

Chapter III

DEMOGRAPHY

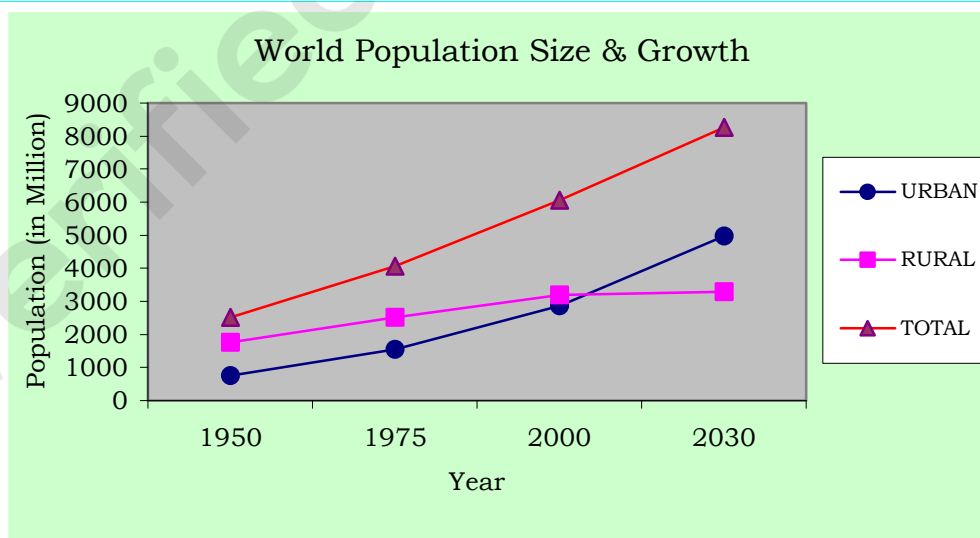
History of the world during the last century has shown that the process of urbanisation and economic growth progress are mutually reinforcing. Cities are the loci and motors of economic and social change. According to United Nations Projections, the World's urban population will grow from 2.86 billion in 2000 to 4.98 billion by 2030 and the World's annual urban growth rate is projected as 1.8 per cent in contrast to the rural growth rate of 0.1 per cent. About 60 per cent of the World's population will live in cities¹ by 2030.

Table No.3.01: World Population Size and Growth, Urban and Rural

	Mid-year population size (million)				Population growth rate (percent)		
	1950	1975	2000	2030	1950-75	1975-00	2000-30
Urban							
World Total	751	1543	2862	4981	2.9	2.4	1.8
High-income countries	359	562	697	825	1.8	0.9	0.6
Middle and low income countries	392	981	2165	4156	3.7	3.2	2.2
Rural							
World Total	1769	2523	3195	3289	1.4	0.9	0.1
High-income countries	219	187	184	139	-0.6	-0.07	-0.9
Middle and low income countries	1550	2336	3011	3151	1.6	1	0.2

Note: High-income countries have gross national income per capita of US\$9266 or more based on World Bank estimates.

Source: National Research Council, 2003, P.85.



¹ The state of the World's cities 2004-05 Globalisation and Urban Culture, published by Earth scan in 2004

Urbanisation in India

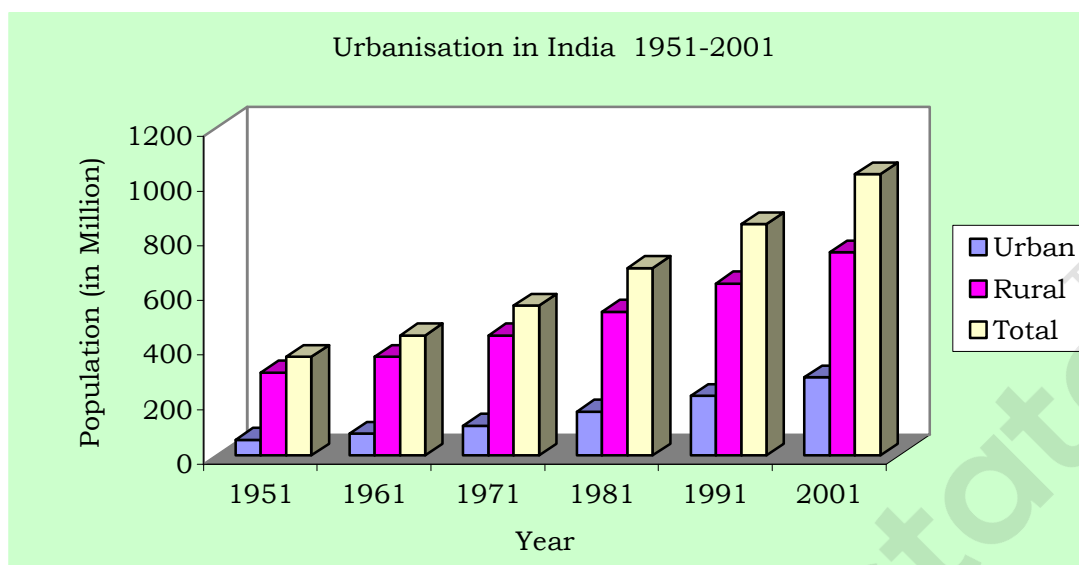
3.02 India, the second largest populous country in the World has one of the longest urban traditions. By the year 2000 BC itself India had an extensive network of towns. Even before the British traders made contact with India (by AD 1600), there was broad regional distribution of towns. These towns were not just of administration, but also of trade and marketing, cultural activities and religious pilgrimage, defence and fortification. New cities - Madras, Calcutta and Bombay were founded by 17th Century. The early British settlements became the means of transforming urban system in India. During the 19th century, the Cities were to be for industrial activities and also became hub of the transport network.

3.03 In a formerly rural economy country like India, because of the need to decrease the number of persons dependent on agriculture and to improve productivity in rural areas, urbanisation is viewed as a prerequisite of growth. The urban population in India has grown from 25.7 million in 1901 to 286.1 million in 2001. After Independence in 1947, the rate of growth of urban population increased from 2.64 percent in 1951 to 3.88 percent in 1981 and thereafter declined to 2.77 in 2001; but the share of urban population to the total population of the country constantly increased from 10.9 percent in 1901 to 15.92 percent in 1951, and thereafter to 27.81 per cent in 2001.

Table No.3.02: Urbanisation in India 1951-2001

	1951	1961	1971	1981	1991	2001
Urban						
Population (in million)	57.50	78.90	109.10	159.70	217.60	286.10
Annual, Rate of Growth (Percent)	2.64	3.21	3.29	3.88	3.14	2.77
% of urban total population	15.92	17.96	19.90	23.30	25.71	27.81
Rural						
Population (in million)	303.60	360.30	439.10	525.50	628.70	742.60
Annual, Rate of Growth	1.02	1.73	2.00	1.81	1.81	1.68
% of rural to total population	84.08	82.04	80.01	76.70	74.29	72.19
Total						
Population (in million)	361.10	439.20	548.20	685.20	846.30	1028.70
Annual, Rate of Growth	1.26	1.98	2.24	2.26	2.13	1.97

Source: Census of India



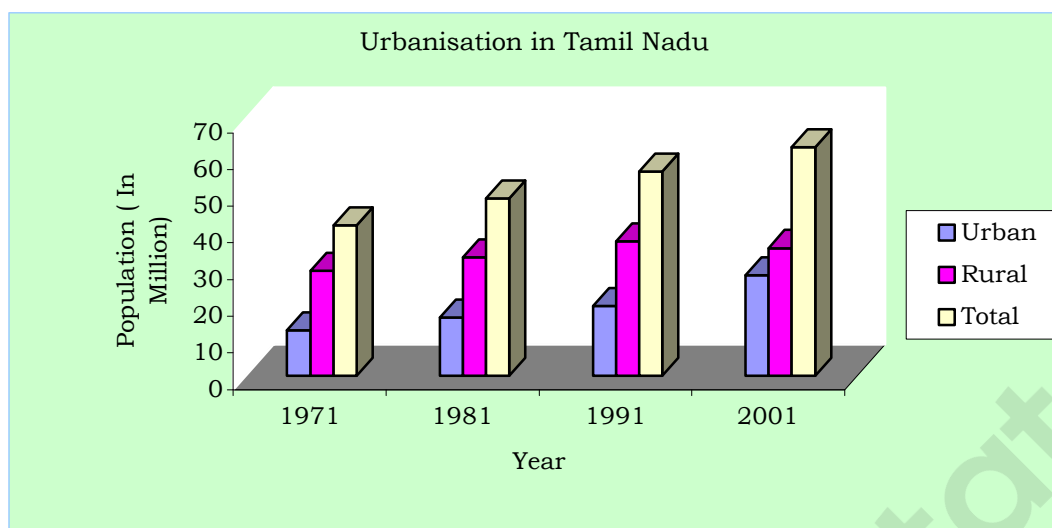
Urbanisation in Tamilnadu

3.04 Tamilnadu has emerged as the third largest economy in India. Cities exist and grow because of economies of urban agglomeration associated with industrial and trade activities. In the recent past, liberalisation, rapidly growing IT sector, an educated, hardworking and disciplined work force etc, accelerating economic development also contributed to the growth of urban areas in Tamilnadu. The extent of the State is 130,058 sq.km. of which the urban area accounts for 12,525 sq.km. Tamilnadu is the most urbanised state in India. It is one of the few states in India with hierarchy of urban areas dispersed fairly uniformly through-out the State. Its urban population has grown from 12.46 million in 1971 to 27.48 million in 2001. Its percentage share of urban population to total population stood always much above the national average.

