3.84
50	Tezoyuca	12,416	16,338	18,852	3,922	2,514	6,436	4.97	3.40	4.30
51	Tlalmanalco	32,984	38,396	42,507	5,412	4,111	9,523	2.72	2.41	2.59
52	Tlalnepantla	702,807	713,143	721,415	10,336	8,272	18,608	0.26	0.27	0.26
53	Tultepec	47,323	75,996	93,277	28,673	17,281	45,954	8.74	4.90	7.08
54	Tultitlan	246,464	361,434	432,141	114,970	70,707	185,677	7.01	4.26	5.82
55	Villa del Carbon	27,283	30,726	37,993	3,443	7,267	10,710	2.12	5.09	3.39
56	Zumpango	71,413	91,642	99,774	20,229	8,132	28,361	2.12	2.01	3.43
57	Cuahuhtlan Izcalli	326,750	417,647	453,298	90,897	35,651	126,548	4.51	1.93	3.35
58	Valle de Chalco Solidaridad	-	287,073	323,461	-	36,388	-	4.44	2.83	-
59	Tizayuca (HIDALGO)	30,293	39,353	46,344	9,060	6,991	16,051	4.74	3.89	4.38

Source: XI Censo General de Población y Vivienda 1990, Conteo de Población y Vivienda 1995, XII Censo General de Población y Vivienda 2000
Elaboration: J. Velázquez, OCIM-SIG Proyect, Universidad Autónoma Metropolitana-Azcapotzalco.

sal in the equally important influx into the capital city of the better educated from provincial towns and cities, in search of higher education and professional advancement. Since 1990, Metropolitan Mexico City has shown a negative migration balance, both in absolute number –there are more emigrants than immigrants – and in terms of human capital; those leaving the city are better qualified and more active economically than those who do not, while the immigrants are the least qualified (Table 11).

These socio-demographic changes have also affected the population's disposable income; family income is now a more important indicator of poverty or ability to pay than individual incomes, although access to monetary and other resources within families is not necessarily equitably distributed. The principal wage earner is not always the main contributor to family income, for example. Figure 9 compares the male and female economically active population in Metropolitan Mexico City. Figure 10, shows the distribution of family

earned income, based the family income and expenditure survey, with approximate correspondence with access to the housing market.

The overall convergence at a national level of socio-demographic indicators contrasts with strong variations within Mexico City. It will have been noted that the household growth rate is much slower in Federal District than in the Metropolitan Municipalities; the population is older, with a higher proportion of women in the workforce and as heads of households; mean household size is smaller, in general, all socio-economic indicators relating to education, health and income are better in the Federal District. In contrast, the population in the Metropolitan Municipalities is younger, has lower education levels and is composed of larger families, with a lower incidence of female-headed households. Breaking the data down further into the Federal District's delegaciones and the metropolitan municipalities, a clearer picture of population shifts and socio-economic trends emerges. By 2000, eight delegaciones and two metropolitan municipalities were losing population, while the major gains were in certain municipalities to the East and South. **Map 8** shows the most recent relative and absolute population shifts. Disaggregating the 2000 data further, **Maps 9 to 16** show the distribution of the following socio-demographic indicators by census tract: age, education levels, fertility rates, economic participation rates, incidence of female headed households and income levels. The less-educated lower income population is clearly concentrated on the urban fringes, especially to the East of the city, following the historical pattern of social segregation. Here also there are more people under the age of fifteen and, in general, a lower economic participation rate. The incidence of female-headed households does not seem relate to poverty, quite the opposite: the richer, more central, areas of the city, with a more active female workforce and a higher incidence of widows, contain proportionally more female-headed households (**Map 14**).

5. Mexico City's Economy

One explanation of the extraordinary degree of economic and demographic concentration in Mexico City is the competitive advantage of cumulative investment in productive infrastructure, inherited from previous eras and enhanced throughout the twentieth century (Garza 1985). The influence of the politically centralised post revolutionary presidential regimes and the consolidation of a one party state, in power until 2000, are equally important. Economic, political and educational opportunities, as well as markets, were overwhelmingly concentrated in the capital. Not surprisingly, it was here that the major part of Mexico's import substitution industrial growth took place, at first due to the World War II bonanza for already existing industries, and subsequently on the strength of national and,

Table 5: Mexico City climate: mean annual rainfall

TACUBAYA (1921-2000)	787.7 mm.
Dryest year (1945.)	460.3 mm.
Wettest year (1976)	1,161.5 mm.
EL GUARDA (1958-2000)	1,343.7 mm.
Dryest Year (1960)	878.9 mm.
Wettest year (1990)	2,873.0 mm.

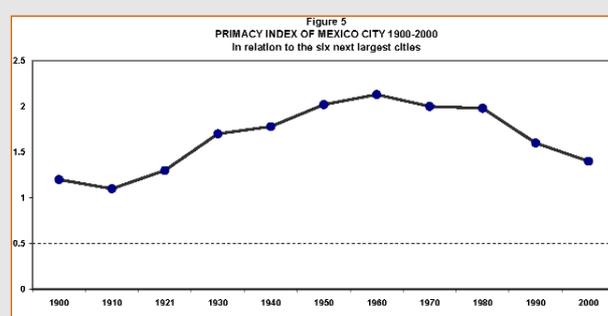
Source: INEGI (2001) *Cuaderno Estadístico de la Zona Metropolitana de la Ciudad de México*, pp. 10,

Table 6: Mexico City Valley: Hydrological balance 2001

	IN	mm3 / year	mm3 / sec.
Rainfall		6,645.58	210.73
Imported from other valleys		625.815	19.844
Extracted from subsoil within the Mexico City Valley		1,846.19	58.542
OUT			
Evaporation by transpiration		-5,256.61	-166.686
Evaporation from surface water		-120.468	-3.82
Infiltration to subsoil		-788.4	-25
Evaporation from soil		-1,363.99	-43.252
Removed from Valley by drainage		-1,588.12	-50.359
TOTAL		0	0

Source: Domínguez Mora, E. (2001) "Agua: Escasez y Vulnerabilidad en la Zona Metropolitana del Valle de México", paper presented semina Día Mundial del Agua, Mexico City 22-23 march 2001.

Figure 5: Primacy index of Mexico City 1900-2000 in relation to the six next largest cities



Data sources: 900-1930, Unikel, L (1976) *El Desarrollo Urbano de México*, México DF, El Colegio de México, p. 57; 1930-1990, CONAPO (1994) *CONAPO (1994) Información Básica sobre Migración por Entidad Federativa*, México, Consejo Nacional de Población, Consejo Nacional de Población, México DF, p. 30. 2000: CONAPO (2001) *La Población de México en el Nuevo Siglo*, p. 106.

Table 7: Mexico: a revolution in vital statistics

GLOBAL FERTILITY RATE		
1970	2000	2020
D.F. 5.3	D.F. 1.95	D.F. 1.6
TLAXCALA 8.4	GUERRERO 3.6	GUERRERO 2.0
LIFE EXPECTANCY		
1970	2000	2020
D.F. 68 YEARS	D.F. 76 YEARS	D.F. 81 YEARS
OAXACA 50	CHIAPAS 70	CHIAPAS 79

Source: CONAPO (1982) México Demográfico; CONAPO (2002) <http://conapo.gob.mx/>

Table 8: Mexico City: mean annual growth rate 1990-2000

	POPULATION	HOUSEHOLDS
TOTAL METROPOLITAN MEXICO CITY	1.70%	3.72%
FEDERAL DISTRICT	0.44%	1.59%
METROPOLITAN MUNICIPALITIES	2.96%	3.99%
TOTAL NATIONAL	1.90%	

Source: Population Census 1990, 2000

Table 9: Metropolitan Mexico City: economic participation rate by gender 1970 and 2000 (population of 12 years and over)

	1970		
	MEN	WOMEN	TOTAL
TOTAL METROPOLITAN MEXICO CITY	79.5%	27.0%	47.6%
FEDERAL DISTRICT	70.6%	28.8%	48.4%
METROPOLITAN MUNICIPALITIES	69.9%	18.6%	44.0%

Source: 1970 Garcia, B and O. Oliveria (2001) "El mercado de trabajo 1930.1998" in G. Garza (coord.) *La Ciudad de México en el Fin del Segundo Milenio*, p. 282; 2000: National Population Census

Table 10. Metropolitan Mexico City: percentage of female-headed households 2000

	2000
TOTAL METROPOLITAN MEXICO CITY	22.3%
FEDERAL DISTRICT	25.8%
METROPOLITAN MUNICIPALITIES	18.7%

Source: National Population Census

increasingly, foreign direct investment by multinational companies, all nurtured by monetary, trade and public investment policies. As **Table 12** shows, Mexico City's contribution to the national economy, already dominant, continued to increase until 1970.

After this, Mexico City's economic pre-eminence began to wane, coincident with the end of the long post war global boom. The critical effects of world recession were postponed in Mexico, due to buoyant oil revenues and public expenditure financed by an escalating national debt. This included ambitious public works projects for Mexico City: the metro, roads and deep drainage, which gave a new lease of life to the now metropolitan-scale city. The incipient recovery of the North Atlantic and Japanese economies, the drop in oil prices and the increased interest rates precipitated the still inward-looking Mexican economy into unprecedented fiscal crisis in 1982. The ensuing three-figure inflation rates, constant currency devaluations, abrupt substitution of economic nationalism for "free trade" and stringent cutbacks in public expenditure, particularly affected Mexico City for a number of reasons. City Hall's inability to pay its foreign debt curtailed the comprehensive public transport programme and public spending in general (federal government actually had to take over Mexico City's debt in 1984). As industries geared to the domestic market went out of business (the city as a whole lost over 385,000 industrial jobs between 1980 and 1993⁶), construction projects ground to a halt and bureaucrats were rationalised out of work or decentralised, unemployment soared, pushing the rising adult working population into informal occupations; commercial activities, particularly on-street vending became a particularly viable option in the face of rampant inflation. All this, combined with the devastating 1885 earthquake and increasing awareness of other environmental problems, particularly traffic congestion and atmospheric pollution, undermined much of Mexico City's comparative advantages causing, among other things, the reversal of migration flows.

6. The Governments of Mexico City

Mexico, or more correctly, the United Mexican States, is a federation with a three-tiered system of government: central government comprised of the executive branch (a six-term presidency and cabinet), congress and senate, elected for a three-year term, and the judicial branch; thirty-one state governments and one Federal District government (GDF), consisting of elected governors and congresses (or assemblies); and municipal governments with elected mayors (presidentes municipales) and councils (cabildos). All electoral terms are non renewable. In spite of recent decentralisation policies, power and resources are highly concentrated in central government, whose budget is roughly nine times that of all other levels of government

Table 11. Metropolitan Mexico City: comparison between emigrants, immigrants and those who did not migrate 1995 to 2000

	NON MIGRANT	INMIGRANT	EMMIGRANT
UNDER 15 YEARS OLD	30.4%	19.0%	25.1%
OVER 15 YEARS OLD	69.6%	81.0%	74.9%
OVER 15 WITH ONLY PRIMARY EDUCATION OR LESS	21.4%	31.7%	19.9%
WITH HIGHER EDUCATION*	16.8%	15.2%	23.3%
ECONOMICALLY ACTIVE**	40.6%	52.8%	53.8%

* Teacher Training, Technical career, University and postgraduate

** Population of 12 years and over who work or are looking for work

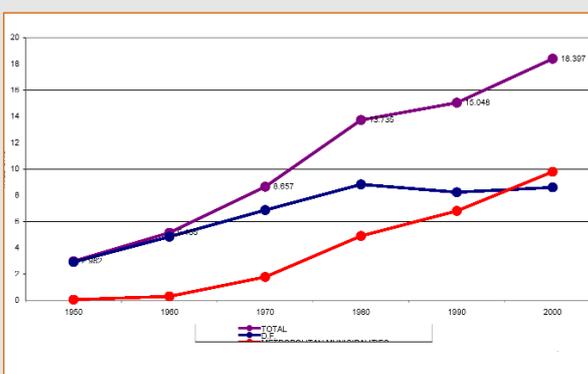
Source: 2000 *National Population and Housing Census*, Microdata of 10% sample with extended questionnaire

Table 12. Mexico: contribution of Mexico City to total GDP 1990-1998, by economic sector

	1900	1940	1970	1980	1988	1998
Primary sector	1.3%	2.0%	1.7%	2.2%	1.2%	1.5%
Secondary sector	7.9%	35.2%	41.9%	40.3%	31.0%	26.5%
Tertiary sector	12.5%	35.2%	40.8%	40.3%	35.4%	37.9%
total	9.2%	30.1%	37.5%	37.7%	31.9%	32.5%

Note: from 1950 onwards, the population refers to Mexico City Metropolitan Area, comprising the Federal Capital and a variable number of municipalities belong to the surrounding State of Mexico (see Table 6).

Source: Sobrino, J. (2001) 'Participación económica'. In G Garza (coord.) *La Ciudad de México en el Fin del Segundo Milenio*, Gobierno del Distrito Federal/ El Colegio de México, México DF. P.163

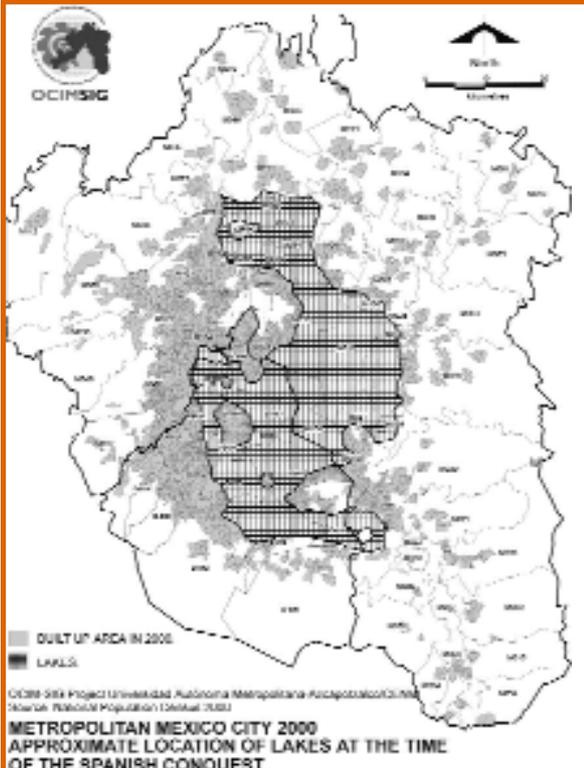
Figure 6 Metropolitan Mexico city: Population growth 1950-2000


Source: Population census of respective years

combined. Throughout most of the twentieth century, political power at all levels of government was virtually monopolised by a single party: the Revolutionary Institutional Party (PRI). Political reform was started in the late 1970's, slowly at first, with electoral successes of opposition parties being limited to lower levels of government, but gathering momentum towards the end of the century. The 2000 presidential elections returned Vicente Fox, representing the centre-right National Action Party (PAN). Until 1998, the national President designated the Federal District government, like a ministerial post, and he in turn designated heads (delegados) of the 16 delegaciones or boroughs. The first elected Head of Government in the federal District was Cuauhtémoc Cárdenas of the centre-left Revolutionary Democratic Party (PRD), son of Lázaro Cárdenas, the nationalist president of the 1930's. The delegados were also elected for the first time in 2000, resulting roughly in an even split between the PAN and the PRD, while at the same time, the Federal District's electorate's preference for the centre-left was confirmed by the victory of PRD candidate Andrés Manuel López Obrador. In the same year, municipal and state government elections in Mexico State returned a PRI governor and a mixture of parties at the municipal level. The resulting highly complex electoral geography Metropolitan Mexico City is illustrated in **Map 17**.

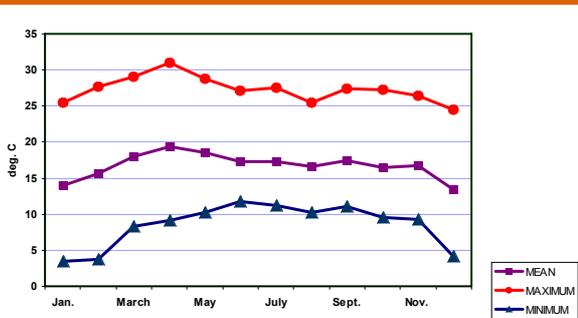
The effects of these political and administrative reforms are equally complex; the following are only some of the main impacts on the lives of Mexico City's low-income populations. First, the replacement of the traditional one-party corporatist clientelism by competitive electioneering has altered the unwritten rules governing access to benefits and basic necessities, such as housing credits, urban services, regularisation programmes and social subsidies. The role of political intermediaries, such as the "official" trade unions, community leaders, professional invaders and other kinds of grass-roots organisation representatives is being undermined, though in many cases the same practices and political culture persists, with different –or sometimes the same– social actors on the scene. Political reform is combined with changes in social policy, which aims at replacing collective targeting and aspirations of global coverage by the individualisation of benefits with a view to "targeting the most needy". The practical effects are, however, uneven, given that all levels of government, and different agencies within each level of government, implement social policy. For instance, the whole social policy framework of the new Federal District Government, in which investment and subsidies are allocated by committees at a micro territorial level, is a radical departure from the systems operated by central government. And within the Federal District, the interaction between the GDF and the delegaciones varies according to the political colour and particular policy of each delegación, giving rise to a

Map 5: Mexico City: approximate location of lakes at the time of the Spanish Conquest



Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

Figure 7: Mexico City: mean, maximum and minimum temperatures 2000 (Tacuba)



Source: INEGI: Cuaderno Estadístico de la Zona Metropolitana de la Ciudad de México pp- 8-9

multiplicity of situations regarding social policy implementation and public participation. All these changes are extremely recent and, given the wide variety of outcomes, it is impossible at the moment to describe, much less evaluate, the new styles of governance of the various levels and instances of Metropolitan Mexico City's public administration.