Table No.3.03: Urbanisation in Tamilnadu (1971-2001)

	1971	1981	1991	2001
Urban				
Population (in million)	12.46	15.95	19.08	27.48
Annual, Rate of Growth (percent)	3.32	2.50	1.91	3.72
% to total	30.26	32.95	34.15	44.04
Rural				
Population (in million)	28.73	32.46	36.78	34.92
Annual, Rate of Growth (percent)	1.53	1.23	1.26	-0.52
% to total	69.74	67.05	65.85	55.94
Total				
Population (in million)	41.19	48.41	55.86	62.40
Annual, Rate of Growth (percent)	2.03	1.63	1.44	1.11
Area in Sq.Km.	130,069	130,050	130,050	130,050

Source: Census of India



Growth of population in Chennai city and CMA

3.05 Chennai (earlier called as Madras) was established in 1639, as one of the East India Company's earliest trading Ports and later became the centre of the company's control over Southern India. By 1700, Madras had become a thriving city with about 3 lakhs inhabitants; most of them lived in the Black Town in the north of the British Fort St. George. By the end of the eighteenth century, according to Dupuis (1968), the north of the city had become profoundly different from the south. The north was densely populated, with Black Town, the heart of the city. To the south were the open spaces and scattered settlements of the Europeans. By the time of the first census in 1871, the city had reached over 4 lakh. The first railway line between Madras and Arcot was opened in 1856 and the Madras Port was improved in 1890, which had attracted industrial developments to the north of the black zones renamed as George Town in 1905². The growth of Chennai City continued in the twentieth century and it has grown to the fourth largest Metro City in India.

3.06 An area about 67 Sq.km. containing 16 hamlets was constituted as the City of Madras in 1798 and subsequently enlarged from time to time. Its enlargement and growth of population since 1901 is given in table No. 3.04.

² Urbanisation in India by Robert W. Bradnock, 1984.

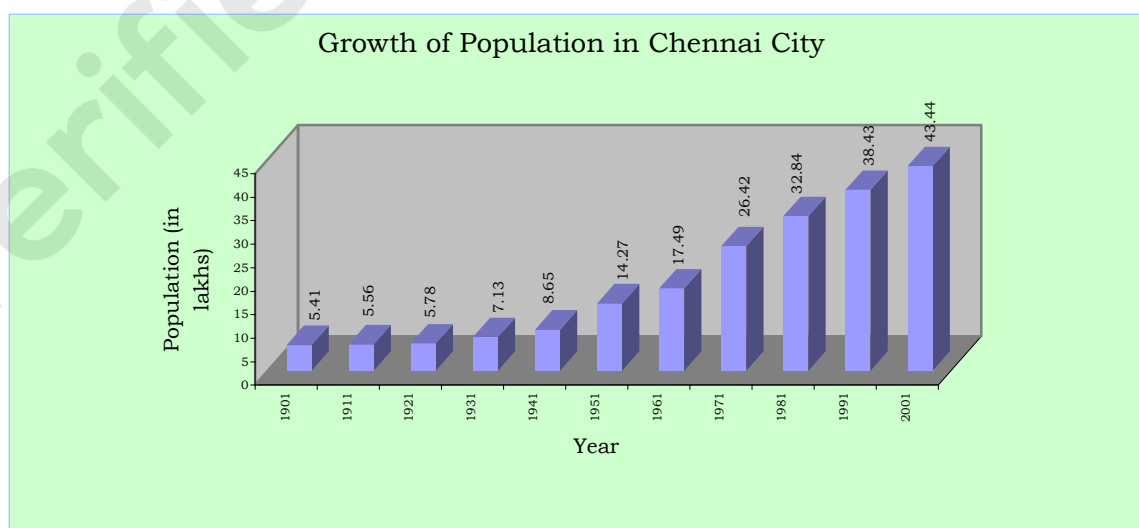
Table No.3.04: Growth of Population in Chennai City, 1901-2001

	1901	1911	1921	1931	1941	1951	1961	1971	1981	1991	2001
City population in lakhs	5.41	5.56	5.78	7.13	8.65	14.27	17.49	24.69	32.85	38.43	43.44
Area in sq.km.	68.17	68.17	68.17	68.17	77.21	128.83	128.83	128.83	176	176	176
Annual Rate of growth of population * (in percent)	--	0.27	0.39	2.12	0.69	-0.11	2.06	3.51	-0.27	1.58	1.23
Population density per Hect.	80	82	85	105	112	111	136	192	187	218	247

*Note: Arrived for a unit area for the purpose of comparison since the city extent varied over time. The figures given are for the decade ended with that year.

Source: Census of India

3.07 The city Corporation area recorded a higher growth of more than 2% per annum during the decades 1951-61 and 1961-71. The reasons for this rapid growth rate can be attributed to industrial developments and increase in economic activities and employment opportunities in the City and its suburbs attracting large migrant population. The negative growth arrived for a unit area during 1971-81 is due to the annexation of lesser dense (then) Panchayat areas around, to the City viz. Velacheri, Taramani, Kanagam, Thiruvannmiyur, Kodambakkam, Saligramam, Koyambedu, Senjery, Thirumangalam, Virugambakkam, Nesapakkam, Kolathur, Villivakkam, Konnur, Erukkanchery, Jambuli, Kodungaiyur, and Selaivoyal in 1978, comprising about 47 Sq.km.



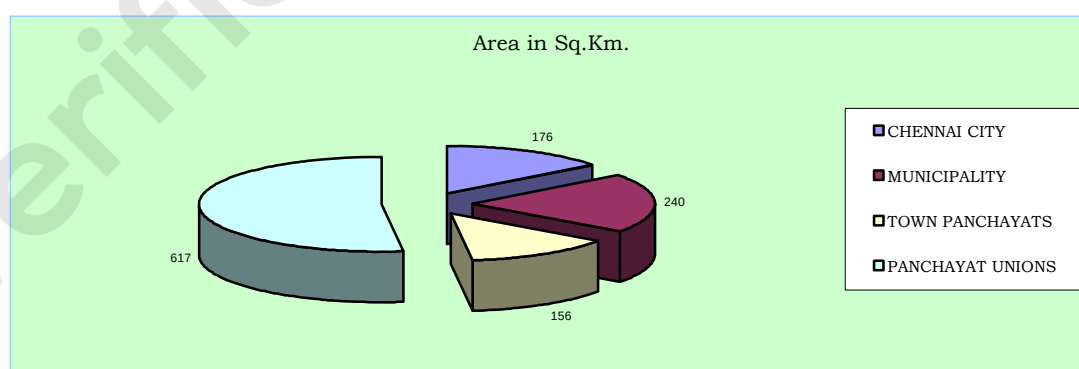
3.08 Chennai City Corporation area consists of 155 divisions within 10 zones (Zone No. I to X) presently. The number of these divisions and its extent varied over time. Hence, for the purpose of comparison, the demographic details have been arrived for the years 1971, 1981 and 1991 keeping the 155 Corporation division boundaries in 2001 as the basis. Spatial distribution of population growth in the City is given in the table no.3.05.

Table No. 3.05: Chennai City - Population Growth in Corporation Zones, 1971-2001

Zone Nos.	Corporation Zone	Area in Sq.km.	Population in Lakhs				Annual rate of growth in percent			Density per Hectare in 2001
			1971	1981	1991	2001	71-81	81-91	91-01	
I.	Tondiarpet	17.30	2.01	2.69	3.72	4.10	2.95	3.28	1.00	243
II	Basin Bridge	11.52	3.59	3.52	3.27	3.76	-0.21	-0.74	1.40	335
III	Pulianthope	13.51	3.34	4.13	4.31	4.60	2.13	0.44	0.64	349
IV	Ayanavaram	19.76	2.22	3.58	4.12	4.97	4.89	1.42	1.89	258
V	Kilpauk	26.38	2.18	3.45	4.94	5.42	4.68	3.66	0.93	211
VI	Ice-House	10.15	3.27	3.49	3.20	3.42	0.63	-0.84	0.65	346
VII	Nungambakkam	12.90	2.91	3.09	3.20	3.48	0.61	0.35	0.83	277
VIII	Kodambakkam	13.00	2.48	3.33	4.39	4.66	2.96	2.81	0.61	368
IX	Saidapet	23.56	1.89	2.61	3.33	4.15	3.25	2.48	2.23	180
X	Mylapore	27.92	2.50	2.97	3.95	4.88	1.70	2.89	2.13	180
	City Total	176.00	26.42	32.85	38.43	43.44	2.20	1.58	1.23	247

Source Census of India

3.09 Population growth in different zones within City Corporation area is found to be not uniform and its rate varied from 0.61% to 2.23%; Saidapet and Mylapore zones have recorded growth rate exceeding 2% during 1991 - 2001.



3.10 Chennai Metropolitan Area comprising City of Chennai and contiguous area around was notified in 1974. It extends over 1189 sq.km. and includes Chennai City Corporation area, 16 Municipalities, 20 Town Panchayats and 214 villages comprised in 10 Panchayat Unions.

Table No. 3.06: CMA - Population Growth in Municipalities - 1971-2001

Sl. No.	Municipality	Area in Sq.km.	Population in thousands				Annual Rate of growth in percent				Density per Hect.2001
			1971	1981	1991	2001	71-81	81-91	91-01	Avg.	
1	Kathivakkam	4.75	16.14	22.10	27.17	32.59	3.19	2.09	1.84	2.37	69
2	Thiruvottiyur	21.35	82.85	134.01	168.64	212.28	4.93	2.32	2.33	3.19	99
3	Madhavaram	17.41	21.05	29.46	49.26	76.09	3.41	5.28	4.45	4.38	44
4	Ambattur	37.77	45.59	115.90	215.42	310.97	9.78	6.39	3.74	6.64	82
5	Avadi	61.57	77.41	124.70	183.22	229.40	4.88	3.92	2.27	3.69	38
6	Poonamallee	6.55	18.72	23.67	28.83	42.60	2.37	1.99	3.98	2.78	65
7	Thiruverkadu	18.63	13.08	17.23	27.84	32.20	2.79	4.92	1.47	3.06	17
8	Maduravoyal	4.78	6.46	7.45	14.88	43.61	1.44	7.17	11.35	6.65	91
9	Valasaravakkam	2.97	2.41	7.58	21.95	30.98	12.12	11.22	3.50	8.95	104
10	Alandur	8.08	65.04	97.45	125.24	146.29	4.13	2.54	1.57	2.74	181
11	Ullagaram-Puzhithivakkam	3.64	2.38	8.58	16.13	30.42	13.69	6.52	6.55	8.92	84
12	Anakaputhur	2.98	10.88	15.30	24.35	31.92	3.46	4.76	2.75	3.66	107
13	Pammal	5.19	9.05	27.82	36.51	50.00	11.89	2.75	3.20	5.95	96
14	Pallavaram	16.10	51.37	83.90	111.87	144.62	5.03	2.92	2.60	3.52	90
15	Tambaram	20.72	58.81	86.92	113.29	137.93	3.99	2.69	1.99	2.89	66
16	Manali	7.49	3.34	11.96	19.09	28.60	13.61	4.79	4.12	7.51	38
	Total	239.99	484.58	814.02	1183.68	1580.5	5.32	3.82	2.93	4.02	66

Source; Arrived based on Census figures

3.11 The high growth rate of more than 5% was found in Ambattur, Maduravoyal, Valasaravakkam, Ullagaram-Puzhithivakkam, Manali and Pammal Municipalities. Kathivakkam, Poonamallee, Alandur and Tambaram Municipalities recorded low growth rates and the rest fall under moderate growth rate category. Maduravoyal Municipality recorded the highest growth rate of 11.35% in the last decade 1991-2001.

Table No.3.07: CMA - Population Growth in Town Panchayats - 1971-2001

Sl. No.	Town Panchayat	Area in Sq.Km.	Population (in thousands)			Annual Rate of growth					Density per Hect.2001
			1971	1981	1991	2001	71-81	81-91	91-01	Avg.	
1	Minjur	8.63	7.24	13.62	19.49	23.74	6.52	3.64	2.00	4.05	28
2	Chinnasekkadu	1.67	2.21	2.68	8.42	9.74	1.95	12.13	1.46	5.18	58
3	Puzhal	6.74	6.94	9.26	15.87	20.64	2.93	5.53	2.66	3.71	31
4	Naravarikuppam	20.76	9.96	14.67	17.41	18.33	3.95	1.72	0.52	2.06	9
5	Thirunindravur	14.56	6.94	9.13	16.31	29.33	2.78	7.78	4.27	4.94	20
6	Porur	3.72	3.54	8.63	19.51	28.92	9.33	8.49	4.02	7.28	78
7	Thirumazhisai	7.25	9.56	11.01	14.54	16.29	1.42	2.82	1.14	1.79	22
8	Mangadu	5.63	10.98	11.23	16.06	19.42	0.22	3.64	1.92	1.93	35
9	Nandambakkam	2.61	4.72	7.68	10.56	9.34	4.98	3.24	-1.22	2.33	36
10	Meenambakkam	3.03	2.51	3.09	3.80	3.61	2.13	2.09	-0.52	1.23	12
11	Kundrathur	12.16	14.45	16.42	22.79	25.07	1.29	3.33	0.93	1.85	21
12	Thiruneermalai	5.87	6.31	9.95	17.94	19.23	4.66	6.07	0.70	3.81	33
13	Perungalathur	7.04	3.71	6.29	11.24	19.59	5.40	5.98	5.72	5.70	28
14	Peerkanaranai	1.76	3.58	5.28	10.74	17.51	3.96	7.37	5.01	5.45	99
15	Chitlapakkam	2.90	5.32	11.72	15.90	25.31	8.22	3.10	4.76	5.36	88
16	Sembakkam	6.35	2.60	6.10	13.50	21.50	8.86	8.32	4.75	7.31	34
17	Madambakkam	7.92	2.32	3.49	8.21	17.00	4.14	8.94	7.55	6.88	22
18	Perungudi	4.64	1.74	4.28	9.71	23.58	9.40	8.54	9.28	9.08	51
19	Pallikaranai	17.43	2.32	3.93	7.82	22.07	5.40	7.13	10.93	7.82	13
20	Sholinganallur	15.35	4.23	5.75	8.53	15.56	3.12	4.02	6.20	4.45	10
Total		156.02	111.18	164.19	271.35	385.72	4.40	5.13	3.62	4.38	25

Source; Arrived based on Census figures

3.12 From the above, it may be seen that Chinnasekkadu, Porur, Perungalathur, Peerkanaranai, Chitlapakkam, Sembakkam, Madambakkam, Perungudi and Pallikaranai Town Panchayats had high growth rates exceeding 5% and Minjur, Puzhal, Thirunindravur, Thiruneermalai and Sholinganallur had recorded moderate growth rates in population; the rest have low growth rates of below 3%.

Table No. 3.08: CMA - Population Growth in Panchayat Unions - 1971-2001

S.No.	Panchayat Union	Area in Sq.Km	Population			Annual Rate of growth in %					Density per Hect.2001
			1971	1981	1991	2001	71-81	81-91	91-01	Ave.	
1	Minjur (4 Villages)	40.02	11015	13900	17032	23368	2.35	2.05	3.21	2.54	6
2	Sholavaram (41 Villages)	131.58	44069	59286	82773	97068	3.01	3.39	1.61	2.67	7
3	Puzhal (28 Villages)	46.87	23739	30493	41661	51081	2.54	3.17	2.06	2.59	11
4	Villivakkam (25 Villages)	84.53	37712	46787	91488	143070	2.18	6.94	4.57	4.56	17
5	Thiruvallur (1 village)	11.39	4409	5505	7789	8719	2.24	3.53	1.13	2.30	8
6	Poonamallee (42 villages)	75.44	56439	60435	66742	71767	0.69	1.00	0.74	0.81	10
7	Kundrathur (30 villages)	80.36	44050	50552	68435	105610	1.39	3.08	4.46	2.97	13
8	Sriperumbudur (4 villages)	20.16	1647	757	0	80	-7.48	-100	--	--	4
9	St.Thomas Mount (33 Villages)	98.39	34773	56118	122435	199235	4.90	8.11	4.99	6.00	20
10	Kattankulathur (6 Villages)	28.26	9490	14905	21891	30695	4.62	3.92	3.44	3.99	11
Total		617.00	267303	338738	520246	730792		2.67	5.18	4.37	12

Source: Arrived based on Census figures

Population Growth in Villages in Panchayat Unions

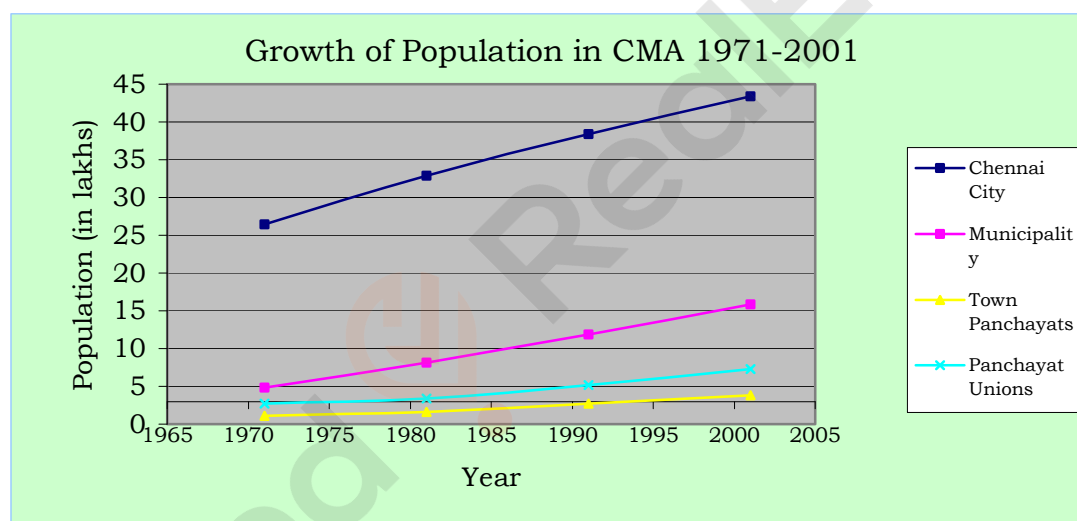
3.13 Attanthangal, Nallur, Sembilivakkam, Vijayavallur in Sholavaram Panchayat Union, Surapattu and Puttagaram in Puzhal Panchayat Union, Keelakondaiyur, Nolambur, Vanagaram, Ayapakkam, Nerkundram and Ramapuram in Villivakkam Panchayat Union, Nemilicheri Nochimedu in Poonamallee Panchayat Union, Chinnapanicheri, Kulathavancheri, Srinivasapuram, Ayyappanthangal, Thelliar Agaram, Mugalivakkam, Manapakkam, Gerugambakkam, Tharapakkam, Kavanur and Nandambakkam in Kundrathur Panchayat Union, Neelankarai, Injambakkam, Okkiam Thuraipakkam, Kovilambakkam, Mudichur, Vengaivasal, Maduraipakkam, Mullaicheri, Arsankalani and Uthandi in St.Thomas Mount Panchayat Union and Mannivakkam in Kattankulathur Panchayat Union have recorded high growth rate during in 1991-2001 exceeding 5%. The villages in St. Thomas Mount Panchayat Union recorded the highest annual growth rate of 6% during 1991 - 2001.