II. HOUSING AND POVERTY

1. Types of "Slums" and Housing Poverty in Mexico City: Introduction

Although most housing in Mexico would probably be considered to be a slum by Northern European standards, the term "slum" –barrio bajo o tugurio in Spanish- is not generally used to describe any specific type of settlement or dwelling in this country today⁷. This does not mean that the problem of bad housing is not recognised; in fact many definitions of poverty include unsatisfied housing needs⁸. But unsatisfied basic housing needs, or "housing poverty", is spread throughout large areas of the city and seldom limited to neighbourhoods identifiable as "slums". It is also to be found in a variety of housing types and settlements including projects, which have been designed to provide "decent homes" (una morada digna), all of which also provide some excellent places to live. The best way to describe and classify the "slums" of Mexico City is therefore to identify the main types of housing and settlements where unsatisfied housing needs are present. Clearly this description must refer to past processes. The nature and extent of these unsatisfied housing needs can then be quantified, together with other indicators of poverty.

2. Irregular Settlements

The most critical housing conditions in Mexico City today are undoubtedly to be found in the asentamientos irregulares or colonias populares ("irregular settlements" or "popular colonies")⁹. The term colonias populares –the Mexican equivalent to the Brazilian favelas, the barrios de rancho of Caracas or the pueblos nuevos of Lima- is really a residual category: the colonias are defined not by what they are, but by what they are not. Essentially, popular denotes not "well to do", though not necessarily "poor" or "extremely poor" and "irregular" means that they were not legally developed. The causes of their illegality, however, have included a variety of closely interlinked conditions: unauthorised land development, non-fulfilment and inexistence of building permits, initial and sometimes permanent lack of urban services, high risk of flooding, landslides or other hazards, dubious or in-existent original and subsequent property titles, the operation of alternative property

jurisdiction, in this case, agrarian communal property law, with all its ambiguities and contradictions. And, of course, the definition of illegality depends on legislation, which is in constant evolution. Most settlements have become “regularised” to a varying degree, as land titles were devised and distributed, infrastructure and services put in, the houses improved, and shops, offices and small or large businesses installed. Yet, except in the very few cases where blanket gentrification has occurred, the colonias populares never become completely regular. Moreover, as time goes by, the regularised properties become irregular again, through intestate inheritance, dilapidation or fiscal problems.

Perhaps a more important defining characteristic of irregular settlements is not their multifaceted and confusing legal status, but the order in which they have been built. Particularly important is the absence of credit for building. The plots have often been bought in instalments from the informal developers and landowners, but usually without the intervention of any financial institution. The lack of credit means that the whole process has been financed, and therefore built, in stages; the rate of progress depended on the amount of spare cash each family could muster. More importantly, the urbanisation process was also incremental: starting with land occupation, followed by electricity, road improvements, water, drainage, telephone lines. The whole process of consolidation has occurred at different paces and to variable degrees. In many settlements, especially in the South of the city, better off people bought plots in colonias where consolidation is well underway, thus accelerating the improvement process. In general, it is true to say that the colonias which were established in the fifties, sixties and seventies took longer to achieve services than the more recent ones, although the quality of housing in the latter is not necessarily any better (see below). The question, often asked, as to whether irregular settlements and “self-build” housing is a good or bad solution is too general; they were the solution during the explosive stages of Mexico City’s development but the quality of environment they provide is extremely varied, both from one colonia to another, and within a single colonia.

As is often cited, Mexico City’s irregular settlements constitute roughly half of the urbanised area and house more than 60 per cent of the city’s population: a fairly wide social spectrum not necessarily limited to the poorest 60 percent. It is misleading, therefore, to classify them all indiscriminately as slums (as sometimes is the case in international housing literature). Some have become over the years extremely nice places to live. Appearances are deceptive, however, and alongside high quality houses, very substandard housing conditions subsist. Other *Colonias populares*, start out poorer and/or never consolidate or improve for a variety of reasons, including elevation and topographical conditions, obstacles to regularisation, or simply the poverty

of their population; these still provide extremely precarious conditions to almost all their inhabitants. *Ciudad Nezahualcóyotl*, a vast agglomeration of irregular subdivisions originating in the 1950’s, with a current population of over 1.2 million, is now highly consolidated, with its own local economy and good services. It still contains, however, a large proportion of precarious dwellings without water and drainage. Perhaps one of the advantages of this kind of housing development is the high degree of social heterogeneity achieved. The majority of irregular settlements existing today in Metropolitan Mexico City were formed between the mid 1950’s and the 1980’s. **Map 18** shows their location; **Table 13** shows some main housing indicators for Mexico City’s colonias populares in 1990. **Boxes 1, 2** and **3** describe the origins, development and current

Figure 8: Metropolitan Mexico city: age pyramids 1970 and 2000

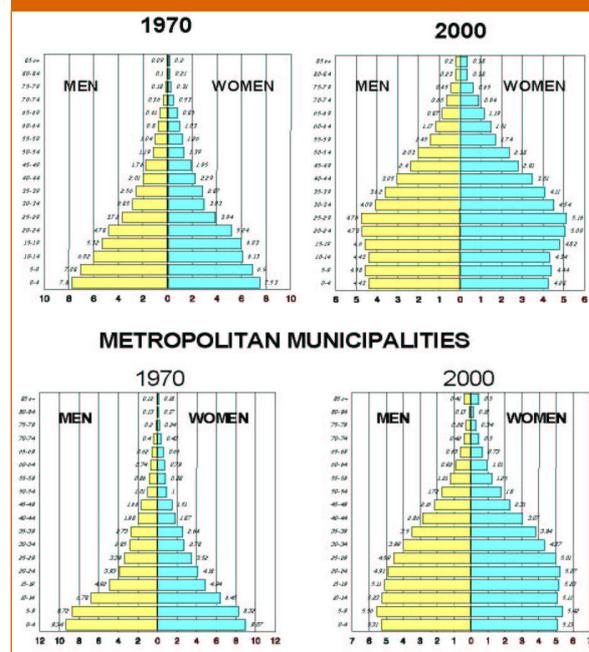
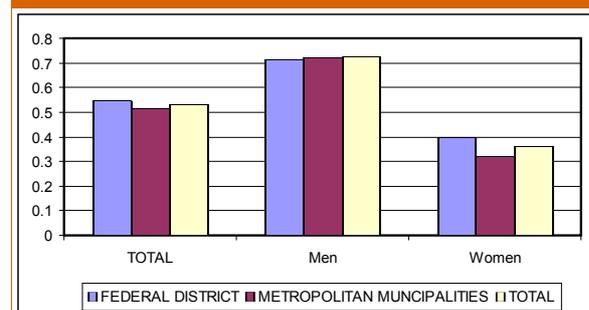


Figure 9: Metropolitan Mexico City: distribution of economically active male and female population by monthly income level 2000



Source: Population census 2000

situation of the three selected municipalities which have been urbanised almost completely by irregular settlement processes: Ciudad Nezahualcóytl, Valle de Chalco Solidaridad and Chimalhuacán.

The boxes describe irregular settlements, which were formed, on a massive scale before 1990. In more recent years, the process has continued, but in a more dispersed manner, and it is unlikely that new Ciudad Nezahualcóyotl or Valle de Chalcos will spring up on an equal scale as before, for various reasons, including the demographic tendencies already mentioned, but also because of new tendencies in formal housing production. Most of the city is already built, and what happens within these built up areas will determine the

quality of habitat for most of the metropolitan population. Before turning to the quantitative analysis of housing conditions in the colonias populares, it is helpful to describe some other types of housing could fall into the category of “slum” in Mexico City.

3. Vecindades or inner city tenements: the traditional slum and present-day rented housing

In the past, specifically in a study published by the (now extinct) National Housing Institute (INV 1958a), the area surrounding the Mexico City’s central square on all sides except to the West was referred to the

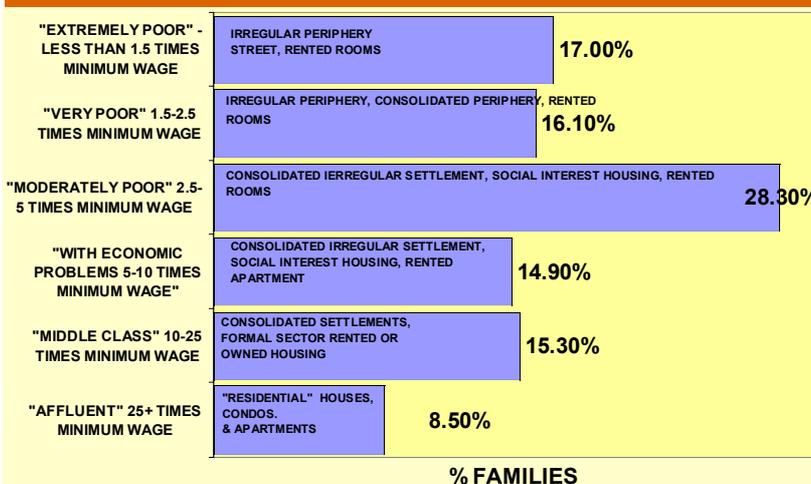
herradura de tugurios (“horseshoe of hovels or slums”) because of the high concentration of overcrowded rented tenements: the traditional *vecindades*

¹⁰ This house-type evolved from the Spanish courtyard building, with rooms distributed around a central patio: a model, which dominated domestic architecture until twentieth century, both as individual houses or collective mesones. Many of the late nineteenth century *vecindades* were grand houses, which were abandoned by the upper classes from the last decades of the nineteenth century, in favour of newly urbanised residential areas; the rooms were then let off to one or several families or individuals. A few of these very old *vecindades* and mesones survive today, some still as cheap housing; those contained in architecturally valuable properties have been mostly converted to other uses.¹¹

As the city grew during the porfirian dictatorship, purpose-built *vecindades* were built for profit in and around the Eastern quarters of central Mexico City to meet the increasing demand for cheap housing¹², the central patio having shrunk in most cases to a narrow passage providing access, lighting, ventilation and “semi-public” space to one and two-roomed houses. Latrines, if there were any, were usually shared; sewage mostly was dumped into open drains, which emptied into the streets. By 1913, water born sanitary drainage was available in Mexico City and, as the twentieth century progressed, communal tap water and flush lavatories were introduced into the *vecin-*



Figure 10: Metropolitan Mexico City: access to housing by income level 1988



Source: income Distribution and "poverty definitions": Boltvinik J. "Incidencia e intensidad de la pobreza en México", in Boltvinik, J. and E. Hernández Laos (1999) Pobreza y Distribución del Ingreso en México, México, Siglo XXI, p. 194. Based on the National Survey of Household Income and Expenditure. Housing Types: own assessment.

dades, with some of the better acquiring individual services. But been urbanised almost completely by irregular settlement processes: Ciudad Nezahualcóytl, Valle de Chalco Solidaridad and Chimalhuacán (Plates 7 to 12).

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20th century, both as individual houses or collective mesones. Many of the late 19th century *vecindades* were grand houses, which were abandoned by the upper classes from the last decades of the 19th century, in favour of newly urbanised residential areas; the rooms were then let off to one or several families or individuals. A few of these very old *vecindades* and *mesones* survive today, some still as cheap housing (Plate 13); those contained in architecturally valuable properties have been mostly converted to other uses¹¹.

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Cheap rented dwellings in *vecindades* continued to be built throughout the century as the city grew,

Table 13. Metropolitan Mexico City 1990*: selected indicators of housing in *colonias populares* (irregular settlements)

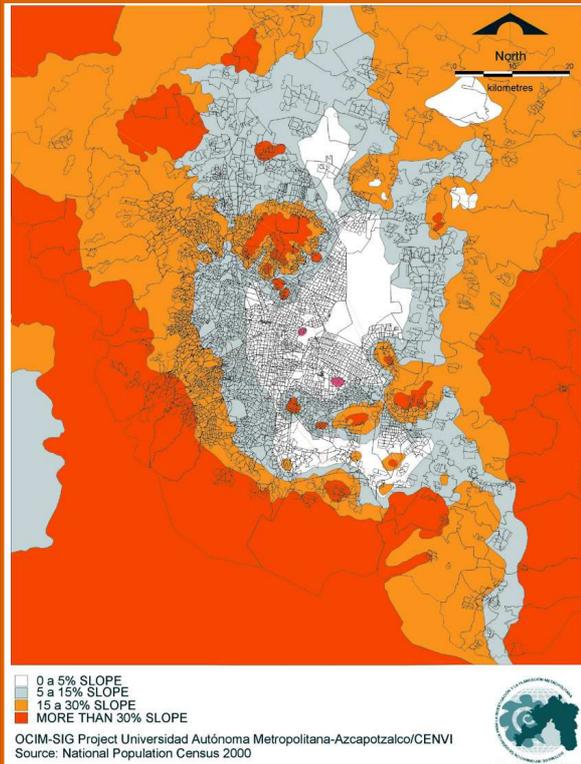
No. inhabited dwellings	Vertical %	% dwellings with "shanty" roofing (e)	% dwellings with only 1 bedroom	% dwellings without electricity	% dwellings without mains drainage	% dwellings without mains drainage	% dwellings without mains drainage	% owner occupied dwellings	% rented dwellings
Total Metropolitan Mexico City	3,119,779	100.0%	20.5%	35.6%	1.8%	17.6%	35.7%	69.2%	21.9%
Total Colonias Populares	1,888,170	60.5%	26.5%	43.0%	2.1%	21.1%	46.2%	66.5%	23.8%
low density/incipient (a)	193,184	6.2%	40.8%	45.8%	7.4%	55.1%	64.4%	79.0%	11.7%
medium density/consolidating (b)	684,945	22.0%	32.4%	43.5%	2.3%	31.2%	55.5%	73.0%	17.2%
high density/consolidated (c)	749,918	24.0%	23.1%	43.0%	1.0%	9.3%	42.9%	63.3%	26.8%
inner city colonias populares (d)	260,123	8.3%	9.9%	39.4%	1.1%	3.2%	17.8%	49.5%	41.2%

* Metropolitan Mexico City was defined in this study as the Federal District plus 37 municipalities of Mexico State and one in Hidalgo State.

(a) less than 100 hab./ha. (b) between 101 and 250 hab./ha. (c) over 250 hab./ha. (d) 4 central delegations (e) asbestos, bituminous corrugatedresd cardboard roofing or galvanised tin.

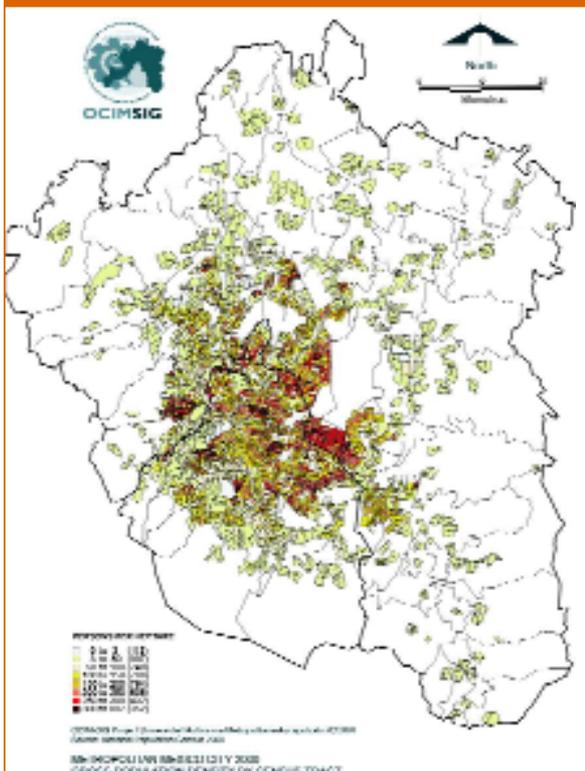
Source: Centro de la Vivienda y Estudios Urbanos (1998) Escenarios demográficos y Urbanos de la Ciudad de México 1990-2010, Database.

Map 6: Metropolitan Mexico City: topographic map and present day built up area (urban census tracts)



Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

Map 7: Metropolitan Mexico City: population density by census tract 2000



Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

although they ceased to provide the profit-motive behind new urbanisation from the 1940's onwards. A number of reasons explain this change, including the introduction of frozen rents in 1941, the tightening up of building regulations and the emergence of more lucrative investment opportunities in industry and commerce. Perhaps more importantly, a new form of urbanisation emerged as the dominant from housing provision for everybody except the wealthy: the ever-increasing supply of cheap unserviced lots in the *colonias populares* for owner-occupied "self-built" (or "self-financed") dwellings.

The appearance on a massive scale of irregular settlements did not, however, mean the extinction of the *vecindades*. These continue to be built within the *colonias populares* themselves, especially as these consolidate. In appearance, these *vecindades* are similar to the traditional ones, except that grey cement blocks with concrete slab or cardboard roofs have replaced adobe and traditional forms of *techumbre*¹³. According to the 2000 population census, which for the first time included the house type in its questionnaire, there are 443 thousand dwellings in *vecindades* in Mexico City, 10 per cent of the total. Table 14 gives some idea of the varied quality of housing standards they provide.

As Map 19 shows, the major concentrations of *vecindades* are not in the inner city, but in the consolidated irregular settlements, notoriously in Ciudad Nezahualcóytl and other *colonias* to the East of the city. A major difference distinguishes these peripheral *vecindades* from the inner city prototypes: unlike the landlords of the latter, the owner and builders of the new generations of rented tenements tend to live in or near the property, often belonging to the same social class as their tenants. Unless the property titles are in order and the dwelling more or less complies with the building regulations, which is extremely rare in the *colonias populares*, there can be no legal contract between landlord and tenant; the agreement is usually verbal. Surprisingly few conflicts arise out of this situation (Coulomb and Sánchez 1991¹⁴). Also surprising is the fact that the renters in consolidated *colonias populares* are not necessarily any poorer than the homeowners, and many are certainly better off than the "home owners" in new settlements in the far off periphery. Rented or other forms of non-ownership tenure in *colonias populares* do, however, show a higher proportion of substandard indicators, such as lack of inside taps. Table 15 compares income and housing indicators of renters and owner-occupiers in Nezahualcóytl, Valle de Chalco and Chimalhuacán, three municipalities largely comprised of *colonias populares*.

Not all rented housing in irregular settlements is substandard and not all is in *vecindades* (in fact only 51 percent of *vecindades* are rented in the three selected municipalities). Clusters of rented single-family housing in one plot and apartments are also to be found. Moreover,

Box 1: CIUDAD EZAHUALCÓYTL

Ciudad Nezahualcóytlⁱ is a vast irregular settlement built on the Texcoco lakebed. The lake was drained in 1900, leaving vast expanses of marshy salt flats in the rainy season, reduced to a dust bowl from October to May. As a lakebed, most of the land constitutionally belonged to federal Government, but during the 1920's it was sold very cheaply and given away to influential politicians and generals. In 1935, all these transactions were cancelled by presidential decree, but as many of the owners won legal contestations (by the Mexican legal recourse of amparo), the property situation became extremely varied and ambiguous. The situation was complicated by the fact that neighbouring communities of Chimalhuacán and Pantitlán also possessed historic titles to the land surrounding the Texcoco lake, dating from the Colonial era and partially confirmed during the nineteenth century. By the nineteen forties the area's potential for the future expansion of Mexico City was apparent, at least to the handful of speculators who, by various means, gained de facto possession of the land. As the sale of land was prohibited between 1945 and 1951, the first settlements were invasions actually promoted by the speculators, who then negotiated the sale of unserviced plots to the "invaders". During the subsequent decades, however, the sale of lots was legal, in the sense the developments were authorised by the State government; but at the same time they were illegal, because they failed to comply with the State regulations, enacted in 1958, concerning provision urban services such as paved roads, street lighting, water and sewage mains, areas for parks, schools and other public services. In all events, during the 1950's and 1960's, the State government did nothing to prevent the sale of hundreds of thousands of unserviced plots, averaging 150 square meters, laid out in a monotonous rectangular grid on about 50 square kilometres of land that turns into a sea of mud in summer and polluted dust in the spring. The plots were mostly sold on credit and cheaply; for instance, in 1959, the down payment was in the order of 15 pesos (US \$1.20) with subsequent monthly payments of about 8 pesos (64 US cents) for ten years. By 1963 these already highly populated settlements merited the creation of a municipality, named Nezahualcóytl, after the poet-king of pre-Columbian Texcoco, constituted in 63.44 sq. km. taken from surrounding municipalities, mostly from Chimalhuacán.

Towards the end of the 1960's with a population was approaching 600,000; over half in colonias were without any form of drainage or water supply. There were also severe conflicts arising out the irregular tenure, including multiple sales of the same plot of land. The colonos (settlers) then organised on a massive scale, forming what was one of the first urban movements, the Movimiento Restaurador de Colonos, demanding incarceration of the land developers for fraud, expropriation of the land and regularisation of tenure, together with the introduction of services.

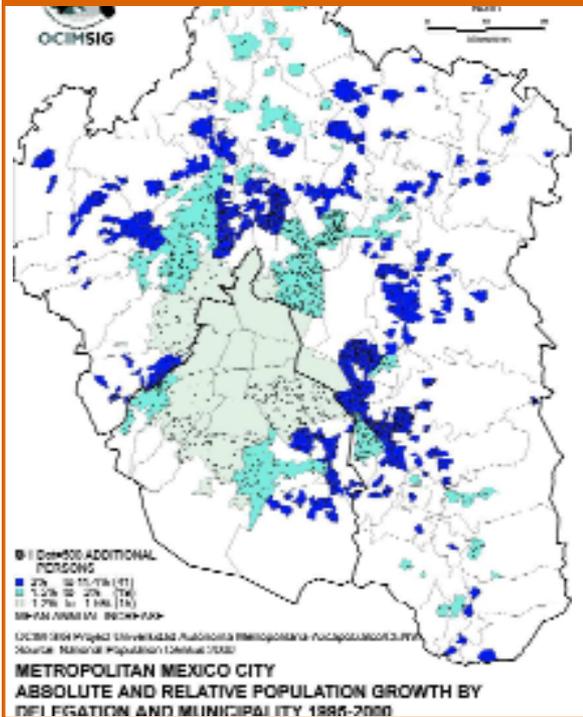
After a decisive rent (or rather, monthly payment) strike, Federal Government stepped in with a solution which would eventually meet the demands of the colonos: at a price. Some of the developers were jailed for fraud, but most of the collaborated with the government putting their stake in the land, their portfolio of credits, into a specially created trust (Fideicomiso de Ciudad Nezahualcóytl: FINEZA), set up in 1973, which would effectively regularised 43 of the 83 colonias in the municipality. Initially the price the colonos was high, as 40% of the payments would cover reimbursement of the 623,607,249 pesos (equivalent to 50 million dollars at that time) that the colonos still owed to the developers, the remaining 60% going towards urbanisations costs. Some inhabitants then resold their plots and moved out, but many just refused to pay. Some of the leaders were bought out, but most stood firm. Negotiations continued until 1977 when the price of the land was brought down to its original value of 10 or 20 years before. After that, the colonos lifted their payment strike and collaborated massively with the programme; a year later over 60,000 properties had been regularised. In 1981, FINEZA as a federal trust, was abolished, and the portfolio and functions were later handed over the State Government organisation, Comisión para la Regulación del Uso del Suelo del Estado de México (CRESEM). Under CRESEM, regularisation accelerated and by 1991, titles to a total of 159,000 lots had been issued. By the late 1990's, only an estimated 12 per cent of the plots in Nezahualcóytl had irregular land titles.

Most of the colonias in the municipality had electricity by the early 1970's. However, street lighting, paved roads, water and drainage were only introduced after the regularisation process was under way, starting with the main thoroughfares. By 1980, most of the streets were paved and supplied with main water lines and drains. During this time, the population duplicated to over 1.3 million, due to the influx of families who could pay higher prices for serviced land, and also the proliferation of rented housing of all categories. Since 1980, population has stabilised, and in the last decade the population actually fell, Nezahualcóytl being the principal exporter of population to other areas of Mexico City. The resident population is now highly mixed, as is the quality of housing: 63 percent of dwellings have inside tap water, for instance, while 15 per cent have shanty roofing.

Consolidation did not only mean improvement, albeit unequal, in housing conditions and diversification of social class. Over the past two decades, trees, banks, shops, offices, libraries, schools, universities, cinemas and even McDonalds have all sprouted on the main streets of Nezahualcóytl, which also has its own cathedral and Olympic sports stadium. What was once considered a "slum dormitory" and described by a visiting journalist as an "enormous refugee camp", is now the place of employment of 262 thousand people: over 4% of the Mexico City's economically active population.

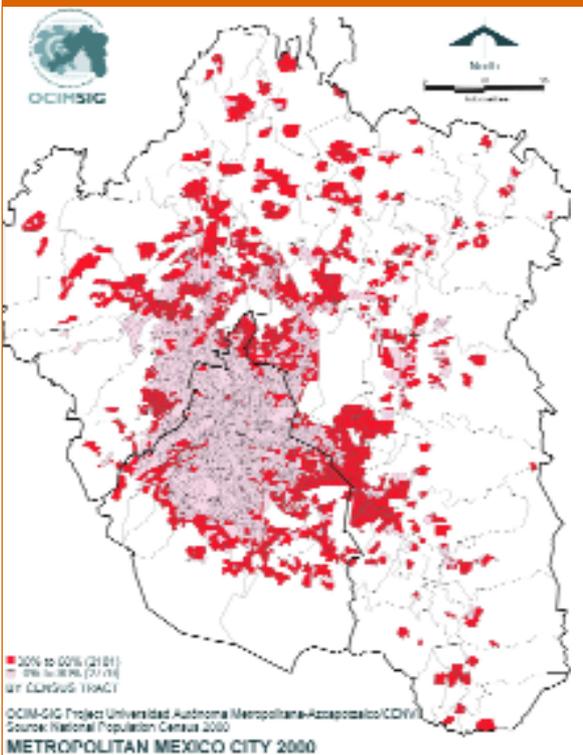
ⁱ Bibliographical note: texts in Spanish on Ciudad Nezahualcóytl are plentiful, although many are based on the same basic sources. The journalistic description of "Neza" by de la Rosa (1974) is one of them. Scheingart (1989) provides important insight into the land development process, based on her research on the fraccionadores. Hauman (1998) is a valuable source on the operations of FINEZA and other regularising organisms in Mexico State. In recent years, official monographic studies on this, and other, municipalities have appeared. Extremely useful is the Atlas Mercadológico de Ciudad Nezahualcóytl, published in 1998. In English, the origins of Ciudad Nezahualcóytl are briefly described by Cornelius (1975, 48-50), who selected one colonia in the municipality for his in-depth study of the local politics of the poor. In French, Bataillon (1971, ch. VII-II) includes a description of this massive urbanisation.

Map 8: Metropolitan Mexico City: absolute and relative population growth 1995-2000. Increase in population and mean annual population growth by delegación and municipality, 1995-2000



Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

Map 9: Metropolitan Mexico City: percentage of population under the age of 15, by census tract. 2000



Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

the distinction between *vecindades* and apartments is often tenuous as it depends on two, not necessarily related, criteria: the architectural model (apartments generally being considered to be arranged vertically) and the quality of the dwelling (apartments being considered to have at least one bedroom, bathroom and kitchen). However, apartments are not per se exempted from being a slum, even the ones that do have bedrooms, bathrooms and kitchens, especially those expressly built cheaply for poor people.

3. Other types of slums in Mexico City Ciudades perdidas

Fundamental research on Mexico City housing undertaken in the nineteen seventies identified other forms of “slum” housing in Mexico which, although numerically less important than the *vecindades* or *colonias populares* are still in evidence around the city. The worst housing conditions are still to be found in what used to be called *ciudades perdidas* (“lost cities”): a broad concept referring to a wide variety of small-scale pockets of shanty housing occupying odd pieces of publicly owned land, such as alongside railway lines, in the public thoroughfare and under pylons, or in plots of land in otherwise built-up neighbourhoods. In the early 1970’s it was estimated that between 100 to 150,000 people lived in *Ciudades Perdidas* (COPEVI 1976, B.23), which even then was less than 1.5 percent of Mexico City’s population. Since then, most of the *ciudades perdidas* have been eradicated, often to make way for road works and other construction project, or for safety reasons; in some cases the inhabitants were compensated or offered cheap credits to buy alternative accommodation.

Cuartos de azotea

Another form of slum identified in the 1970’s are the *cuartos de azotea* or “rooftop homes”: mainly servants quarters and makeshift housing on the flat roofs of apartment buildings and early public housing projects. The 2000 census reported 17.5 thousand dwellings of this type in Metropolitan Mexico City, the majority of which, 14.5 thousand are located within the Federal District. The quality of this type of housing varies (Table 16), but generally roofed-over spaces are small and services are often shared. Against this, the *cuartos de azotea* are almost invariably well located in central areas (Map 20). The inmates include a wide range of people whose housing priority location, such as concierges, students and domestic servants. (But live-in domestic workers who live in servants’ quarters on the rooftops or elsewhere are generally registered in the census as part of the household they work for.)

Social interest housing projects

Box 2 VALLE DE CHALCO SOLIDARIDAD

Valle de Chalco Solidaridad, like Nezahualcóytl, is a municipality that was created in recent years following massive irregular settlement: in this case in the agricultural municipality of Chalco, to the South East of Mexico City. Like Nezahualcóytl also, the area was originally under water but, unlike lake Texcoco, Lake Chalco was a freshwater lake fed by its own springs, rather than by the drain-off from the entire Mexico Valley. At the end of the nineteenth century a canal was built to drain the area by Spanish entrepreneurs, the Iñigo brothers, who became the proprietors of the resulting rich agricultural land, in detriment to the local fishing communities who previously lived around the lake. After the Mexican Revolution, the Iñigos' hacienda and other large agricultural properties were expropriated and distributed as ejidos or agrarian communal properties to the local communities. The land on which the Valle de Chalco settlements were established belonged to four ejidos in the State of Mexico and, to complicate the situation further, one ejido belonging to a village inside the Federal District (Santa Catarina).

By the late 1970's, Mexico City's growth began to affect the Chalco area. On one hand, the demographic growth of the local communities meant that agriculture was increasingly unfeasible as a means of subsistence, on parcels of ejidal land averaging 1.7 hectares per family. On the other, demand for housing meant that the illegal sale of this land was an attractive proposition. In the case of Chalco, before 1984, many of the transactions were not handled by the ejidatarios themselves but by professional intermediaries or developers, who bought the land off the individual ejidatarios, parcelled it out into lots of mostly between 120 m² and 250 sold them on credit. By this means the settlement process began between 1970 and 1980, when the population of the area now included in Valle de Chalco Solidaridad almost doubled from 44,000 to 82,000, living in about 18 colonias.

In the following decade, it increased still more to about 220,000 (Lindón 1999, 94) reaching over 323,000 in 2000. Settlement began in the North, in the area bordering the main highway out of Eastern Mexico City, and continued South, engulfing what used to be the hillside village of Xico, perched on the side of an extinct volcano of the same name. Most of the inhabitants came from the Eastern areas of the Federal District and metropolitan municipalities, especially Ciudad Nezahualcóytl, where over a third of the settlers originated according to one survey carried out in 1990-91 (Hiernaux and Lindón 1998).

In 1984, further sales by the developers was prohibited, which had the effect of converting the ejidatarios themselves into the principal social agent responsible for selling the plots of land. In the same survey, two-thirds of the families said they had bought land directly from the ejidatarios, a further 6 per cent had bought from the ejido authorities (comisariado ejidal), 22 per cent had bought from professional developers, while 4 per cent had acquired their plot from a previous settler (Hiernaux and Lindón 1998, 256). Land prices in this period, coincident with hyper-inflation, high interest rates and prolonged economic crisis, were actually lower than in the early 1980's (Castañeda 1988, Hiernaux and Lindón 1998, 240-1), mostly below 100 old pesos a sq. m. at 1978 prices, (about \$4 US dollars).

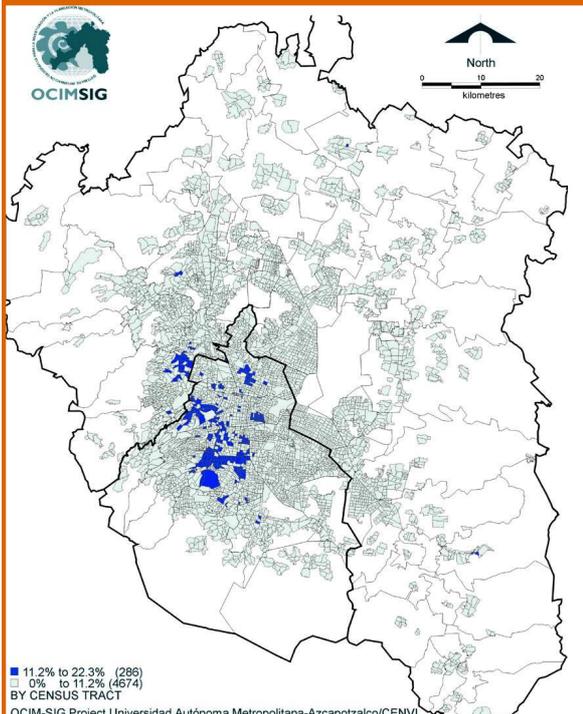
As the land was originally agrarian, except for a small area of private property, the procedure for regularization implied the wholesale expropriation of the ejidos by presidential decree with indemnification to the ejidatarios at agricultural prices, and the resale of lots to the settlers or colonos. In this case, the regularisation was handled by the State of Mexico Delegation of the Comisión Nacional para la Regularización de la Tenencia de la Tierra (CoReTT). The first ejido was expropriated in 1978, followed by three more in 1985, 1986 and 1988. In all the process takes about five years (Hiernaux and Lindón 1998, 248), except for the Ejidos belonging to villages in the Federal District, which have taken longer. The settlers have had to pay from 1.6 to 2 pesos a m² for regularizing a plot of land for housing: up to 13.20 pesos for any land occupied by commercial activities, plus 10% administrative costs. This means that the cost of regularising a 120 m² plot occupied only by housing would have been around 215 pesos at 1992 prices, or around 80 dollars (Huamán 1998, 73). By 1997, according to official figures, 14,750 plots on agrarian land had been regularized, and a further 4,917 on government or private property, in benefit of an estimated 110,000 people (Iracheta 2000). A survey in 1998 found that 90% of the plots in Valle de Chalco had been regularized (Juárez 2000, 256-7).