3.14 The overall growth of population in CMA from 1971 to 2001 is given in the table below:

Table No. 3.09: Growth of Population in CMA, 1971 - 2001

Sl. No.		Population (in lakhs)				Annual Rate of growth (in percent)			Area in Sq.km.	Density per Hect. in 2001
		1971	1981	1991	2001	71-81	81-91	91-01		
1.	Chennai City	26.42	32.85	38.43	43.44	2.20	1.58	1.23	176	247
2.	Municipalities	4.84	8.14	11.84	15.81	5.24	3.80	2.91	240	66
3.	Town Panchayats	1.11	1.64	2.71	3.86	4.43	4.94	3.62	156	25
4.	Panchayat Unions	2.67	3.38	5.20	7.31	2.40	4.38	3.58	617	12
5.	CMA Total	35.04	46.01	58.18	70.41	2.76	2.37	1.93	1189	59

Source; Arrived based on Census figures



3.15. The rate of growth in the local bodies within CMA is given in the Sheet No 2.5 & 2.6 from which it may be seen that the proximity to the main city and major urban centres, rail transport availability, ground water availability and residentially developed land availability are the major reasons for faster growth of certain areas within the CMA.

Migration

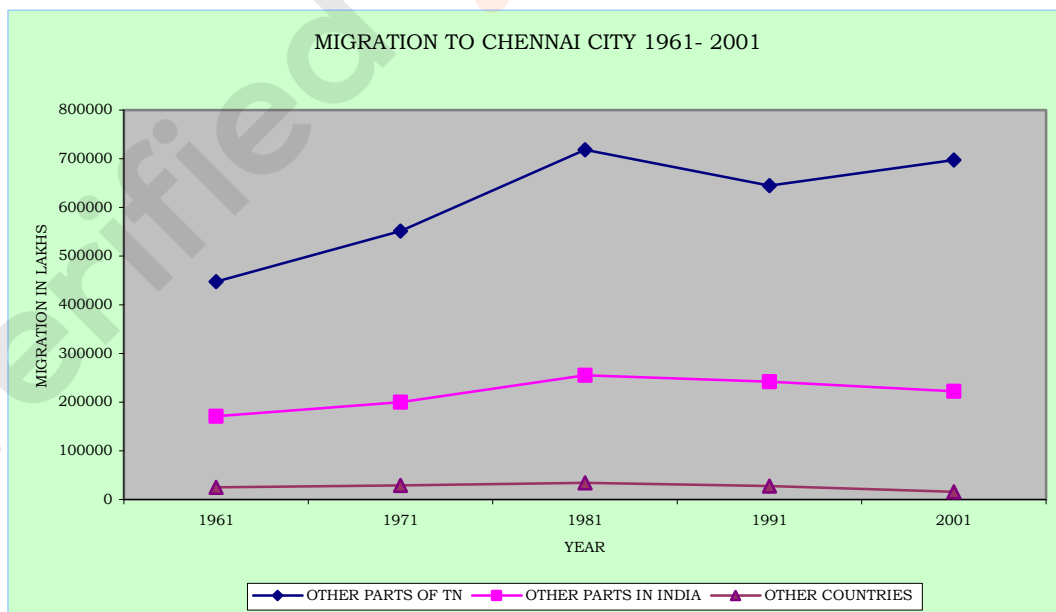
3.16 The cosmopolitan nature of Chennai was a reflection of its attractions to migrant groups from all over India. Migrants came not only predominantly from the surrounding Tamil and Telugu speaking areas but also from southern and northern India. These migrant groups from other states have made their distinctive mark on the patterns of residential and social organisations within this Chennai Metropolis.

3.17 Chennai is a city of migrants like any other metropolitan city in India. According to 2001 Census, migrants to Chennai City from other parts of Tamil Nadu State constitute 74.5 % and the table no. 3.10 shows a downward trend in the migration to the City from 37.24% in 1961 to 21.57% in 2001. Migrants from other parts of India constitute 23.8% and the remaining 1.71 % of the migrants is from other countries.

Table No. 3.10: Migration to Chennai City, 1961-01 (in Lakhs)

Year	Total Population	Total migrants to the city from								% of Total Migrants to the total population
		Other parts of Tamil nadu		Other parts of India (Excluding Tamilnadu)		Other Countries		Un-classi-fiable	Total migrants	
		No.	%	No.	%	No.	%			
1961	17.29	4.47	69.45	1.71	26.6	0.25	3.90	--	6.44	37.24
1971	24.69	5.51	70.61	2.00	25.63	0.29	3.76	--	7.80	31.59
1981	32.84	7.19	71.28	2.55	25.31	0.34	3.41	--	10.08	30.70
1991	38.43	6.44	70.51	2.42	26.47	0.28	3.01	0.04	9.18	23.90
2001	43.44	6.98	74.49	2.23	23.80	0.16	1.71		9.37	21.57

Source: Census of India, 1961, 1971 & 1981, 1991 Social and Cultural Table

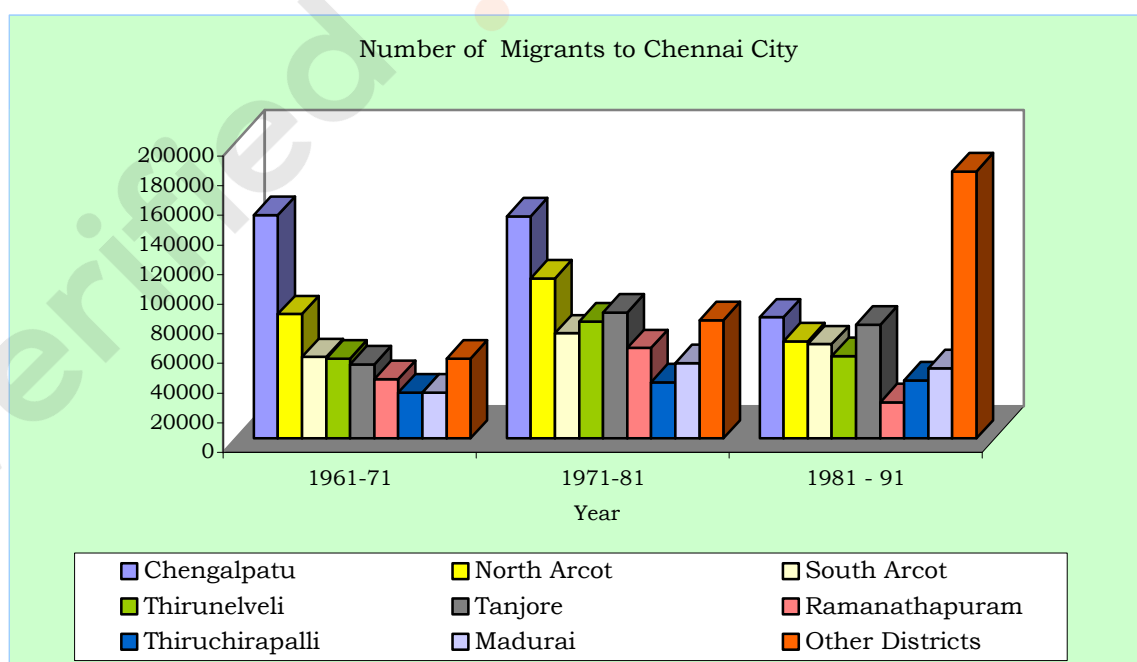


3.18 According to 1991 Census migrants from the nearby districts of Chengalpattu District (now bifurcated as Kancheepuram and Thiruvallur Districts), North Arcot District (now renamed as Vellore District) and South Arcot District (now bifurcated as Villupuram and Thiruvannamalai Districts) alone constitute 33% and Thirunelveli and Thanjavur Districts constitute another 21% of total migrant population to Chennai City. From the table no. 3.11 it may also be seen that the proportion of migration from other districts have almost tripled.

Table No. 3.11: Migration to Chennai city from the Districts of Tamilnadu, 1961-91

District	No. Of Migrants to Chennai city			Percentage to Total Migrants		
	1961-71	1971-81	1981 - 91	1961-71	1971-81	1981 - 91
Chengalpattu	151000	150000	81830	27.5	20.9	12.8
North Arcot	84000	108000	65550	15.3	15.0	10.3
South Arcot	55000	71000	63670	10.0	9.9	10.04
Thirunelveli	54000	79000	55530	9.8	11.0	8.75
Tanjavur	50000	85000	76760	9.1	11.8	12.1
Ramanathapuram	40000	61000	24390	7.3	8.5	3.84
Thiruchirapalli	31000	38000	39170	5.6	5.3	6.2
Madurai	31000	51000	47292	5.6	7.1	7.5
Other Districts	54000	80000	180230	9.8	10.5	28.4
Total	550000	719000	634422	100.0	100.0	100.0

Source: Structure Plan for MMA, and Census of India 1981 and 1991 Tamilnadu Migration Tables



3.19 Increase in immigration to the City and also to the CMA is evident from the table Nos. 3.11 and 3.12.

3.20 Study conducted by the Time Research Foundation in 1991 (sponsored by CMDA) showed that:

- i) Migrants from other urban areas constitute 63.4% and only 36.3% are from rural areas.
- ii) Among migrants from urban areas, female migrants outnumber male migrants.
- iii) Among rural migrants, male migrants outnumber female migrants.
- iv) Among total migrants there is near parity as between male and female migrants.
- v) In respect of migrants from southern region of the state, the urban proportion (75%) is higher and the rural proportion being only 25%
- vi) Among migrants from other southern states of India, there are more female migrants than male migrants (with migrants from Kerala being an exception) and
- vii) The reason on 'family moved' shows the household movement and it constitutes 30%; for marriage reasons another 25% migrated.