The regularization process in this case dealt exclusively with property registration. But once this was underway, material improvements were largely financed by the new federal poverty programme Solidaridad, which invested in 407.9 million pesos (about US \$160 million) in Valle de Chalco between 1989 and 1993 (Sobrino 1996). Federal interest in the area was largely due to lack of support for the PRI registered in the 1988 elections. As usual, the first step was electricity and street lighting; this was introduced at record speed and inaugurated with great pomp and ceremony by president Salinas de Gortari himself in 1999. Water mains and schools came next, followed by more electrification, hospitals and pavements. Finally, main drainage was installed and some streets were paved between 1992 and 1993. Drainage was, and is, a particular problem in this low-lying terrain. Floods are a constant threat, turned into nightmare reality in summer 1999, when large tracts of Valle de Chalco were under water, due to the overflowing of regional drainage channels.

During these years, Valle de Chalco was the centre of attention of both federal and state governments. It also attracted academic enquiry, cultural events, international architectural competitions and a visit from the Pope in 1990. In 1994, the colonias populares in the Valle de Chalco acquired a separate identity in the form of a newly created municipality: Valle de Chalco Solidaridad, with the status of a city centered around the original village of Xico. The Municipality was created on land taken from five municipalities, mostly from Chalco.

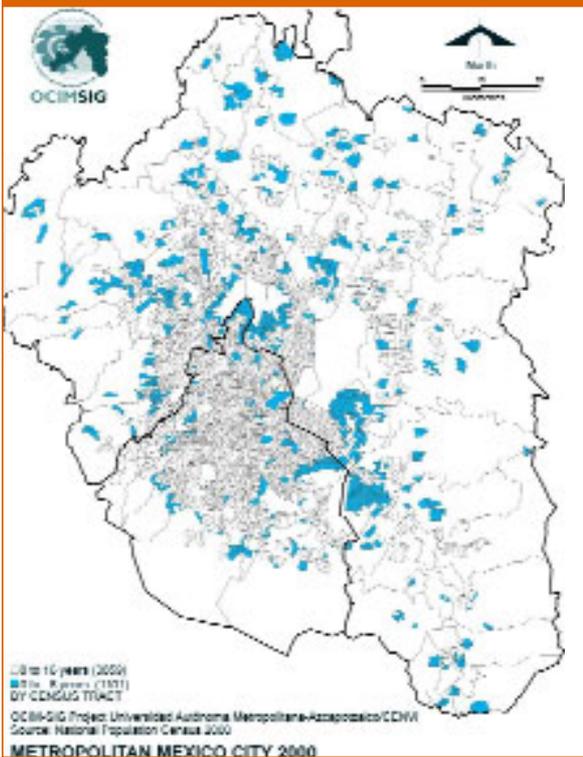
Comprehensive regularization of tenure, millionaire public works and social investment programmes, influx of national and international NGOs and religious groups, not to mention academic concern with female-headed households, cultural identities and perceptions, ethnicity, family roles and domestic divisions of labour: none of this is reflected in the 2000 housing indicators: 78 percent of the dwelling with no inside tap, 40 percent with corrugated cardboard roofing and 20 percent having only one room. Valle de Chalco today still contains some of the worst housing conditions in Mexico City.

Map 10: Metropolitan Mexico City: percentage of population over the age of 65, by census tract. 2000



Source: OCIM-SIG Project Universidad Autónoma Metropolitana-Azcapotzalco/CENVI; National Population Census (2000)

Map 11: Metropolitan Mexico City: average years in school, by census tract. 2000



Source: OCIM-SIG Project Universidad Autónoma Metropolitana-Azcapotzalco/CENVI; National Population Census (2000)

Slum accommodation in formally produced housing projects is not limited to the cuartos de azotea. Many of the government-financed social housing projects, especially those built since the 1970's for the lower income working class, are in danger of becoming slums, if they do not already qualify as such. All public housing projects are built for owner occupation and the previous generation of public rented housing was privatised in the 1980's. The self-administration of these housing projects, some of which contain up to 6,000 apartments, is a key issue, leading to the following problems: lack of maintenance, invasion or deterioration of public spaces, structurally dangerous alterations (such as removal of load bearing walls in ground floor flats or the erection of cantilevered extensions), bad neighbourhood relations, the construction of caged-in parking lots, etc. These problems are aggravated by the fact that these projects were generally cheaply built, have minimum space standards (between 40 and 65 m²) and, in general, are occupied by an increasingly impoverished working class, smitten by unemployment, alcohol and drug dependency, social violence and high crime rates. As a result, much of the housing that was conceived as viviendas dignas (decent homes) are deteriorating into slums.

Map 21 shows the location of 1990 census tracts containing larger social interest housing projects. If this is compared to Map 7, it can be seen that this type of housing, along with the highly consolidated colonias populares and the remnants of the traditional inner city vecindad area, contains the highest densities in the city: often reaching up to 400 persons per hectare.

The 2000 census did not include "public housing project" among its housing types, but alternative estimates show that as much as 15% of Mexico City's population live in these projects, which occupy about 10% of residential land (CENVI 1997). In the Federal District alone, 750 projects of over 100 housing units have been identified, amounting to 320 thousand dwellings: again 15% of the total (GDF 2002).

From Map 7, it can be seen that most of the social interest housing projects are located in certain municipalities and delegaciones on the outskirts of Mexico City, where land was cheaply available. Since then, drastic changes to the government housing finance systems have revolutionised low-cost housing production. Now in the hands of comprehensive developers, new housing is being built on a massive scale –up to six thousand units at a time– mostly on the extreme periphery, for people with access to the credit systems: mainly those who have young families and steady jobs in the private and public sectors. The houses and individual plots are miniscule: two storey houses on plots of 3.5 by 7 or 8 metres, with the possibility of vertical extending one more floor. In contrast, there is ample public open space, especially roads, implying long distances to walk to the bakery or the nearest public transport. These new projects provide basic services such as a bathroom,

Box 3 CHIMALHUACÁN

Like its neighbour Nezahualcōyotl, the third example of a municipality which is almost exclusively occupied by irregular settlements occupies the remains of the saline Texcoco Lake. Unlike Nezahualcōyotl, to which it gave up the greater part of its territory, Chimalhuacán, as a municipality, has a long history as a human settlement centred on what used to be a lakeside town of the same name. Like Valle de Chalco, it has experienced explosive irregular settlement in the last two decades but, unlike Valle de Chalco, Chimalhuacán was not the centre of attention for federal funding, religious ceremonies and academic enquiry. After the excision of Nezahualcōyotl, in 1970, the municipality registered a total population of 20,000, growing to 60,000 in 1980. At this time, most of the population lived in the original urban centre. The total urbanised area was 450 hectares, giving a fairly high density of about 138 personas per hectare.

During the following decade the population quadrupled, reaching 242,317 in 1990, and doubling again to over 490,000 in 2000. The terrain is the same as Nezahualcōyotl, but the legal and social processes are radically different. Instead of massive land subdivisions in the hands of developers, the sale of lots is usually small-scale. Much of the land is purported to be ejidal, but also much of the communal property is sold off as if it were private property. The tenure situation is diversified, fragmented and ambiguous. There is much less information on prices and sizes of lots than in the other municipalities. An expert on regularisation programmes made the following comment about Chimalhuacán in 1998:

In a *sui generis* landscape of mud and dust, irregularity appears to be normal; there are signs saying "private property" in land that is patently government or ejidal, makeshift stands selling swampy lots side by side with posters promoting regularisation and units representing the organisms in charge of tenure regularisation. It is difficult to distinguish those areas which have already been regularised; in fact it all looks irregular (Huamán 2000, 89).

These impressions reflect the lack of efficiency of the Mexico State regularisation programmes in Chimalhuacán, especially in ejidal properties. The process has been piecemeal and slow. According to Huamán (ibid, 90), in 1994, 70% of all dwellings were in a situation of irregular tenure and only 40% were in any way consolidated.

In spite of the sluggishness of regularization programmes and lack of attention from federal government, in 2000 Chimalhuacán had practically identical income levels, possession of household consumer goods and other socio economic indicators as those registered in Valle de Chalco.

kitchen sink, electricity and connections to mains water and drainage. (The actual water supply may be intermittent as in most areas of Mexico City.) And, of course, there is a parking space for each house: a foresight into the car-dependent future this kind of urbanisation is creating.

It is too early to evaluate how these new housing project will evolve, but it is fairly easy to predict what might happen when the toddlers grow into disenchanted teenagers, when many of this second generation fail to find the kind of employment that allows them to set up house of their own, when the current wage-earners reach the age of sixty-five. The present occupants of

Table 14 Metropolitan Mexico City 2000. Vecindades

	Federal District	State of Mexico	Total
Number of dwellings in vecindades	232,586	210,115	442,701
% of total houses	10.6%	9.2%	9.9%
VECINDADES			
% not owner-occupied	60.7%	66.8%	63.6%
% rented	47.7%	55.9%	51.6%
% without inside tap			
% without individual toilet	32.1%	37.6%	43.7%
% with only one room			
% with shanty roof			
% under 5 years old	7.5%	12.9%	10.0%
% over 30 years old	35.5%	9.4%	32.1%

Source: 2000 National Population and Housing Census, micro-data of 10% sample with extended questionnaire

these housing projects are by no means the "poorest of the poor" as they need to have a steady income of at least 5 times the minimum wage to be eligible for a mortgage. However, the fact that this better off strata of the poor is being offered an alternative to the self-build process in the colonias populares may be undermining one of the main advantages of irregular urbanisation itself: their socio-economic heterogeneity which is both the cause and effect of spontaneous neighbourhood improvement.

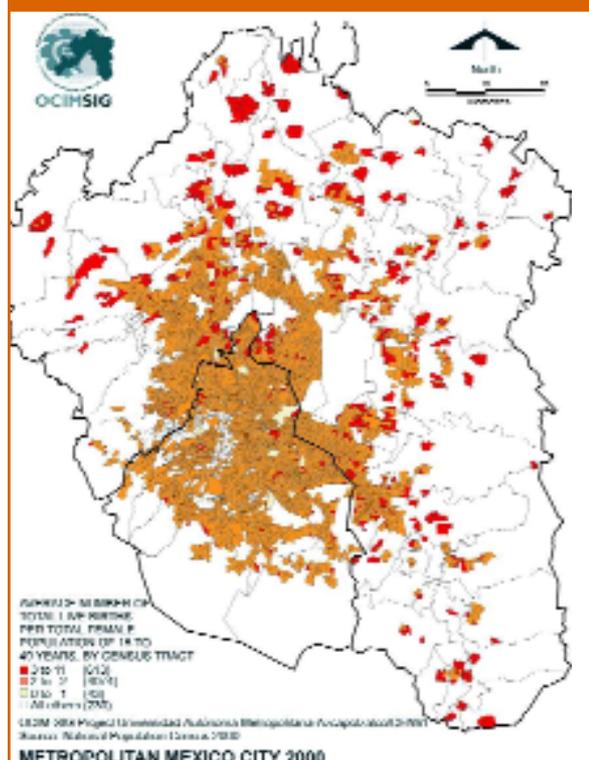
4. Data on Slums: the Statistics of Mexico City's Housing Poverty

As the preceding section shows, the immense scale of Mexico City's housing poverty and the highly complex, dynamic processes, which characterise it, preclude official or unofficial definitions of slums. Data on slums, *per se*, does not exist. What does exist, and in increasingly improved quality and quantity, is disaggregated census data providing fairly accurate indicators of housing conditions in urban localities¹⁵, at least for 1990, 1995 and 2000. For 2000, the Mexican National Statistical Institute (INEGI) offers three types of population census products¹⁶: distributions and cross tabulations of selected census variables, disaggregated by municipality; three data bases of individuals, households and overseas emigrants generated by the 10% extended census questionnaire, which is representative at least to the municipal level. Both these products are available free of charge on the Internet, as well as in

Table 15: Metropolitan Mexico city 2000: homeownership and non-home ownership comparisons in three municipalities urbanized predominantly by irregular settlements (Ciudad Nezahualcóytl, Chimalhuacán and Valle de Chalco Solidaridad)

	Total no. Inhabited dwellings (100%)	Home ownership			Non home-ownership			N.A.
		Currently being paid for	Totally paid for	In other situation	Rented	Lent, being looked after, etc.,	N.S.	
NEZAHUALCÓYOTL	292,281	5.7%	60.6%	1.4%	19.5%	10.8%	2.0%	0.0%
CHIMALHUACÁN	107,758	10.4%	65.6%	0.8%	10.3%	11.6%	1.3%	0.0%
V. DE CHALCO SOLIDARIDAD	71,543	8.2%	65.0%	1.3%	11.3%	12.1%	2.1%	0.0%
Total 3 Municipalities	471,582	7.1%	62.4%	1.3%	16.1%	11.2%	1.9%	0.0%
% With Monthly Household per Capita Income of Less Than US \$50	124,029	8.0%	60.4%	1.1%	15.3%	13.5%	1.0%	0.7%
% With Monthly Household per Capita Income of Less Than US \$50	74,514	7.6%	58.6%	1.4%	14.3%	7.8%	2.2%	8.2%
% With No Inside Tap Water	247,203	7.2%	58.2%	1.3%	16.9%	13.9%	1.0%	1.5%
% VECINDADES	60,686	2.20%	31.10%	0.90%	51.30%	12.60%	1.40%	0.50%

Source: 2000 National Population and Housing Census, microdata of 10% sample with extended questionnaire

Map 12: Metropolitan Mexico City: Fertility


Source: OCIM-SIG Project Universidad Autonoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

compact disk and printed publications. The third census product is the recently released (INEGI April 2002) database of 170 variables by census tract (área geoes-tadística básica or AGEB). This may be purchased in compact disks by state, which also include an interac-tive programme for analysis by municipality. The digi-tised cartography may also be purchased from INEGI by urban locality, but needs assembling into an inte-grated system, and revising. There are just over 5000 census tracts in urban localities in Metropolitan Mexico as defined above, with a mean, minimum and maximum population of 3,604 and 15,905, respectively (standard deviation: 2,358.07)²².

Each of the three products from the 2000 census offer different sets of data; for instance, the variable “male or female-headed household” is included in the aggregate databases by census tract and by municipality, but not in the microdata from the 10% sample extended ques-tionnaire. This, however, is the only product to include the variable “*type of family*”.

Based on analysis of the 2000 census to date, the following maps and tables offer an accurate description of the location and degree of housing poverty in Mexico City. The indicators are grouped in three sections: construction quality and size, services and tenure. The selection of indicators is based both on their relevance both statistically and for housing quality. Reference to some definitions of housing and poverty are also included.

Construction size and quality

The indicator selected here is “shanty roofing”, liter-ally defined in the census as “houses with roofs of

Table 16. Metropolitan Mexico City 2000. Cuartos de azotea

	Federal District	State of Mexico	Total
Number of dwellings	13,478	4,060	17,538
% of total	0.6%	0.2%	0.4%
% not owner-occupied	84.1%	65.9%	79.9%
% rented	49.1%	49.6%	49.2%
% without inside tap			
% without individual toilet	32.1%	35.2%	31.5%
% with only one room			
% with shanty roof			
% under 5 years old	9.6%	20.3%	12.0%
% over 30 years old	43.3%	3.6%	34.1%

Source: 2000 National Population and Housing Census, microdata of 10% sample with extended questionnaire

waste material and cardboard (bituminous corrugated felt)". **Map 22** shows the absolute distribution of houses in this condition, to the nearest 100 houses by census tract. In all, about 16 per cent of all dwellings in Metropolitan Mexico City have shanty roofing (**Table 17**). There are other indicators relating to materials in floors and walls, but these are less prevalent than precarious roofing in Mexico City. For instance, CONAPO (2000), includes the percentage of houses with earth floors in its identification of localities with high marginality indices. As none of the localities within metropolitan Mexico City have significant proportions of houses with earth floors, they would not be considered "marginal" on this count. Also significant as an indicator of housing poverty is the size of the dwelling. **Map 23** shows the distribution of the 343 thousand one-roomed houses in Mexico City, that is, houses without separate kitchens bathrooms or bedrooms. **Maps 24** and **25** show average occupancy rates per dwelling and per room.