Table No. 3.12: Migration into CMA 2001

Sl. No.	Place	Males	Female	Total	Percentage to Total
1.	Total Migrants	855103	753196	1608299	
2.	Elsewhere in the district of enumeration	138235	124844	263079	16.35
3.	Other Districts of the State	549214	471981	1021195	63.50
4.	Outside the state	155431	145307	300738	18.70
5.	Outside India	25360	22360	23287	1.45

Source: Census of India, Tamil nadu Migration Tables-2001

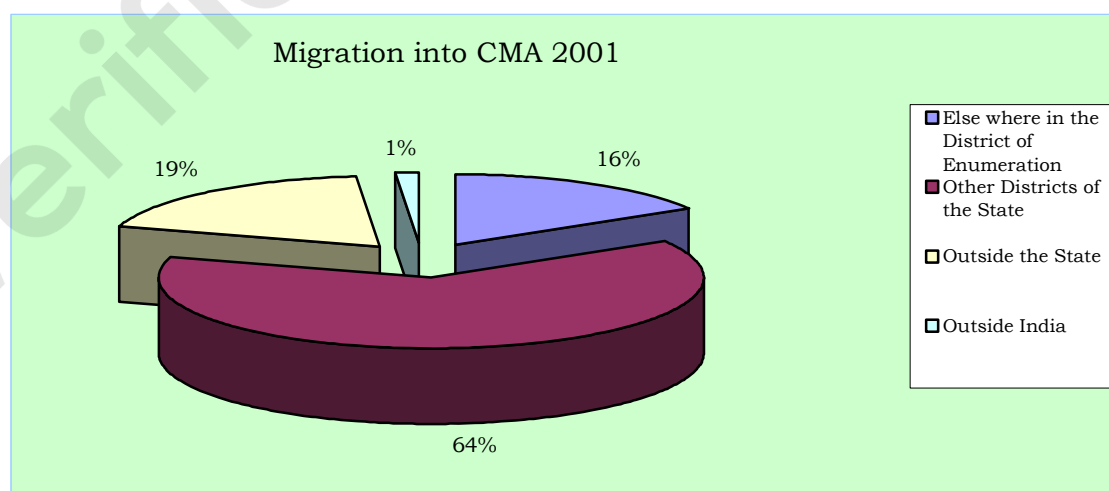
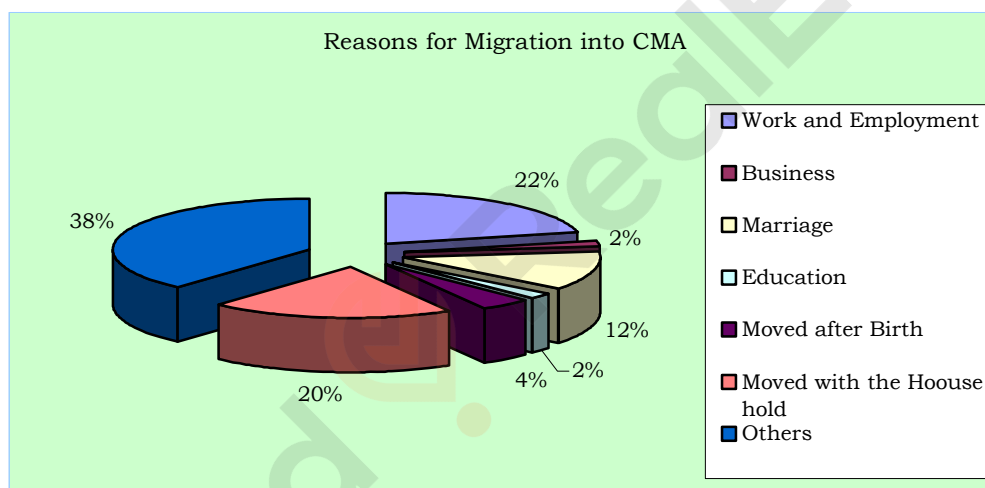


Table No. 3.13: Reasons for Migration into CMA - 2001

Reason	Migrants			% to total
	Males	Females	Total	
Work & Employment	300939	44761	345700	21.50
Business	20719	4553	25272	1.57
Education	20314	9157	29471	1.83
Marriage	10737	189828	200565	12.47
Moved after birth	38250	30617	68867	4.28
Moved with the Household	144611	175205	319816	19.89
others	319533	299075	618608	38.46
Total	855103	753196	1608299	100

Source: Census of India 2001 Tamil nadu Migration Table



3.21 The origin of the migrant population to the CMA and the reasons for the migration are given in the table Nos. 3.12 and 3.13.

3.22 An interesting and important fact found is the out migration from Chennai City to its suburbs and other areas. The population of the Chennai City in 1991 was 38.43 lakhs which includes 9.18 lakhs migrant population and natural increase of 6.40 lakhs (for 1981-91) population; the net population increase works out to only 5.59 lakhs which shows that there was a net out migration of 10 lakhs (30.4% of 1981 population) from City mostly to the rest of CMA (during 1981-1991). Similarly, an out migration of 10.19 lakhs (26.5% of the 1991 population) is noted during 1991-2001. Though there were large scale building construction activities noted during the above periods, the out migration of resident population from Chennai City proves that considerable conversion of residential premises into non-residential mostly for office, shopping, hotels and other

commercial purposes took place; this trend will continue in this metropolis.

Birth rate, death rate and rate of Natural Increase

3.23 Birth rates, death rates and rates of natural increase for the Chennai City are tabulated below:

(Per 1000 population)

Table No. 3.14: Chennai City - Birth, Death and Natural increase rates 1971-1976			
Year	Crude Birth Rate	Crude Death Rate	Natural increase rate
1971	38.6	12.3	26.3
1972	37.8	12.7	25.1
1973	36.4	12.4	24.0
1974	34.4	11.5	22.9
1975	34.3	13.1	21.2
1976	32.1	12.0	20.1

Source: Structure Plan for CMA, 1980

(Per 1000 population)

Table No. 3.15: Chennai City - Birth, Death and Natural increase rates 1991-2003			
Year	Crude Birth Rate	Crude Death Rate	Natural increase rate
1991	25.89	9.67	16.22
1992	24.01	9.50	14.51
1993	23.82	9.14	14.68
1994	23.39	9.07	14.32
1995	23.75	8.49	15.26
1996	22.68	8.54	14.14
1997	22.50	8.20	14.30
1998	23.81	9.00	14.81
1999	25.68	8.87	16.81
2000	25.53	8.92	16.61
2001	24.50	8.42	16.08
2002	23.72	8.27	15.45
2003	22.62	8.01	14.61

Source: Corporation of Chennai

3.24 From the above two tables, it may be seen that the registered birth rate in Chennai City in 1971 was 38.6 and it was varying from 38.6 to 32.1 during 1971-76. It has now reduced to 22.62 in the year 2003. Similarly the death rate also reduced to a considerable extent from 13.1 in 1975 to 8.01 in 2003. The rate of natural increase declined from 26.3 in 1971 to 14.61 in 2003 as detailed in the tables above.

3.25 The factors which affect birth rate includes age structure of population, the average age of marriage, and the incidence of family planning, among others. Increase

in longevity of life due to improved health facilities may also be a reason for reduction in the death rates in Chennai.

3.26 Birth and death rates in 2001 in some of the local bodies within CMA and also the average rates in the Kancheepuram and Thiruvallur districts wherein the rest of CMA falls are given in the Table below which show that these rates vary from local body to local body and that too a large extent.

(Per 1000 population)

Table No. 3.16: CMA - Birth, Death and Natural increase rates 2001			
Local Body	Birth Rate	Death Rate	Natural increase rate
Kathivakkam Municipality	24.5	8.42	16.08
Ambattur Municipality	6.52	2.90	3.62
Avadi Municipality	13.05	3.21	9.84
Thiruverkadu Municipality	1.77	6.02	4.25
Maduravoyal Municipality	2.32	2.91	0.59
Valasarawakkam Municipality	16.21	3.91	12.30
Alandur Municipality	18.06	5.59	12.46
Ullagaram-Puzhuthivakkam Municipality	4.96	3.15	1.81
Anakaputhur Municipality	3.04	3.92	0.88
Pammal Municipality	5.86	4.70	1.16
Pallavaram Municipality	26.50	4.80	21.70
Tambaram Municipality	21.88	6.13	15.75
Districts			
Thiruvallur	11.26	4.73	6.53
Kancheepuram	15.58	5.74	9.84

Source: Concerned Local Bodies and Statistical year Book 2001

Age Structure

3.27 Age structure of a population in a city / metropolis plays a major role in urban planning. It gives an idea about dependent population, working population, jobs to be created, the present and future requirements of educational, health and other facilities and amenities etc. It depends on natality (birth rate), mortality (death rate) and also migration. Age structure of population in CMA as per Census 1971 to 2001 is given in the table below:

Table No 3.17: Age Structure in CMA in %					
Age Group	1961	1971	1981	1991	2001
0-4	13.20	12.51	11.03	8.68	7.31
5-9	12.39	11.74	10.35	9.56	7.97
10-14	10.64	10.97	11.37	10.51	8.95
15-19	8.66	9.97	10.61	10.22	9.55
20-24	10.73	11.05	10.68	11.14	10.47
25-29	10.21	9.29	9.61	10.20	10.33
30-34	7.98	7.15	7.46	8.06	8.46
35-39	6.69	6.99	6.66	7.48	8.04
40-44	5.49	5.14	5.36	5.68	6.19
45-49	4.15	4.33	4.70	4.98	5.50
50-54	3.65	3.51	3.70	3.92	4.37
55-59	2.10	2.46	2.73	2.90	3.10
60-64	2.06	2.30	2.40	2.64	2.83
65-69	1.10	1.15	1.37	1.51	1.96
>70	1.20	1.65	1.97	2.33	3.02
not stated		0.00	0	0.18	1.93
Total	100.00	100.21	100	100.00	100.00

M- Male, F- Female, T- Total

Source: CMDA / TRF Study data Hand book 1991

Census of India, Social and Cultural Tables 1961, 1971, 1981, 1991&2001

3.28 From the above, it may be seen that the proportion of primary school going children percentage has reduced from 12.39% in 1961 to 7.97% in 2001 and the proportion of Secondary school going age group has also reduced from 10.64 in 1961 to 8.95 in 2001. But the proportion of old age group has increased from 4.36 to 7.81% in the said period.

Sex Composition

3.29 Sex ratio is denoted by number of females per 1000 males. In Chennai the ratio has improved over the decades, though it is lower than the Tamil Nadu average. However, it is much above the Indian National average of 900 in urban areas.

Table No. 3.18: Sex ratio in Chennai City, CMA, Tamil Nadu and India						
Year	Chennai City	CMA	Tamil nadu		India	
			Urban	Total	Urban	Total
1961	901	909	963	992	N.A.	N.A.
1971	904	907	951	978	N.A.	N.A.
1981	934	927	956	977	878	933
1991	930	936	951	972	893	929
2001	957	956	981	987	900	932

Source: Census of India, 1961, 1971, 1981, 1991 Social and cultural Tables and 2001 census of Tamil nadu

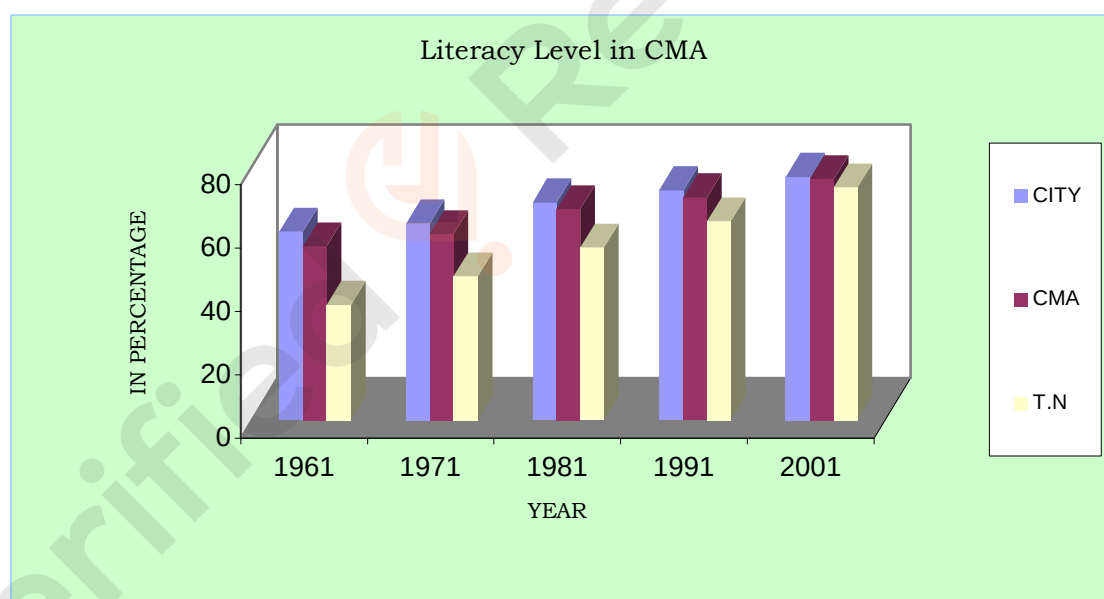
Literacy

3.30 Literacy is defined as the ability to read and write in any single language. The literacy levels in Chennai City and CMA were higher than the state average.

Table No. 3.19: Trends in Literacy levels in Chennai Metropolitan Area - 1961-2001

Units	Literacy rate (in percentage)				
	1961	1971	1981	1991	2001
City	59.47	62.01	68.68	72.54	76.81
CMA	54.82	58.64	66.56	70.32	76.09
T.N.	36.39	45.40	54.40	62.70	73.50

Source: Census of India, 1961, 1971, 1981, 1991 Social and Cultural Tables and 2001 Census of Tamil Nadu)



Population Projection

3.31 Population projection for Chennai City and CMA had been made earlier on various occasions; the details of the same are given in the Table below summarising the earlier forecasts.

Table No.3.20: Summary of Population Estimates 1991-2011 Population in lakhs)								
Sl. No.	Description	1991		2001		2011		Method Adopted
		CMA	City	CMA	City	CMA	City	
1.	Master Plan [1971] -Projections -Assigned as per the strategy	58 58	43 36	71 71	53 40	-- --	-- --	
2.	Madras Urban Development Project (MUDP I) (World Bank 1974)	59 57	43 43	71 69	53 51	-- --	-- --	Exponential Component
3.	MMA Structure Plan (MMDA, 1980)	73	54	--	--	--	--	
4.	NCU: 1988 - Registrar General Census of India - United Nations			74 82				
5.	MMA, Demography, 1981 (MMDA undated)	60 60	43 43	81 77	59 55	- --	-- --	High Medium
6.	Department of Statistics Government of Tamil Nadu)	61	43	78	54	98	--	
7.	MMDA Projections: 1989	60 59	41 40	79 75	51 49	104 95	58 60	Geometric
	Actual as per Census	58.1	38.4	70.3	43.4	--	--	

Source: Report on Madras 2011, Policy Imperatives-An Agenda for Action by TRF & CMDA1991 (Volume III)

3.32 As part of the Second Master Plan preparation exercise the following population estimate had been made in the 1995 draft Second Master Plan.

Table No. 3.21: Draft Second Master Plan Population Estimate for CMA 1992011 (Population in lakhs)						
Year	Chennai Metropolitan Area			Chennai City		
	Low	Medium	High	Low	Medium	High
1991	54.41	59.17	64.15	37.24	40.34	43.56
1996	58.94	66.76	75.26	39.69	44.69	50.08
2001	63.79	75.22	88.09	42.31	49.47	57.48
2006	69.00	84.64	102.84	45.07	54.72	65.84
2011	74.57	95.09	119.84	48.00	60.46	75.27

3.33. It was stated in the report that the population with medium growth rate could be the more accurate population for the period up to 2011 and concluded that the (then) estimated population were as follows:

(Population in Lakhs)		
Year	CMA	Chennai City
1996	66.76	44.69
2001	75.22	49.47
2006	84.64	54.71
2011	95.09	60.46

3.34 As the Tables above illustrate, the population projections are not to be considered exact; rather they reflect the natural growth, migration trends and assumption made at the time of the estimates, including vision then for development in the city/CMA. Review of the population forecast made earlier shows that actually there were reductions in natural increase and migration, when comparing the assumptions made for the projections. However, it is seen that the population projected based on land use assignment and first Master Plan strategy is very close to the actual and it showed that the population increase was as anticipated / planned in the first Master Plan.

3.35 Now, for projecting the population up to 2026, the following methods have been adopted:

- (i) Linear method
- (ii) Geometric growth method
- (iii) Exponential Curve method
- (iv) Urban-Urban Growth Difference (UUGD) method
- (v) Urban-Urban and Rural Growth Difference (UURGD) method

3.36 Methodology adopted, assumption made, estimate arrived are given in the Annexure to this Chapter. For projection of the population, UUGD method is found suitable for the City and UURGD method is found more appropriate for the CMA as a whole, with the assumption of growth rate based on history and judgment and also the future urbanisation and population policies. For forecast of population of individual municipalities and other local bodies within CMA, the exponential curve method is found suitable (when considering also the trends in growth over the past decades).