From **Table 17** it is clear that lack of water and sanitation is a more crucial factor in defining housing poverty. Almost a third of households in Mexico City have no inside tap water, although most of these have access to a tap outside. Five per cent have to carry water from public hydrants or buy it from water-trucks. This is not much of an improvement on the situation in 1990, when 35% of all houses had no inside tap. In fact, over the last decade almost a quarter of a million new houses without inside piped water have been built. **Maps 26** and **27** show the absolute and relative distribution of those houses without inside water supply, while **Maps 28** and **29** show where the households without drainage and sanitation are located. It is relevant to point out that the CONAPO criteria for identify-

ing localities with high marginality rates is the percentage of houses without any kind of piped water and without any kind of drainage: both of which are fairly low in Mexico City: 4.6 percent and 3.7 percent. The problems of identifying marginalized populations only in terms of the percentage of households or individuals lacking one or other basic need can also be appreciated by comparing **Maps 26** and **27**. The areas with very high relative indicators do not necessarily coincide with high absolute indicators, depending on population density. For instance, high percentages of housing without water are to be found in newly established irregular settlements on the extreme and fragmented periphery and, more importantly, in older settlements located on steep slopes over 2,300 metres above sea level: the colonias on the Northern slopes of the Sierra de Santa Catarina, in Iztapalapa, in an almost continuous string of settlements to the West and South of the Federal District delegaciones of Alvaro Obregón, Magdalena Contreras, Tlalpan and Xochimilco, and on the arid hillsides to the North of the sierra de Guadalupe in the municipalities of Tlalnepantla and Ecatepec. The highest numbers of houses without water, however, are concentrated in Ciudad Nezahualcóytl and other consolidated irregular settlement areas, as well as in the more recent colonias such as those in Chimalhuacán and Valle de Chalco. The identification of deprived or marginalized areas for targeting social policies needs to take into account both indicators.

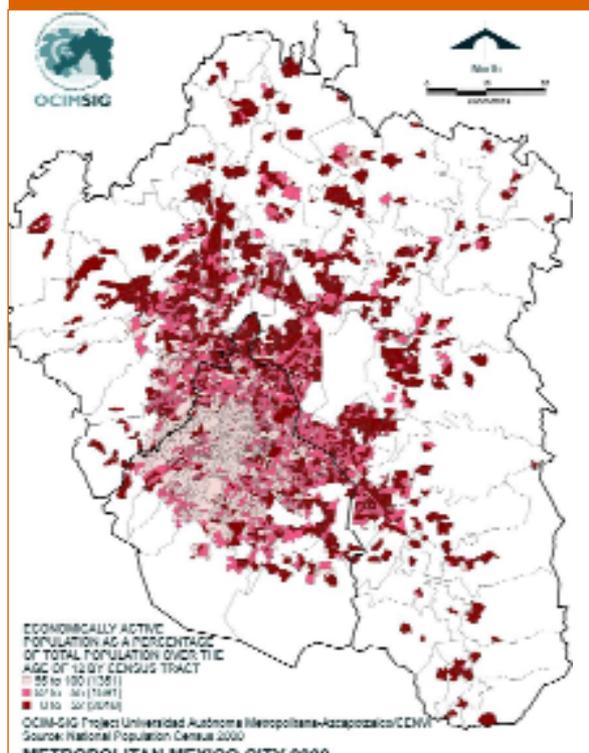
Finally, **Map 28** shows the distribution of rented housing. As very little housing in new developments or settlements is produced expressly for rent, this form of tenure across the housing market is essentially related to the age of the area. As has been shown, non-home-ownership is not necessarily related to poverty.

III. PEOPLE IN HOUSING POVERTY

C. WHO LIVES IN THE SLUMS?

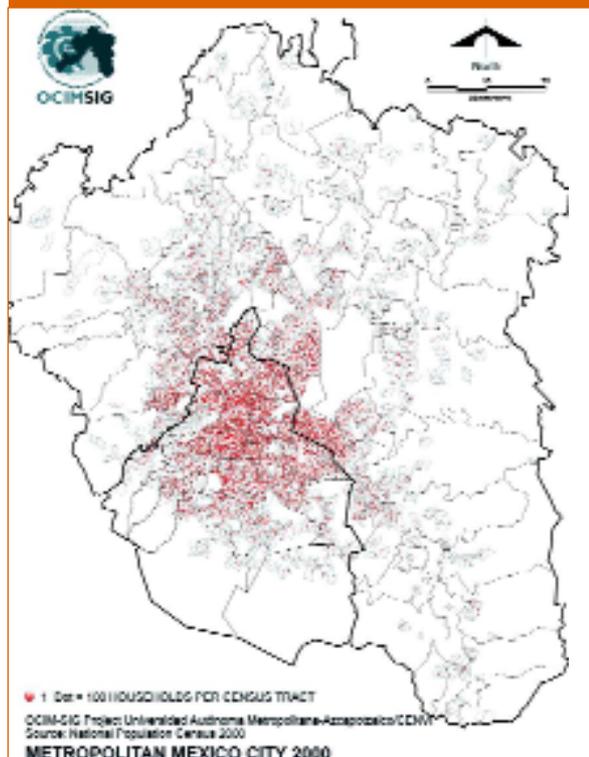
From the previous section it should be clear that about two-thirds of the population of Mexico City live in what might be called a slum: in owner occupied or rented housing in irregular settlements at various stages of consolidation, in traditional vecindades, in pauperised public housing projects or in other forms of minority types of dwellings on rooftops or in shacks on forgotten bits of land here and there. But by no means all of these people necessarily suffer extreme forms of housing poverty and, even if they do, they are not necessarily extremely poor. On the other hand, not all the extremely poor necessarily live in areas that we have identified as "slums"¹⁷. With these limitations in mind, the following section provides some indicators characterising the population of Mexico City's irregular settlements, in

Map 13: Metropolitan Mexico City: economic participation rate, by census tract. 2000 (Population over 12 years of age)



Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

Map 14: Metropolitan Mexico City: percentage of households headed by women, by census tract. 2000



Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

different stages of consolidation, and the central city traditional *vecindades*.

Unconsolidated irregular settlements or “*colonias populares precarias*”.

The least hospitable habitats are mostly to be found on the extreme periphery, either high up on steep slopes where provision of services has been virtually impossible, or else in the newer settlements, such as Valle de Chalco or Chimalhuacán, where improvements have also been slow. From **Map 27** it can be seen that a high incidence of dwellings without inside tap water coincides very closely with identified precarious settlements. By selecting the census tracts with over 75% of houses with no inside tap (dark blue areas on the map), the following population profile emerges (**Table 18**).

According to the 2000 census, about 1.8 million people or 10% of the city’s total population lived in census tracts where over 75% of the dwellings lacked inside water. A first noticeable characteristic is a slightly higher than average masculinity index (49.8% compared to the metropolitan average of 48.4%). The proportionately higher number of males is probably due to the relative youth of the population of these colonias, with 35.9% being under 15, compared to a metropolitan average of 28.5%, while only 3.7% are over 60, compared to 6.8% in Mexico City as a whole (3.8% against 7.4% considering only the female population). The low proportion of older women probably explains the equally low incidence of female-headed households: 16.5%, compared to the metropolitan average of 22.1 %.

Regarding income levels, the overwhelming characteristic of these colonias is not so much presence of low incomes, as these are ubiquitous, but rather, the absence of middle and high incomes. Only 3.9% declared incomes greater than five minimum wages, compared to a metropolitan average of 14.6%; 29.5% earned between 2 and 5 minimum wages compared to 33.1%, while the rest 66.6% earned less than 2 minimum wages. Access to job-related health care is also much lower than average, with 64.4% of these “slum dwellers” with no coverage, compared to 48.2%. The mean house occupancy rate of 4.7 is substantially higher than the metropolitan average of 4.2, probably reflecting the high proportions young families with children, rather than present-day fertility rates. These are, however, higher than the metropolitan average with a mean of 2.7 live births per woman of over 15, compared to the metropolitan mean of 2.3¹⁸. Literacy rates are somewhat lower than the metropolitan average (94.6% and 89.7% respectively for men and women over 15, compared to the metropolitan averages of 97.7% and 94.6%). Housing mobility is only slightly lower than average: 70.1% of the population of 5 years and more had been living in the same municipality five years previously (1995), compared to 76.8% in Mexico City as a whole.

Table 17. Metropolitan Mexico City 2000: indicators of housing poverty

	Total		Federal District		Metropolitan Municipalities	
	No.	%	No.	%	No.	%
Private occupied Dwellings	211,693	100.0%	2,103,742	2,103,742	2,107,95	100.0%
With shanty roofing	686,855	16.3%	265,326	12.6%	421,529	20.0%
With only one room	343,231	8.1%	142,160	6.8%	190,525	9.0%
Without inside tap	1,349,930	32.1%	465,395	22.1%	884,535	42.0%
But with outside tap	1,156,633	27.5%	399,611	19.0%	757,022	35.9%
With no form of drainage	154,674	3.7%	28,007	1.3%	126,667	6.0%
With no individual sanitation	408,011	9.7%	182,206	8.7%	225,805	10.7%
Rented	728,773	17.3%	427,743	20.3%	300,832	14.3%

Source: 2000 National Population and Housing Census, Sistema de Informal Censal (SINCE), Data by census tract. OCIM-SIG Project, Universidad Autónoma Metropolitana-Azcapotzalco

Regarding housing indicators, as would be expected, the vast majority of the precarious settlement occupants are homeowners: only 7% are rented compared to the metropolitan average of 17.3%. A much higher than average proportion of dwellings (18.9% compared to 8.1%) are single roomed with no separate kitchen and bathroom, while all the other housing indicators are obviously more critical than average: 43.9% have "shanty" roofs compared to the metropolitan average of 16.3%, 74.4% do not have inside tap water compared to 32.1%.

1. A Closer Look at the Population of Nezahualcóyotl, Chimalhuacán and Chalco

A more detailed description of the population of irregular settlements may be obtained from the microdata of the ten per cent extended questionnaire sample of the 2000 census, considering the three municipalities already described: Nezahualcóyotl, Chimalhuacán and Chalco. For instance, **Table 19** shows type of household, a variable not included in the standard census questionnaire. Although nuclear families account for nearly three-quarters of all households, in the older settlements of Nezahualcóyotl, the proportion is slightly less, with a correspondingly higher proportion of extended families and single person households. Compound families with more than one nucleus and non-familiar households are extremely rare in the three municipalities and, in general, in Mexico City. **Table 20**

shows per capita household incomes in relation to the age of the dwelling, as a proxy for time of residence in the settlement. As a general rule, newer inhabitants include a higher proportion of lower income families, and correspondingly less households with higher incomes; and vice versa, lower income families are slightly under represented among residents of older buildings. Disaggregated data by municipality (not shown) reveals that this relation does not hold in Nezahualcóyotl, where income is not related to age of dwelling, probably because many houses are not occupied by their original first generation owners. As has been shown, tenure is only slightly linked to income levels (**Table 15**). Income is, however, strongly related to available space, measured in people per room, as can be seen in **Table 21**.

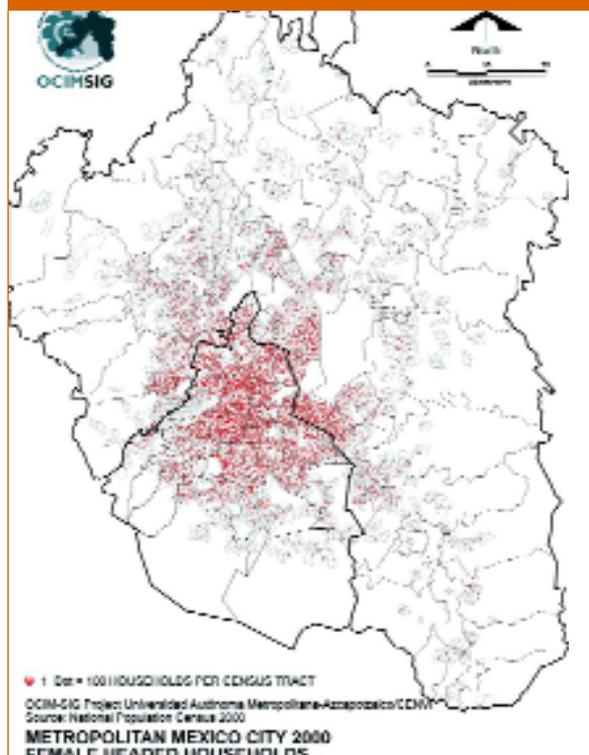
Finally, **Table 22** compares the possession of consumer durables in three municipalities with the average for Metropolitan Mexico City and with those census tracts in which more than 75% of the houses

have no inside water tap. While nearly everyone watches American and Mexico soap operas on their own TV, less than a quarter of the inhabitants of these areas can have a hot bath at home, only 10 per cent have a telephone, in spite of the system's recent expansion and the availability of cell-phones. And scarcely 2% have a computer: a strong disadvantage given the increasing demand for computer literacy as a job requirement. In an increasingly car dependant city, the 85% of households without cars has limited access to everything: a situation partially compensated by the over 150,000 taxis estimated to be circulating in the city. The intermediate situation of Ciudad Nezahualcóyotl regarding the possession of consumer durables is indicative of the highly heterogeneous population of this agglomeration of fifty-year-old consolidated irregular settlements.

D. COSTS OF LIVING IN MEXICO CITY SLUM: THE PRICE OF IRREGULARITY

Inhabitants of central-city vecindades enjoy the advantages that the inside core of a large metropolis can offer: cheaper goods and services, highly subsidised and reasonable efficient public transport, an oversupply of schools (due to the demographic transition and population decline), health and other public services. Within the Federal District, public spending per capita is many times that of neighbouring Mexico

Map 14: Metropolitan Mexico City: percentage of households headed by women, by census tract. 2000



Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

State, which is reflected in a generally better quality of public assets of all kinds. Against this, rents are high; any kind of cheap housing in central areas is scarce and relatively expensive. It is difficult for a family to find anywhere to live in central areas for under one thousand pesos (US \$100) a month. However, tenants already living in central-city vecindades usually are paying relatively low rents; or extremely low rents in the few properties still affected by frozen rents, or those whose landlords do not increase rents in accordance to inflation. In their survey, Coulomb and Sánchez (1991, 129) found in that central city tenants in the notorious vecindad area of the Colonia Doctores were spending only 4.9 per cent of their income on housing, compared to 12.4 per cent spent by tenants in consolidated colonias populares and 15.4 per cent by owner-occupiers in recently-established irregular settlements (including the Colonia Avándaro in what is now the Valle de Chalco municipality). It is here, in the formative processes of irregular settlements, where the question arises about both the relative costs of housing itself and the higher prices of goods and services.

Whether self-built homes are more expensive than professionally-designed houses built by construction firms is an unresolved question. A first consideration is the cost of house itself. The unit price of building materials acquired in small quantities from local distributors is much higher than those negotiated by contractors directly with manufacturers. Likewise, bad design including over and under structuring, inefficient layout of spaces and dysfunctional services all contribute to higher costs of self-built housing in the short or long run. Much of the ageing self-built housing stock is now in a deplorable state, both due to initial errors and lack of

Table 18. Metropolitan Mexico City 2000. Selected population characteristics in census tracts where over 75% of dwellings are without inside piped water

	Total population	Masculinity index	% under 15	% over 60	% female headed households	Personal income in multiples of minimum wages (2002 Minimum Wage = ca. US \$100/month)			% pop. with health benefits	Mean occupancy rate (persons per dwelling)	Mean live births per women over 15	Literacy rate in population over 15		% population over 5 living in same municipality in 1995
						% EAP with 5 +	% EAP with 2 to 5	% EAP with under 2				Men	Women	
Total Metropolitan Mexico City	18,396,677	48.4%	28.5%	6.8%	22.1%	14.6%	33.1%	44.5%	48.2%	4.23	2.27	97.7%	94.9%	76.80%
Census Tracts with 75% Dwellings without Inside Water	1,777,531	49.8%	35.9%	3.7%	16.5%	3.9%	29.5%	59.9%	64.4%	4.69	2.74	94.6%	89.7%	70.10%

Source: 2000 National Population and Housing Census, microdata of 10% sample with extended questionnaire

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Table 19:
Metropolitan México City 2000: household type in three municipalities urbanized predominantly by irregular settlements (Ciudad Nezahualcóytl, Chimalhuacán and Valle de Chalco Solidaridad)

Source: 2000 National Population and Housing Census, microdata of 10% sample with extended questionnaire

Municipality	Nuclear Family	Extended Family	Compound Family	N.S. Family	Single Person	Non Family Co-Residents	N.S.	Total
Nezahualcoytl	201,595	71,418	2,013	1,056	15,469	542	188	292,281
	69.00%	24.40%	0.70%	0.40%	5.30%	0.20%	0.10%	100.00%
Chimalhuacán	82,479	20,256	689	490	3,706	84	54	107,758
	76.50%	18.80%	0.60%	0.50%	3.40%	0.10%	0.10%	100.00%
Valle de Chalcos	53,651	14,733	423	271	2,420	27	18	71,543
	75.00%	20.60%	0.60%	0.40%	3.40%	0.00%	0.00%	100.00%
Total	337,725	106,407	3,125	1,817	21,595	653	260	471,582
	71.60%	22.60%	0.70%	0.40%	4.60%	0.10%	0.10%	100.00%

Table 20:
Metropolitan Mexico City 2000: Per Capita Monthly Household Income by Age of Dwelling in Three Municipalities Urbanized Predominantly Irregular Settlements (Ciudad Nezahualcóytl, Chimalhuacán and Valle de Chalco Solidaridad)
Source: 2000 National Population and Housing Census, microdata of 10% sample with extended questionnaire