3.37 The population projection made for the CMA as a whole, Chennai City, 16 Municipalities, 20 Town Panchayats and for the villages in 10 Panchayat Unions in CMA are given in the Tables below:

Table No. 3.22: Population Projections (Various methods) - Chennai City						
Year	Actual Population	Projected Population				
		Linear	Geometric	Exponential	UUGD	UURGD
1971	2642403					
1981	3284622					
1991	3843195					
2001	4343645					
2006		4706630	4718968	4722228	4627915	4724150
2011		5069614	5126721	5133807	4950145	5144832
2016		5432599	5569707	5581259	5238817	5565962
2021		5795584	6050970	6067710	5540456	6024451
2026		6158569	6573818	6596559	5855804	6524126

Chennai City Population Projection

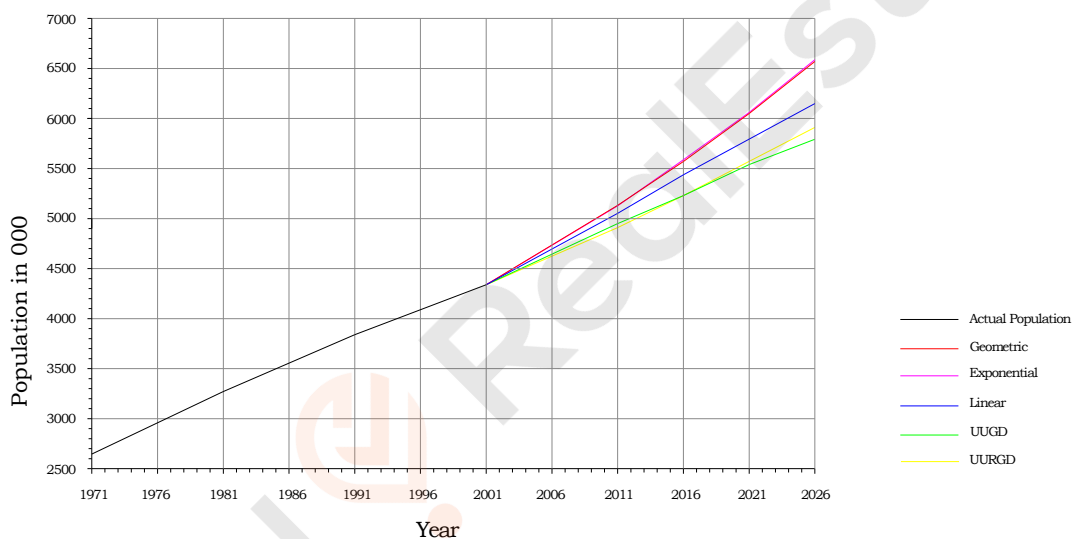


Table No. 3.23: Population Projections (Various methods) - CMA						
Year	Actual Population	Projected Population				
		Linear	Geometric	Exponential	UUGD	UURGD
1971	3505502					
1981	4601566					
1991	5818479					
2001	7040582					
2006		7860735	7927646	7875703	7815056	7896230
2011		8687731	8953451	8702252	8711726	8871228
2016		9514727	10162041	9528802	9710880	9966636
2021		10341723	11600796	10355352	10824396	11197753
2026		11168719	13334095	11181902	12065697	12582137

CMA-Population Projection

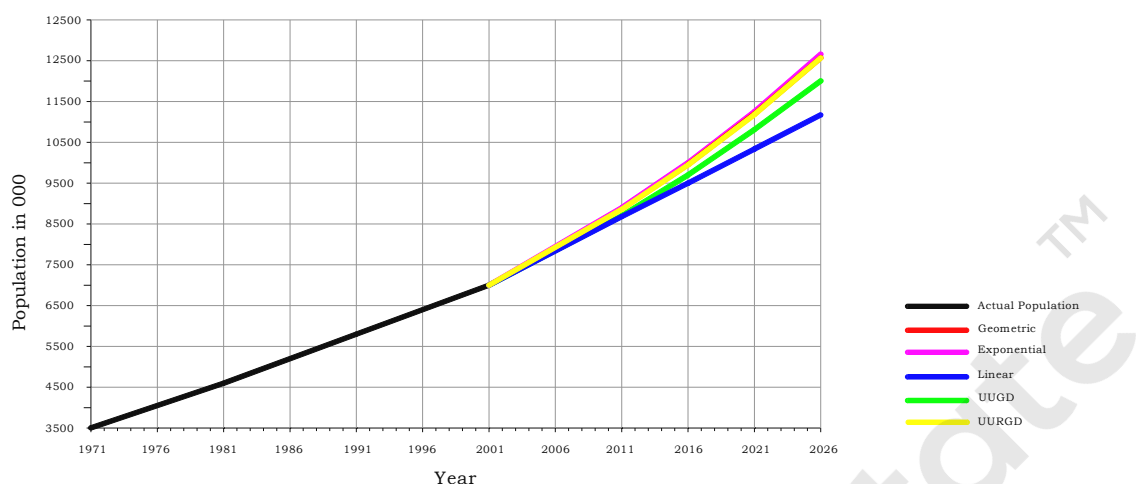


Table No. 3.24: Projected Population for CMA and Chennai City(In Lakhs)

Sl. No.	Description	Actual	Projection				
		2001	2006	2011	2016	2021	2026
1	CMA	70.41	78.96	88.71	99.66	111.97	125.82
2	Chennai City	43.44	46.28	49.50	52.39	55.40	58.56

Table No. 3.25: Population Projection for Municipalities within CMA (In Lakhs)

Sl. No.	Description	Actual 2001	Annual rate of growth assumed in %	Projection					Density 2026
				2006	2011	2016	2021	2026	
1	Kathivakkam	0.33	2.0	0.36	0.40	0.43	0.49	0.54	113
2	Thiruvottiyur	2.12	2.5	2.41	2.73	3.09	3.50	3.97	186
3	Madhavaram	0.76	4.0	0.93	1.14	1.39	1.69	2.07	119
4	Ambattur	3.11	4.5	3.89	4.88	6.11	7.65	9.58	254
5	Avadi	2.30	3.0	2.67	3.10	3.60	4.18	4.86	79
6	Poonamallee	0.42	4.0	0.52	0.64	0.78	0.95	1.16	177
7	Thiruverkadu	0.32	3.0	0.37	0.43	0.51	0.59	0.68	37
8	Maduravoyal	0.43	3.5	0.52	0.62	0.74	0.88	1.05	219
9	Valasarawakkam	0.31	3.5	0.37	0.44	0.52	0.62	0.74	250
10	Alandur	1.46	1.5	1.57	1.70	1.83	1.97	2.13	263
11	Ullagaram-Puzhudhivakkam	0.30	4.0	0.37	0.46	0.55	0.68	0.83	227
12	Anakaputhur	0.32	2.7	0.36	0.42	0.48	0.55	0.63	210
13	Pammal	0.50	3.0	0.58	0.67	0.78	0.91	1.05	204
14	Pallavaram	1.45	3.0	1.68	1.95	2.27	2.64	3.06	190
15	Tambaram	1.38	2.5	1.56	1.77	2.01	2.27	2.58	124
16	Manali	0.29	4.0	0.35	0.43	0.52	0.64	0.78	104
	Total	15.81	3.98	18.52	21.75	25.60	30.20	35.69	149

Table No. 3.26: Population Projection to Town Panchayats in CMA									(In Lakhs)
Sl. No.	Description	Actual 2001	Annual rate of growth assumed in %	Projection					Density 2026
				2006	2011	2016	2021	2026	
1	Minjur	0.23	2.5	0.27	0.30	0.35	0.39	0.44	51
2	Chinnasekkadu	0.10	2.5	0.11	0.13	0.14	0.16	0.18	109
3	Puzhal	0.21	3.0	0.24	0.28	0.32	0.38	0.44	65
4	Naravarikuppam	0.18	2.0	0.20	0.22	0.25	0.27	0.30	15
5	Thirunindravur	0.29	5.0	0.38	0.48	0.62	0.80	1.02	70
6	Porur	0.29	4.0	0.35	0.43	0.53	0.64	.79	211
7	Thirumazhisai	0.16	2.0	0.18	0.20	0.22	0.24	0.27	37
8	Mangadu	0.19	3.0	0.23	0.26	0.30	0.35	0.41	73
9	Nandambakkam	0.09	2.0	0.10	0.11	0.13	0.14	0.15	59
10	Meenambakkam	0.04	2.0	0.04	0.04	0.05	0.05	0.06	20
11	Kundrathur	0.25	2.0	0.28	0.31	0.34	0.37	0.41	34
12	Thiruneermalai	0.19	2.0	0.21	0.23	0.26	0.29	0.32	54
13	Perungalathur.	0.20	6.0	0.26	0.36	0.48	0.65	0.88	125
14	Peerkanaranai	0.18	2.0	0.19	0.21	0.24	0.26	0.29	164
15	Chitlapakkam	0.25	2.5	0.29	0.33	0.37	0.42	0.47	163
16	Sembakkam	0.21	7.00	0.30	0.43	0.61	0.87	1.24	195
17	Madambakkam	0.17	8.0	0.25	0.38	0.56	0.84	1.26	159
18	Perungudi.	0.24	5.0	0.30	0.39	0.50	0.64	0.82	177
19	Pallikaranai	0.22	6.0	0.30	0.40	0.54	0.73	0.99	73
20	Sholinganallur.	0.16	9.0	0.24	0.38	0.60	0.94	1.48	96
Total		3.86		4.73	5.89	7.41	9.45	12.22	78

Sl. No.	Description	Actual 2001	Annual rate of growth assumed in %	Projection					Density 2026
				2006	2011	2016	2021	2026	
1	Minjur (4 Villages)	0.23	1.8	0.28	0.33	0.38	0.45	0.54	13
2	Sholavaram (41 Villages)	0.97	1.6	1.12	1.30	1.51	1.76	2.06	16
3	Puzhal (28 Villages)	0.51	1.4	0.60	0.75	0.95	1.23	1.60	34
4	Villivakkam (25 Villages)	1.43	2.2	1.73	2.12	2.64	3.32	4.27	51
5	Thiruvallur (1 village)	0.09	3.5	0.10	0.12	0.15	0.18	0.21	18
6	Poonamallee (42 villages)	0.72	1.3	0.73	0.82	0.93	1.06	1.21	16
7	Kundrathur (30 villages)	1.06	1.9	1.25	1.49	1.79	2.15	2.59	32
8	Sriperumbudur (4 villages)	--	--	0	0	0	0	0	0
9	St.Thomas Mount (33 Villages)	1.99	2.6	2.50	3.15	3.98	5.03	6.38	65
10	Kattankulathur (6 villages)	0.31	2.7	0.39	0.49	0.63	0.81	1.04	37
Total		7.31	3.45	8.70	10.59	12.90	15.90	19.88	32

Floating Population:

3.38 Arrival of passengers by the 92 inter city trains is estimated to be 1.125 lakhs per day. Similarly arrival of passengers in inter city buses (2028 arrivals) is estimated to be about 83,000 per day. These main arrivals of passengers to CMA accounts to 1.955 lakhs. In addition, there are people who commute every day for work, education, business and others from the adjoining and nearby districts and return home in the evening. These daily commuters estimated to be 20,000. Hence the people arriving in CMA through trains, buses and air is estimated to be about 2.25 lakhs and an equal number of persons may be departing from the metropolitan area. This floating population should also be taken into account in planning for infrastructure development in CMA appropriately.