Per Capita Monthly Household Income	Age of Dwelling in Years								Total
US Dollars	< 1	1 to 5	6 to 10	11 to 20	21 to 30	31 to 50	50 +	N.S.	
0 a 49	36.4%	32.6%	30.5%	23.6%	20.2%	22.5%	26.7%	28.3%	27.0%
50 a 99	35.4%	36.1%	36.4%	36.4%	31.7%	36.2%	32.6%	32.6%	34.7%
100 a 149	14.8%	14.6%	14.6%	17.6%	19.6%	17.8%	15.1%	15.9%	16.5%
150 a 199	5.1%	5.9%	6.3%	8.6%	9.6%	8.7%	5.8%	6.8%	7.5%
200 PLUS	8.3%	10.8%	12.2%	16.4%	18.9%	14.8%	19.8%	13.7%	14.3%
N.S	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 21: Metropolitan Mexico City 2000: per capita household income by number of people per room per dwelling in three municipalities urbanized predominantly by irregular settlements (Ciudad Nezahualcóytl, Chimalhuacán and Valle de Chalco Solidaridad)

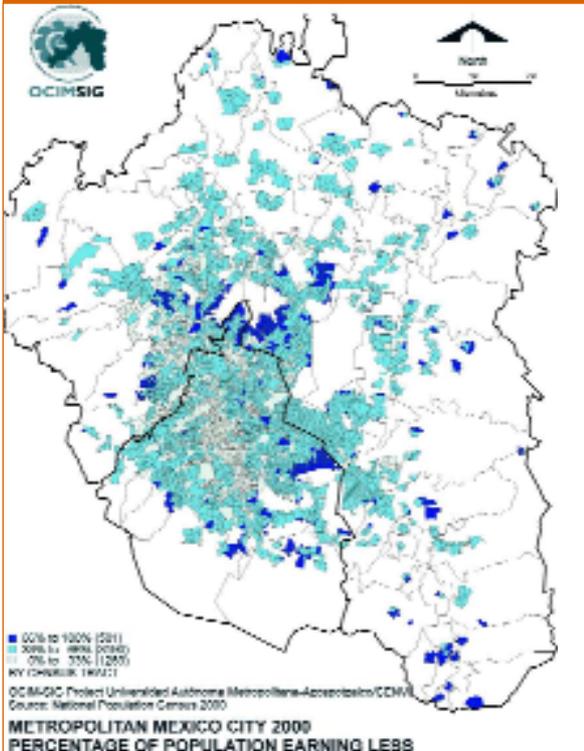
Source: 2000 National Population and Housing Census, microdata of 10% sample with extended questionnaire

PER CAPITA MONTHLY HOUSEHOLD INCOME	NUMBER OF PEOPLE PER ROOM					Total
US Dollars	over 3	2 to 2.9	1 to 1.9	under 1	n.d.	Total
0 a 49	44.9%	37.2%	23.2%	13.1%	11.9%	26.3%
50 a 99	38.9%	39.5%	36.7%	25.1%	28.1%	34.7%
100 a 149	9.8%	12.8%	19.1%	19.7%	16.9%	16.8%
150 a 199	2.6%	4.2%	8.5%	11.8%	11.9%	7.7%
200 PLUS	3.8%	6.2%	12.5%	30.3%	31.3%	14.5%
N.S	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
No. of dwellings	68,355	82,277	204,686	116,104	160	471,582

Source: 2000 National Population and Housing Census, Sistema de Informal Censal (SINCE), Data by census tract. OCIM-SIG Project, Universidad Autónoma Metropolitana-Azcapotzalco

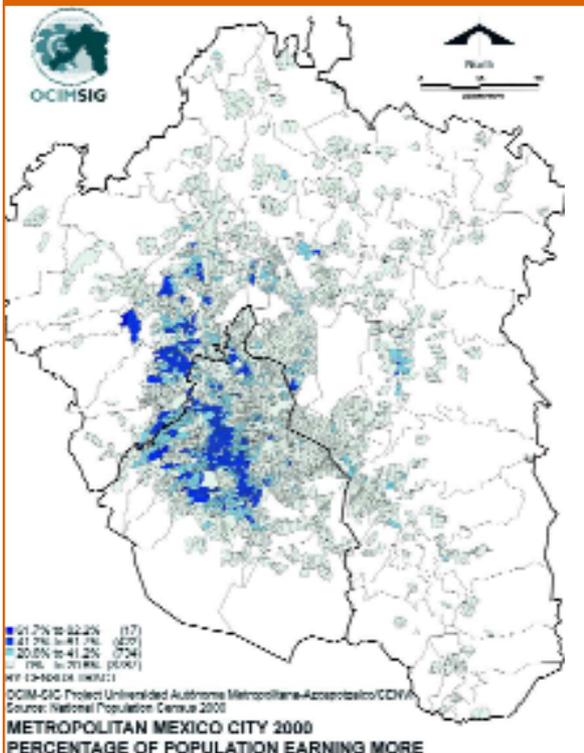
	Total Dwellings	Percentage of Dwelling with:									All items
		T.V.	V.C.R.	Liquid-izer	Fridge	Washing machine	Phone	Water heater	Car or van	Compu-ter	
Total Metropolitan Mexico city	4,211,693	96.0%	54.8%	94.3%	80.0%	64.7%	55.9%	65.0%	34.6%	16.6%	11.3%
Nezahualcoytl	274,984	96.3%	51.2%	94.1%	79.1%	65.8%	54.1%	61.6%	30.2%	11.0%	6.7%
V. de Chalco	66,901	92.7%	32.2%	90.9%	58.1%	48.4%	19.6%	26.0%	14.2%	2.3%	0.8%
Chimalhuacán	99,372	92.9%	31.2%	90.9%	91.4%	47.9%	20.0%	24.9%	14.6%	2.1%	0.8%
Census tracts with 75% dwellings without inside water	359,041	90.2%	27.7%	88.8%	51.6%	40.7%	18.3%	22.7%	14.9%	2.1%	0.8%

Map 15: Metropolitan Mexico City: percentage of population earning less than 2 minimum wages, by census tract. 2000



Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

Map 16: Metropolitan Mexico City: percentage of population earning more than 5 minimum wages, by census tract. 2000



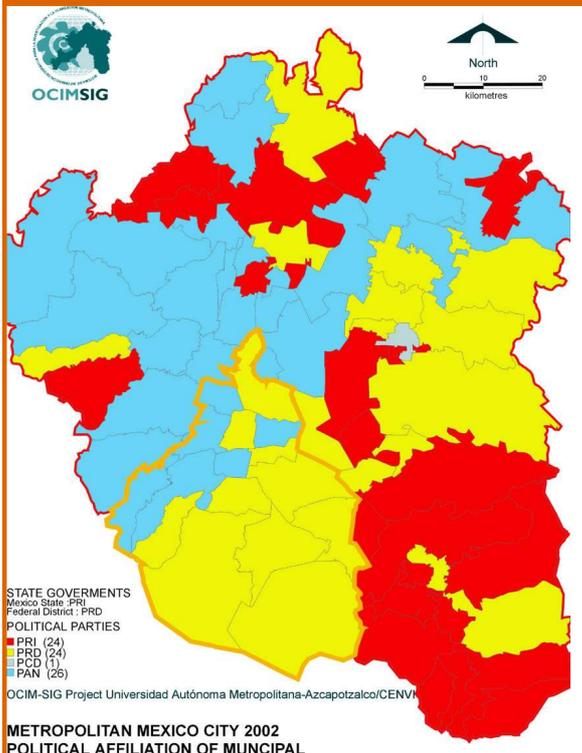
Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

maintenance; improvements are often more expensive than initial layout. Against that, there are no professional fees, no profits to be paid to contractors, no taxes and no interest on mortgages. For it is, above all, the absence of credit that has given rise to the irregular settlement phenomenon; and the incremental self-financed, self-managed, often self-designed and built has been the only solution that fits in with the financial capacities of the vast majority of the population, including in many cases, families and individuals that could well be characterised as “middle class”.

Another main issue is the cost of land in relation to location and services. Some argue that land in irregular settlement turns out to be more expensive than formal land¹⁹. Certainly plots of land in consolidating settlements, especially those that are well placed within the city, may command higher prices than serviced plots with legal titles in some areas. My general impression, based on results of various (not necessarily representative) surveys undertaken over a long period is that what people have paid for their plots in irregular settlements is extremely varied, within the same settlements and time period, and even more so across different settlements and time periods. In general, prices have been low in retrospect, and terms have been flexible and accessible. The total amount paid, including regularisation costs and improvements, seems to be arbitrary, depending on how much was paid to the sellers of the land prior to regularisation, the political skills in negotiating a deal with the authorities, pressure from competing uses and so forth. Even when the payment various times over of plot and service seems “unfair”, in retrospect, the amount paid by most of the proprietors of plots in irregular settlements has been relatively small. A very careful study in Aguascalientes (Jiménez 2000) suggests that land in irregular settlements cheaper than comparable land in the formal market, permits flexibility in the amount acquired and in the form of payment, while there are advantages (to the purchaser) of the absence of license requirements. In reality, it is extremely difficult to compare land prices in irregular and commercially produced settlements, or government projects. Often the latter simply are not available at an accessible price and income requirements. If they do exist, as is increasingly the case, often they are inconveniently located or involve inflexible requirements concerning house types, etc. Plots are almost inevitably larger in irregular settlements (over 120 square meters), which facilitates not only incremental construction, but also allows for multi family occupancy: a crucial consideration for housing the future generations in a strong family system.

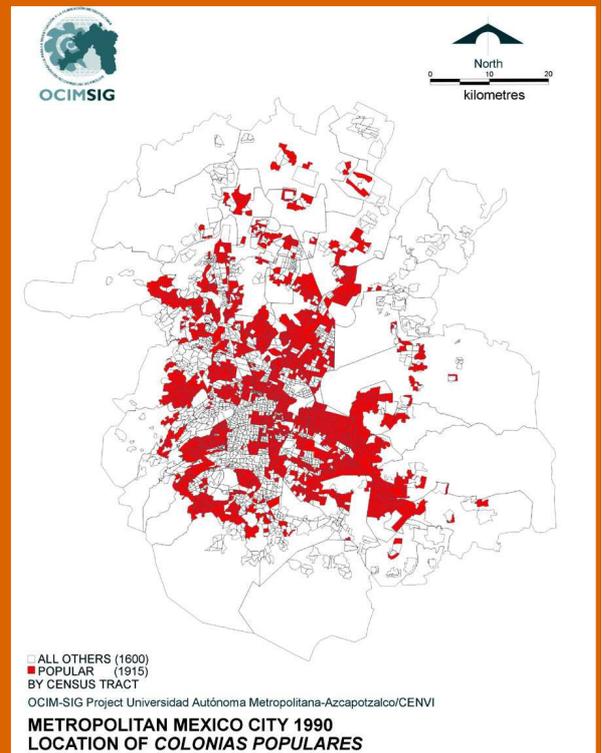
The advantages of irregular settlements are many, as John Turner pointed out more than thirty years ago; but there are also high individual and social costs. The individual cost of the initial absence of services, especially water and sanitation, have been mainly borne by

Map 17: Metropolitan Mexico City: the political mosaic 2001-2003.



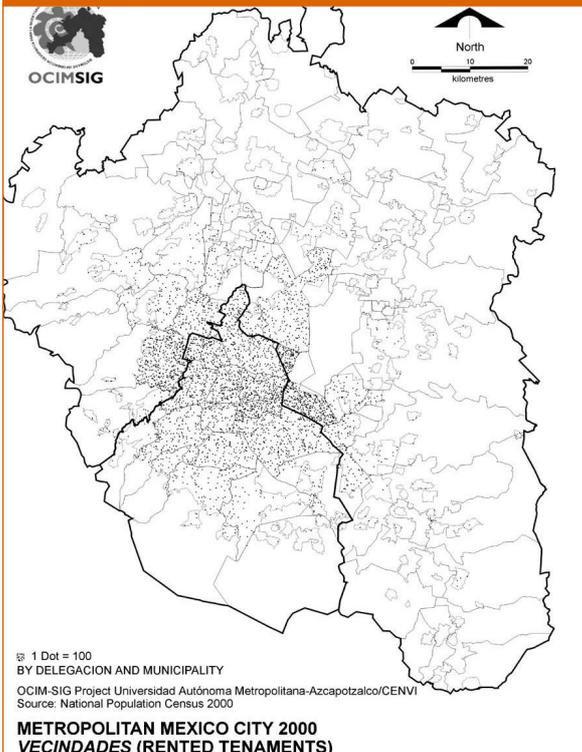
Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

Map 18: Metropolitan Mexico City: location of irregular settlements 1990, by census tract



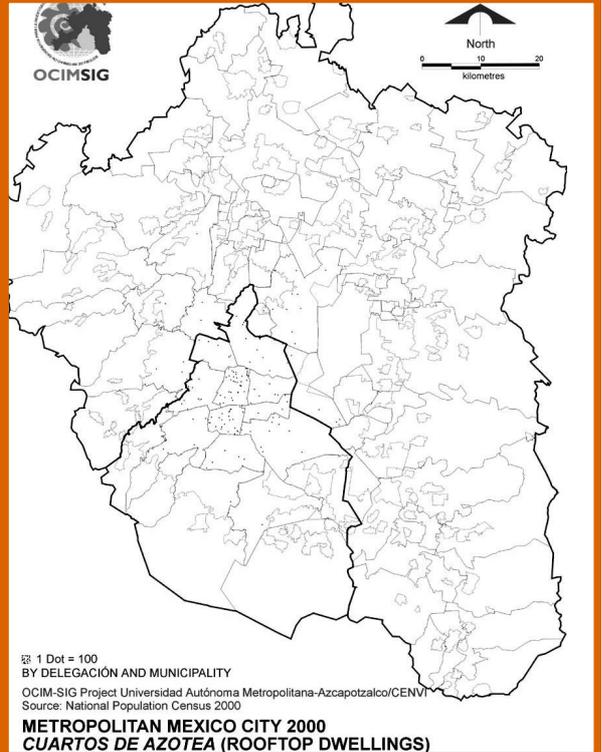
Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

Map 19: Metropolitan Mexico City 2000: location of vecindades (rented tenements) by delegación and municipality



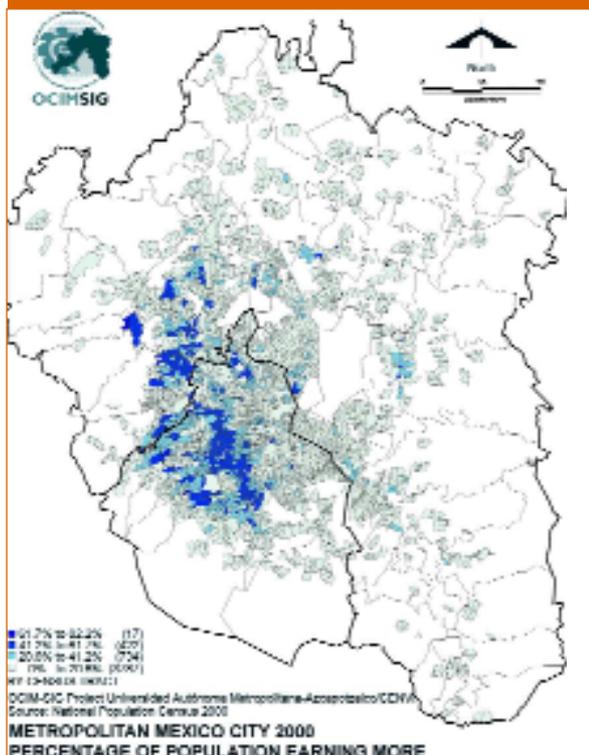
Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

Map 20: Metropolitan Mexico City 2000: location of cuartos de azotea (rooftop dwellings) by delegación and municipality



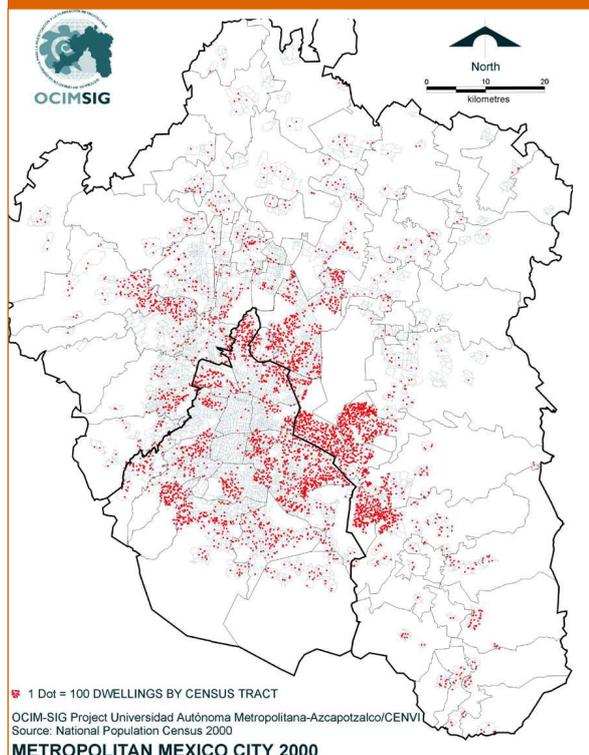
Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

Map 21: Metropolitan Mexico City 2000: location of social interest housing project by census tract



Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

Map 22: Metropolitan Mexico City 2000: dwellings with "shanty" roofing, by census tract



Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

women²⁰, who have the double onus of solving the immediate needs of the household, and pressuring authorities to step in and provide basic infrastructure and other public services, as well as regularisation and other social facilities. There have been no studies to measure the toll of irregularity on the health of the women and men who have, literally, built the city, with the help of unskilled construction workers and maestros. But it is quite possible that the lower fertility rates and higher economic participation rates will make the "self build" housing solution in remote peripheral settlements increasingly unattractive to women.

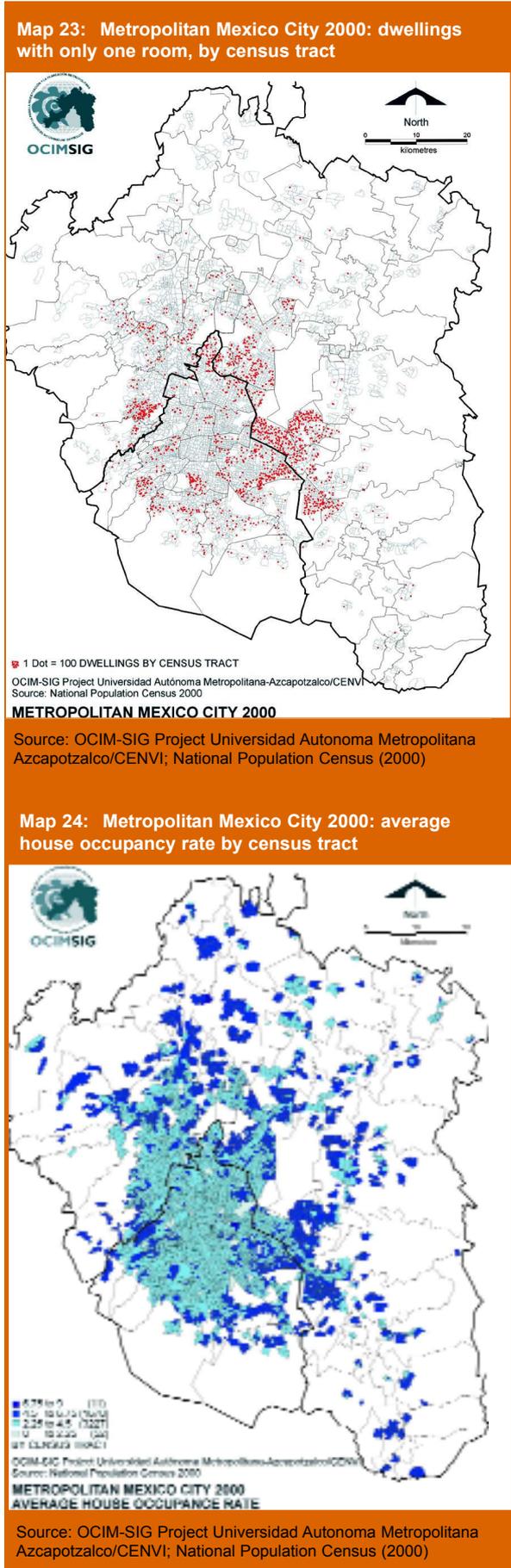
Some individual costs of irregularity can be identified. In settlements without mains water supply, or where the supply is erratic, household expenditure on water can be extremely high. Families with enough money to build a large enough cistern can simulate a proper water supply by buying a truckful of water, at varying prices depending on the location: in the Federal District, the authorities provide the water free or for a small charge, depending on the area, but the distributors charge from 80 to 500 pesos (8 to 50 US dollars) a 10 m³ truck. In the State of Mexico water trucks cost more. Otherwise, water is bought by the 200 litre drum from intermediaries expensively: for example, in a colonia in the foothills of the Sierra de Santa Catarina in Ixtapalapa, filling ten oil drums cost 60 pesos (just under 10 US dollars), that is 30 pesos a cubic meter, compared to the base rate of 2.3 pesos per m³ for the first 25 m³ consumed monthly in areas with constant water supply²¹. This means that families consuming a monthly average of 20 cu. m. (or about 150 litres per day per person) can spend over half a monthly minimum wage just on water. So many families consume much less. In areas where there is no vehicular access and no mains, water has to be carried, usually uphill in plastic buckets, two at a time. Within certain limits of cost and effort, all colonias achieve some sort of water supply.

Another basic condition, without which an irregular settlement cannot function at all, is the existence of transport links to metro stations and other interchange nodes. The connection between transport routes and irregular settlement formation has been well documented, first with the buses and, more recently, with the minibuses and "combis". Often the land developers also controlled the buses, as was the case in Ciudad Nezahualcóyotl. In other cases, for instance Valle de Chalco, the minibuses worked in alliance with the developers, providing an essential, even personalised, transport service for the settlers. In other cases, the settlers formed alliances with the bus owners to put pressure on local authorities to improve road access. The much criticised²² shift towards the smaller, more flexible, peseros (collective taxis) and minibuses, has improved accessibility in many of Mexico City's colonias populares, while at the same time contributing to decentralisation of central-city functions to suburban transport

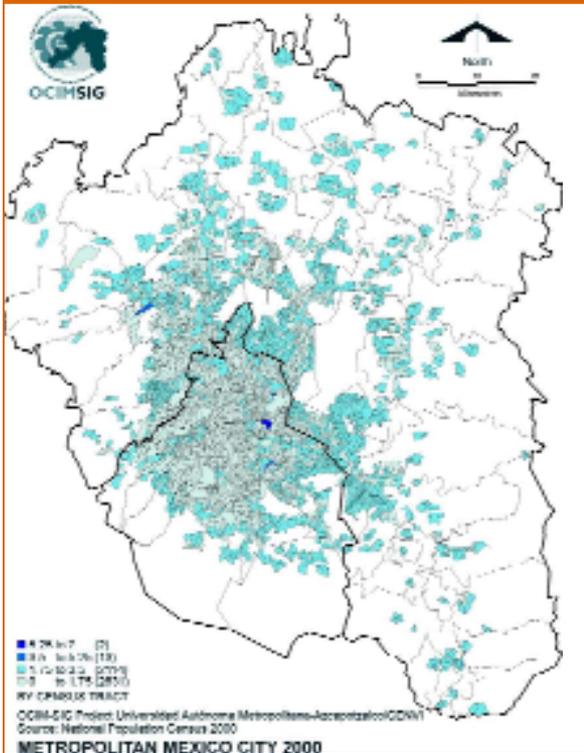
hubs. Even so, the minibuses only transit along the main roads of a settlement. There may be a half hour walk to nearest route, and then all the minibuses may be full, especially in the morning rush hour, when it is preferable to walk a longer distance to a main road (Salazar 1999, 129). Lack of vehicular access in the more remote irregular settlements, and those located on steep hillsides, adds additional onus on already extremely long travel times endured by all Mexico City's inhabitants.

Up to date information on travel costs, times and distance is unavailable, but the latest origin-destiny survey carried out in 1994 suggests that average one-way travel time for the whole city is 46 minutes, or 50 minutes for those travelling by public transport. According to the same data, over a third of the trips took between one and two hours, while 5 per cent and 7.5 per cent took over two hours in the Federal District and State of Mexico, respectively (Islas 2000, 85). To get to work or school at eight in the morning, many people will have get up before five o'clock.

Transport is cheap in Mexico City, especially in the Federal District, where most people have to travel to work, even if they live in the metropolitan municipalities. A ride anywhere on the metro, trolleybus or bus costs two pesos (July 2002: 20 US cents), while a microbus ride costs between 2.50 and 5 pesos, depending on distance covered. Fares are higher in the State of Mexico, especially for those who have to make longer trips in buses. In spite of the cheap fares, transport costs can take up a large part of a low-income family's budget. The Coulomb and Sánchez (1991, 129) survey revealed owner occupiers in both incipient and consolidated settlements spent about 10% of their income in transport, while renters spent considerably less: presumably due to the flexibility of housing location that renting affords. As Salazar (1999, 127) has pointed out, the more heterogeneous the neighbourhood, and the nearer the poor live to the better off, the less need there is to travel. In the same study, Salazar points out that women in colonias populares, especially wives with young children, have very limited mobility compared to men, although female heads of household and daughters have a wider range of action within the city. However, a preliminary analysis of 2000 census micro data shows that women seem to travel further to work than men. This is no doubt a result of the fact that women are no longer predominantly "wives with young children" but single parents, daughters, wives with older or grown-up children, or older women who live on their own. (Younger women who live on their own are unusual, even amongst the professional classes.)

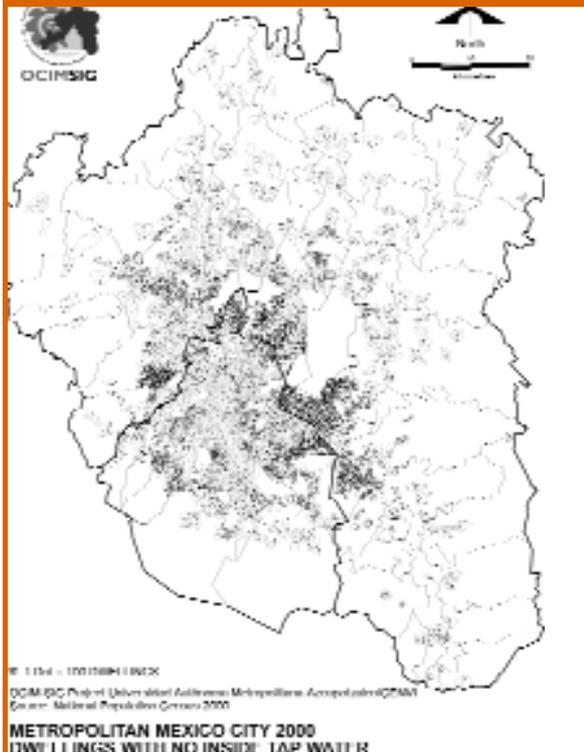


Map 25: Metropolitan Mexico City 2000: average inhabitants per room



Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

Map 26: Metropolitan Mexico City 2000: percentage dwelling with no inside tap



Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

THE SOCIAL COSTS AND BENEFITS OF IRREGULAR SETTLEMENTS

Independently of the individual costs and benefits of Mexico's irregular settlements, an important consideration is the question of their socialised or collective costs and benefits: the social, political, economic and environmental impacts of uncontrolled urbanisation for the city as whole, for the country and beyond, in the past, present and future. This is clearly not the place to explore this issue fully, but Mexico City can provide some useful illustrations of how the ways the poor are housed have wider implications, beyond the immediate conditions of the affected population. Of these wider implications, only two will be touched on here: the political effects of irregularity and the environmental impacts.

Regarding the first issue, after a first wave of irregular settlements in Mexico City, about 1970, there was a general consensus²³ that irregular urbanisation (then referred to widely as marginality), far from providing a hotbed of social unrest and revolutionary struggles, in Mexico provided a strong foothold for the ruling clientilistic one-party corporative State. In the absence of clear-cut universally applied rules (such as those concerning what you can build where), individual rights (such as security of tenure on an invaded or illegally acquired plot of land) can depend largely on allegiance to leaders who are able to negotiate satisfactory outcomes with the authorities; the power of the leader, and thus of the official political party machine, in this case the PRI, is derived from the popular following she or he can muster. For the system to work, some of the goods, at least, have to be delivered. In the case of Mexico City, the most important good to be delivered was security of possession of land, which was occupied illegally for one, or various of the reasons mentioned above. In fact, although evictions of invaded private or public property have occurred, these have been the exception, rather than the rule, as the over ten million inhabitants of what were originally irregular settlements testify. However as the goods demanded by the population became more expensive and difficult to deliver, such as paved roads, cheap transport, water, drainage and schools, the leaders' political power was weakened. Alternative popular organisations sprung up, whose first aim was to eliminate corrupt leaders in order to obtain legal recognition of tenure, basic infrastructure and services; politicised collective action became an essential part of settlement upgrading²⁴.

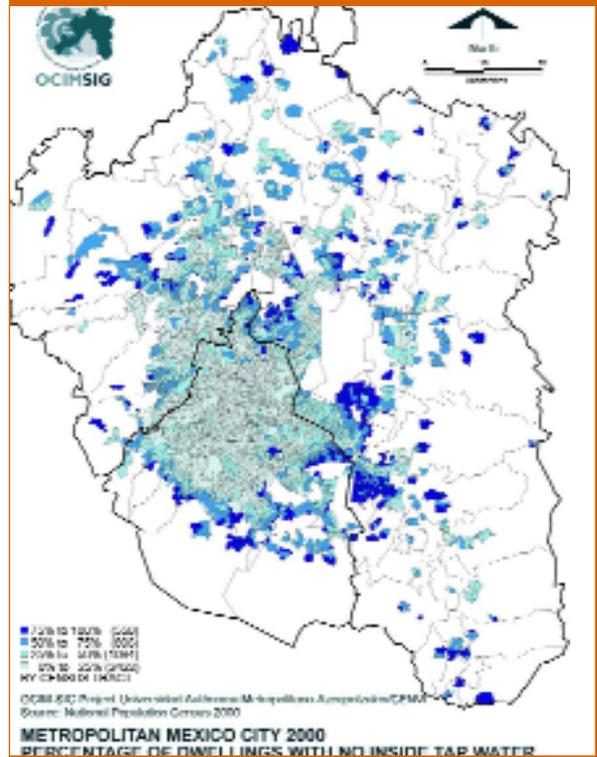
It would be difficult to argue that the Popular Urban Movement was decisive in achieving political reform in Mexico; but it certainly was an active participant in the process. The fact that the PRI has lost its political base in most of Mexico City to the left-wing PRD (see [Map 17](#)) is due largely to its failure to keep control over the colonias populares. Many of the PRD elected representatives in the Federal District and Municipal govern-

ments, including an important contingent of women, have come out the ranks of the Popular Urban Movement.

If the political outcome of irregular settlement processes might be considered a social benefit, there are clearly social costs as well, most of which are directly or indirectly related to environmental impacts. The fact that many irregular settlements are located in high-risk areas affects not only the inhabitants themselves, but also may have wider implications. On the hillsides, natural drainage channels become blocked by buildings, causing floods and landslides. Down in the valley, the urbanisation of areas almost below the water table, such as Valle de Chalco, implies immense social costs for drainage provision. Widespread use of latrines, dysfunctional septic tanks and widespread deposit of human (and canine) faeces contaminate both the atmosphere and the aquifer. The lack of rational road layout and design of individual houses in most settlements create enormous problems and unnecessary costs for service provision. For example, building access roads perpendicular to contours in order to maximise the amount of land that can be sold off as lots is not the best way to urbanise a hill from an environmental point of view. Two of the most important environmental problems, deforestation and soil erosion, are also brought about by irregular settlements, although it is debatable whether these are more harmful than agriculture. Sooner or later urbanisation by all social classes includes trees, even in what used to be the saline wastes of Ciudad Nezahualcóytl.

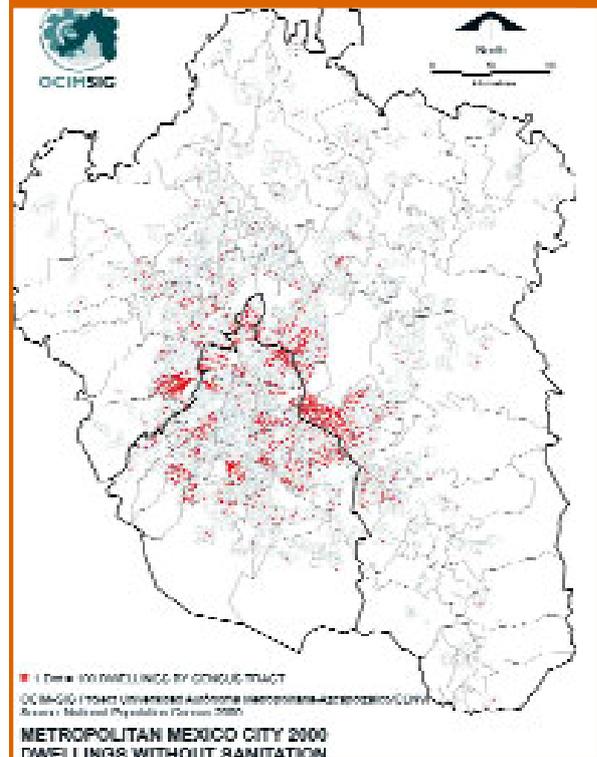
Over and above these and other specific ecological disadvantages, irregular settlement as a solution for housing the poor has a more general implication, relating to the possibility of environmental control. The laissez-faire and even supportive public policies towards irregular settlement in Mexico, as in much of Latin America, whatever their advantages and disadvantages as a low cost housing solution, have inevitably widened the gap between letter and lay of the law, including environmental and urban planning regulations. In short, nobody expects these regulations to be universally applied, and no government is capable of enforcing them. This clearly makes planning extremely difficult to achieve, with widespread consequences for present and future damage to the environment. And, as has been frequently demonstrated, the principal victims of environmental degradation are the poorest members of society: those who are unable to buy a better urban environment.

Map 27: Metropolitan Mexico City 2000: dwellings with no inside tap water, by census tract



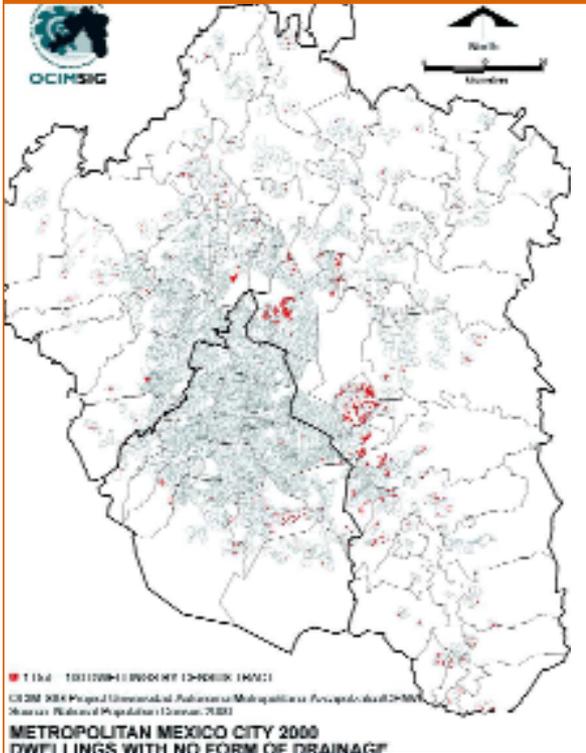
Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

Map 28: Metropolitan Mexico City 2000: dwellings without sanitation by census tract



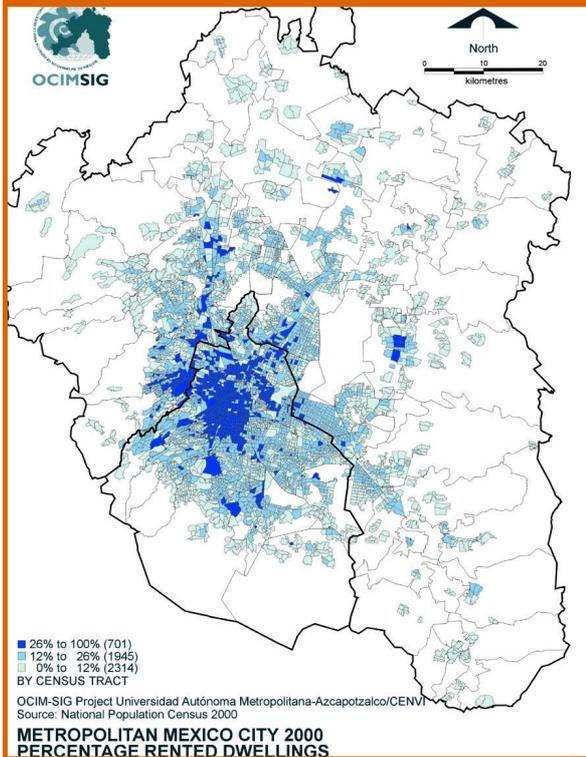
Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

Map 29: Metropolitan Mexico City 2000: dwellings with no form of drainage by census tract



Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

Map 30: Metropolitan Mexico City 2000: percentage rented dwellings



Source: OCIM-SIG Project Universidad Autónoma Metropolitana Azcapotzalco/CENVI; National Population Census (2000)

THE POLICIES

The policies that have enabled the creation, improvement, degradation or eradication of slums in Mexico City have a long history. To understand the role of the State regarding the most important manifestation of slums here, the irregular settlements, it is necessary to go back at least fifty years, to the prototypical situations out of which subsequent policy evolved. During this time there have been many changes and innovations, which have been recorded and analysed in an extensive body of literature, attracting the attention European and North American Scholars, as well as constituting a mainstream subject of urban studies in Mexico²⁵. The general tendencies defining these policies may be summarised as follows.

First, as has been shown, the overwhelming policy towards irregular settlement formation has been that of *laissez faire*, due both to the inability of local governments to prevent unauthorised land occupations and to political and economic benefits that irregular urbanisations provided for individual government officials, party leaders and in general to the political system as a whole. The introduction of electoral competition due to political reform, has not eradicated the popular clientilistic culture fostered by irregular land possession.

Once established, a *colonia popular* will normally encounter few problems in obtaining electricity from the State-owned company. In the initial stages, electricity is often obtained free of charge by illegal hook-ups to distribution lines. Further improvement in basic infrastructure, namely water and drainage, may take longer, depending on the terrain, the location of the settlement, the political climate and other contingent factors. The costs will be covered both by contributions from the inhabitants and local government budget. Over the years, various forms of federal finance have been made available to municipalities for paving roads and introduction of services, as part of central government's normal social and public works budget, or poverty alleviation programmes. Exceptionally, such as the case of Nezahualcóytl in the 1970's, specific federal funding was applied. In early 1990's, the *colonias populares* in Valle de Chalco were also targeted as beneficiary to the federally funded poverty alleviation programme Solidaridad (hence the name of municipality created in 1994). Benefits here included not only regularisation, electrification, water, drainage and some paved roads, but also a civic centre and a visit from the Pope. Apart from the magnitude of the problem and its visibility from one of the main roads out of Mexico City, a major reason for targeting Chalco was the low vote for the PRI in that area in the 1988 presidential elections.

The Federal District, being the richest entity in the Mexican federation, has been excluded from federal funds to finance this type of investment. Improvements

to colonias populares have been paid for by their inhabitants and the local government budget.

The existence of procedures and programmes for tenure regularisation in irregular settlements provides the vital *de facto* legitimacy, or tacitly understood rules, underlying the otherwise illegal property transactions by which the settlers take possession of their plots (Azuela 1989, 81-130). All parties understand that sooner or later some form of property title will materialise; meanwhile the purchaser usually can count on a considerably degree of security of tenure. The precise nature of regularisation procedures has varied over time, and according to the original form of property. Agrarian communal property or ejidos can be regularised by three distinct procedures, all involving the intervention of one or other federal government agencies, including in one case, expropriation by presidential decree²⁶. Regularisation of unauthorised popular urbanisation on private property or federal land is handled by state government agencies. Usually the regularisation programme is accompanied by credit package for the purchase of the property, and/or the introduction of services. In some programmes, technical assistance, in the form of house plans, cheap materials and so forth²⁷, was also provided as part of the regularisation process.

In all, it is true to say that the response of the various levels of government to irregular settlements has been more supportive than repressive. And yet, these and other measures are not considered to constitute an official urban or housing policy. Neither has there been any systematic evaluation of the different procedures and actions, in terms of the resulting quality of habitat. One reason for this is that there are so many intervening factors that it is extremely difficult to identify relations of cause and effect. The overall results of this tacit policy towards irregular settlement are the housing conditions described above.

In the present context, in which most of the city is already built, in which the main problems have to do with existing housing, an innovative programme providing credits for home improvements has been implemented by the Federal District Government since 2001. The programme forms part of a wider policy for territorializing social investment, based on the electoral sub-districts. These are classified according to their "marginality index" based on relative levels of socio economic indicators, such as income, housing conditions, and access to services. Funds are distributed according to registered degree of marginality per population. The assignation of the individual credit is decided by neighbourhood committees that have been set up in most of the 591 sub-districts to be benefited by the programme in 2002. This year it will invest 633 million pesos (63.3 million US dollars) in 15,404 home improvement credits²⁸. The maximum amount loaned to each beneficiary is 37,092 pesos (3.7 thousand US dollars) which covers preliminary studies, project and building costs. This

amount is enough to build a two or three additional small rooms, a room and a bathroom, overhaul the services, etc. To be eligible for this kind of credit, the beneficiary must earn less than 3 times the minimum wage (or have a minimum family wage of 6.5 times the minimum wage), have some previous savings for the programme, be head of household with dependents and/or be married, prove the property or possession of the house, among other requirements. Repayment of the loan can take up to eight years. Houses in high risk and very irregular areas are not eligible. The programme also contemplates technical assistance from private architects, under a blanket agreement with the Mexican Confederation of Architects, and also from NGO's.

The home improvement project is run from the Federal District Government's Instituto de la Vivienda, along with other programmes, such as new housing, purchase and rehabilitation of houses in listed heritage buildings, purchase and rehabilitation of houses in non-listed buildings, sites and services, purchase of used housing and building of new housing in already-own plot. Additionally, the Procuraduría Social de Distrito Federal (Social Prosecutor) is implementing a programme called "recate de unidades habitacionales" ("social interest housing projects rescue") consisting of non repayable grants for maintenance and repairs. In 2002, the total amount to be spent by this programme is 130 millions of pesos (13 million US dollars) in 719 housing projects, with a total of 325,000 dwellings.

For the moment, these types of programme is limited to the Federal District, under the PRD government. However, given the demonstration effect that the nation's capital has in the rest of the country, it is probably that similar projects will crop up in other areas, particularly, though not exclusively, in cities controlled by the PRD. At this time (July 2002) similar territorially based social investment schemes are being contemplated In the State of Mexico.

An evaluation of the immediate and longer-term effects of the credits for home-improvement, as well as the housing project rescue scheme, is premature. Follow-up procedures are built into the project, but these refer more to the way the funds are administrated and distributed, rather than their general impact on housing conditions. A first impression from those directly involved in the programme as advisors or beneficiaries is that the credits for home improvement are not going to the most needy. However, as long as other basic necessities remain unattended, it is doubtful that what the "most needy" need most is credit for home improvement. ■

NOTES

Except where otherwise indicated, the statistical and cartographical information included in this chapter was generated by the project SISTEMA DE INFORMACIÓN GEOGRÁFICA PARA LA INVESTIGACIÓN Y PLANEACIÓN METROPOLITANA, currently in progress at the UAM-A, coordinated by the author. The project benefits from the collaboration of the Centro de la Vivienda y Estudios Urbanos AC (CENVI) and is financed by the UAM-A and Mexico's Consejo Nacional para la Ciencia y Tecnología (CONACYT). Special thanks to Jesús Velázquez and his CENVI team for help in preparing the maps presented here. Except for Map 1, these were generated in MapInfo and finished in Corel Draw.

- 1 The Mexican National Population Council (CONAPO) calculated the marginality index for municipalities and localities in 1995, confirming that poverty indicators are inversely proportional to the size of the municipal population. In 1995, of the 9.2 million people living in localities of less than 500, 8.5 million registered a medium, high or extremely high marginality index. CONAPO (2000, p36).
- 2 There are numerous contradictory estimates of Tenochtitlán's population in 1520. The early C16 population of the whole Valle of Mexico, roughly corresponding to the site and extension of present-day Mexico City, has been estimated at as much as two million.
- 3 By Luis Unikel, who used physical contiguity as the main criterion to define "metropolitan areas" and "administrative boundaries containing urban areas directly related to the central city" to delimit "metropolitan zones" (Unikel, L. et al 1976, pp 116, 118).
- 4 Nor is their much consensus on what to call Mexico City. "Mexico Valley Metropolitan Zone" has tended to replace "Mexico City Metropolitan Area" and "Metropolitan Zone", reflecting the wider coverage of topographical criteria. The Government of Mexico State tends to refer to its municipalities within metropolitan Mexico City as the "Cuautitlán-Texcoco Valley".
- 5 How the city is defined does, however, affect the measurement of poverty based on relative indicators, for example, the percentage of population without access to clean water. Inevitably, the more sparsely populated semi-rural peripheral municipalities show up with higher incidence of poverty-related indicators.
- 6 Out of a total of 1,144 million in 1980. These figures refer to employees in industries registered in the industrial census of 1980 and 1933, for the Federal District and 27 metropolitan municipalities.
- 7 As the word "slums" is not generally used, there are no meaningful definitions, official or otherwise, beyond what the dictionary provides.
- 8 The lack of distinction between official and unofficial definitions also applies to the definition of "poverty". There are as many "official" definitions of "poverty" as there are government departments. Non government (unofficial?) definitions, such as those provided by the Economic Commission for Latin America (ECLA) or the wider definitions of the Mexican expert, Julio Boltvinik, are often used as yardsticks, but not necessarily

applied in policy definition and targeting. Furthermore, as academics move in and out of government, taking with them their particular view of the world, the distinction between "official" and "unofficial" is temporary. What is relevant is the conceptualisation of poverty behind the major social policies.

- 9 Translation into English can be misleading. The Spanish word popular should be strictly translated as "of the people", in general to denote the lower social classes (las clases populares). These include a much wider segment of society than those who are strictly "below the poverty line" (however defined). Popular is also used to denote a residual category (like marginal or informal), defined not for what it is, but what it is not (sector popular) ie. not legal, not public, not private, not well-to-do. Because of the lack of clear translation, I shall use popular in italics as a Spanish word. Colonia, has a much more specific connotation than "neighbourhood", as it is usually translated. The whole city is divided into colonias, and although they have no official boundaries, their territorial identity is usually fairly clear cut.
- 10 The word tugurio was possibly applied at that time because it was believed that the housing in those areas should be eradicated and replaced by Le Corbusian-type unites (INV 1958b). Fortunately, this did not happen, except for the 11,000 high-rise flats in the Unidad Nonoalco-Tlatelolco, built in the early 1960s.
- 11 In the city of Zacatecas, one infamous vecindad -the Mesón de Jobito - is now a five-star hotel!
- 12 See Thompson (1990) for an account of the appalling living conditions of the poor in Porfirian Mexico City.
- 13 The traditional roof and flooring techniques generally consists of closely spaced beams, covered various layers of other materials. Towards the end of the C19 these were replaced by compressive structures, such as the bóveda catalana (a type of narrow vaulting).
- 14 For an analysis in English of rented housing in irregular settlements in Guadalajara and Puebla see Gilbert and Varley (1991)
- 15 More than 2,500 inhabitants.
- 16 For conceptual and methodological reasons, the figures from each of the census products may not exactly coincide.
- 17 The financial crisis over the last two decades has created many extremely impoverished middle-class individuals and families, whose housing conditions are better than their incomes might suggest.
- 18 This should not be interpreted as global fertility rate.
- 19 For example Iracheta (2000a, pp18-19) refers to a study which found that unserviced land in irregular settlements in metropolitan municipalities in Mexico State cost more, on average, per m2 than plots of 120 m2 in a government financed sites and services project.
- 20 The role of women in settlement creation and improvement has been widely emphasised. See for example the testimonies in Massolo and Díaz (1990), Moctezuma (1999) and Sánchez Mejorada and Herrasti (1999).
- 21 Consumption over and above 50 cu. m. bi-monthly is charged at the rate of 4.05 pesos (40 US cents) per cu. m.
- 22 Mexico City's minibuses are criticised mainly for their high contribution to air pollution, the bad, even dangerous quality of the service they offer and, in general, their apparently chaotic occupation of road space in detriment to the need of the private car. Most inhabitants of Mexico City, including those who rely on public transport would not share Robert Cervero's enthusiasm for its "paratransit" system. Cervero (1998, 394) is right, however, in pointing out that the minibuses and "peseros"

deliver "badly needed services and jobs in poor neighbourhoods".

23 Two widely-cited texts in this vein are: Cornelius (1975) and Montaño (1976).

24 There is a wealth of literature in Spanish on the emergence and development of the Popular Urban Movement in Mexico's irregular settlements during the 1970s and early 1980s, perhaps the most influential at the time being Navarro and Moctezuma (1981).

25 See Ward (1998) for comprehensive bibliographical references on the subject in English, and Duhau (1999) and Cruz (2001) for equally comprehensive accounts of the bibliography in Spanish.

26 The first, original form of both legitimisation and, to some degree, regularisation of urbanised agrarian land was the application of agrarian law allowing for the creation of urban areas within the agrarian communities, as described in detail by Varley (1985). The second procedure, put into practice after 1970, involves the expropriation of the ejido, indemnification of the original communal owners or ejidatarios and the resale to the settlers. The third mechanism, created after constitutional reforms in 1992 allowed for the dissolution and privatisation of ejidal lands, is by means of the direct sale of agrarian property, following a procedure certifying the property rights of the ejidatarios. (See Jones and Ward 1998).

27 This was the case of some colonias on the ejidal lands in Naucalpan municipality regularised by the State of Mexico agency AURIS in the early 1970s.

28 This programme also includes a range of other social benefits, with a total budget for the Territorial Social Investment Programme for the Federal District in 2002 of 4,222,384,166 pesos (422 million US dollars).

GLOSSARY

<i>Asentamientos irregulares</i>	Irregular settlements
<i>Barrio bajo</i>	Term for a slum
<i>Cabildos</i>	Councils
<i>Ciudades perdidas</i>	"Lost cities" - pockets of shanty housing within the city
<i>Colonia</i>	Neighbourhood
<i>Colonias populares</i>	Popular colonies (settlements)
<i>Colonos</i>	Settlers
<i>Cuartos de azotea</i>	"Rooftop homes" - housing on the roofs of apartment buildings
<i>Delegación</i>	An administrative district of Mexico City
<i>Delegados</i>	Heads of Delegaciones
<i>Ejidatarios</i>	Commoners (with rights to use of common land)
<i>Ejidos</i>	Communal agricultural lands, often urbanised around cities
<i>Mexica</i>	The Aztecs
<i>Peseros</i>	Collective taxis
<i>Presidentes municipales</i>	Elected mayors
<i>Tenochtitlan</i>	The city of the Mexica, the site of today's Mexico City
<i>Tugurio</i>	Term for a slum
<i>Vecindad</i>	Tenements, often with slum conditions

ACRONYMS

GDF	Government of the Federal District
GDP	Gross Domestic Product
NGO	Non-Governmental Organisation
PAN	National Action Party
PRD	Revolutionary Democratic Party
PRI	Revolutionary Institutional Party

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