ANNEXURE - III A

1. The following methods were adopted for projection of population.

(1) Linear Method:

$$P_{(t+n)} = P_t \{1 + (n \times a)\}$$

where P_t - is population at time 't';

$P_{(t+n)}$ - is population at time 't+n';

n - is no. of time periods;

a - is average change in the past time periods.

(2) Geometric Growth Method:

$$P_{(t+n)} = P_t (1+r)^n$$

where P_t - is population at time 't';

$P_{(t+n)}$ - is population at time 't+n';

n - is number of time period;

r - is average percentage of change in population over past time period.

Note: Often the rate 'r' is not calculated, but estimated based on historical patterns, and judgment for the future.

(3) Exponential Curve Method:

$$P_{(t+n)} = P_t \times e^{rt}$$

where P_t - is population at time 't';

$P_{(t+n)}$ - is population at time 't+n';

n - is number of time period;

r - is average percentage of change in population over past time period.

Note: Often the rate 'r' is not calculated, but estimated based on historical patterns, and judgment for the future.

(4) Urban - Urban Growth Difference (UUGD) Method

$$U^1 = \left[\frac{T^1 + dR}{T} \right] \times U$$

where U - Urban population at time 't';

U^1 - Urban population at time 't+1';

T - Total population at time 't';

T^1 - Total population at time 't+1';

d - u-r, where u - urban growth rate;
r - rural growth rate;

R - Rural population at time 't';

$$C^1 = \frac{U^1 + dU_1 \times C}{U}$$

Where

C - City population (Chennai/CMA) at time 't';

C_1 - City population (Chennai/CMA) at time (t+1);

U^1 - Urban population (CMA/Tamil Nadu) at time (t+1);

U_1 - Rest of urban population (i.e. U-C);

U - Urban population (CMA/Tamil Nadu) at time 't';

d - $r_c - r_u$ where

r_c - the rate of growth of city population;

r_u - the rate of growth of urban population.

(5) Urban - Urban - Rural Growth Difference (UURGD) Method:

$$C^1 = \left\{ w_1 \left(\frac{U^1 + d_1 U_1}{U} \right) + w_2 \left(\frac{T^1 + d_2 R}{T} \right) \right\} C$$

Where U - Urban population at time 't';

U^1 - Urban population at time 't+1';

U_1 - Rest of urban population (i.e. U-C);

T - Total population at time 't';

T^1 - Total population at time 't+1';

R - Rural population at time 't';

d_1 - $r_c - r_u$;

d_2	-	$r_c - r_r$;
w_1, w_2	-	Weights of these population components;
C	-	City population at time 't';
C_1	-	City population at time 't + 1';
r_c	-	rate of growth of city population;
r_u	-	rate of growth of urban population;
r_R	-	rate of growth of rural population.

Note: $w_1 + w_2 = 1.0$. The quantum of weight is determined based on urbanisation level. At low levels of urbanisation contribution from rural areas will be more, and vice versa. The weights adopted based on the U.N. method is as follows:

Level of Urbanisation in percent	w_1	w_2
25	0.2	0.8
30	0.3	0.7
50	0.4	0.6
60	0.6	0.4
75	0.8	0.2

Assumptions made

Tamil Nadu Population

2. The historical pattern of annual growth rate of Tamil Nadu population was as detailed in Table A in Annexure III B. It varied from 0.85% to 3.72% in respect of urban, -0.52% to 1.53% in respect of rural, and 0.34% to 2.03% in respect of total population.

3. The annual rate of growth assumed for Tamil Nadu for population projection as low, medium and high category of growth rate, is 2.0%, 2.5% and 3.0% for urban, and 1.0%, 1.1% and 1.2% for the total population; the rural population growth rate has been arrived out of the total and urban population growth rates assumed.

CMA/City Population:

4. The annual growth rates of population in 1971-81, 1981-91, and 1991-2001 were 2.76%, 2.37% and 1.93% respectively for CMA and 2.2%, 1.58% and 1.23% respectively for the Chennai City. The average rate of annual growth arrived for these three periods was 2.35% for CMA and 1.67% for City and the same was adopted for linear, geometric and exponential growth methods of projection.

5. Projection of population for individual Corporation Division was made based on average annual growth rates. In respect of villages, Town Panchayats and Municipalities, future growth rates were assumed based on the past and judging the future trends. For UUGD and UURGD method, the assumption made based on the historical pattern is given below:

Growth Rates assumed in %						
Year	Growth rate category	Tamil Nadu (TN)	TN Urban population	Rest of TN Urban population	Chennai City	CMA
2006	Low	1.00	2.00	2.50	1.00	2.00
	Medium	1.10	2.50	3.00	1.50	2.50
	High	1.20	3.00	4.00	2.00	2.75
2011	Low	1.00	2.00	2.50	1.00	2.00
	Medium	1.10	2.50	3.00	1.50	2.50
	High	1.20	3.00	4.00	2.00	2.75
2016	Low	1.00	2.00	2.50	1.00	2.00
	Medium	1.10	2.50	3.00	1.25	2.50
	High	1.20	3.00	4.00	1.50	2.75
2021	Low	1.00	2.00	2.50	1.00	2.00
	Medium	1.10	2.50	3.00	1.25	2.50
	High	1.20	3.00	4.00	1.50	2.75
2026	Low	1.00	2.00	2.50	1.00	2.00
	Medium	1.10	2.50	3.00	1.25	2.50
	High	1.20	3.00	4.00	1.50	2.75

ANNEXURE IIIB

POPULATION PROJECTION URBAN - URBAN GROWTH DIFFERENCE METHOD AND URBAN RURAL GROWTH DIFFERENCE METHOD

Table No. A Population and Growth Rate - Tamil Nadu						
Year	Population			Growth rate		
	Urban	Rural	Total	Urban	Rural	Total
1901	2724781	16527849	19252630			
1911	3149137	17753479	20902616	1.46%	0.72%	0.83%
1921	3428079	18200439	21628518	0.85%	0.25%	0.34%
1931	4230382	19241717	23472099	2.13%	0.56%	0.82%
1941	5173682	21093825	26267507	2.03%	0.92%	1.13%
1951	7333525	22785522	30119047	3.55%	0.77%	1.38%
1961	8990528	24696425	33686953	2.06%	0.81%	1.13%
1971	12464834	28734334	41199168	3.32%	1.53%	2.03%
1981	15951875	32456202	48408077	2.50%	1.23%	1.63%
1991	19077592	36781354	55858946	1.81%	1.26%	1.44%
2001	27483998	34921681	62405679	3.72%	-0.52%	1.11%

Table No. B Population Projection - Tamil Nadu 2006 – 2026 Exponential Method							
Year		Projected Population			Annual Growth Rate assumed		
		Urban	Rural	Total	Urban	Rural	Total
2006	Low	30374515	35230771	65605287	2.00%	0.18%	1.00%
	Medium	31143450	34790685	65934134	2.50%	-0.08%	1.10%
	High	31931850	34332781	66264631	3.00%	-0.34%	1.20%
2011	Low	33569031	35399911	68968942	2.00%	0.10%	1.00%
	Medium	35290152	34371939	69662091	2.50%	-0.24%	1.10%
	High	37099517	33262690	70362207	3.00%	-0.63%	1.20%
2016	Low	37099517	35405538	72505055	2.00%	0.00%	1.00%
	Medium	39988981	33611847	73600828	2.50%	-0.45%	1.10%
	High	43103489	31609673	74713162	3.00%	-1.01%	1.20%
2021	Low	41001307	35221161	76222468	2.00%	-0.10%	1.00%
	Medium	45313452	32448812	77762264	2.50%	-0.70%	1.10%
	High	50079109	29254057	79333166	3.00%	-1.54%	1.20%
2026	Low	45313452	34817026	80130478	2.00%	-0.23%	1.00%
	Medium	51346868	30812123	82158991	2.50%	-1.03%	1.10%
	High	58183624	26055231	84238855	3.00%	-2.29%	1.20%

Table No. C Urban Population Projection - Tamil Nadu 2006 – 2026 Urban -Urban Growth Difference (UUGD) Method

Year		Growth Rate (GR) Assumed in %		Growth Rate Difference in %		Projected Tamil Nadu Urban Population
		TN Urban	TN Rural	TN Urban GR (-) TN Rural GR	D-TN Urban GR (-) TN Rural GR for 5 years	
2006	Low	2.00	0.18	0.0182	0.0912	30295467
	Medium	2.50	-0.08	0.0258	0.1288	31018215
	High	3.00	-0.34	0.0334	0.1670	31751609
2011	Low	2.00	0.10	0.0190	0.0952	33484836
	Medium	2.50	-0.24	0.0274	0.1371	35157207
	High	3.00	-0.63	0.0363	0.1816	36910278
2016	Low	2.00	0.00	0.0200	0.0998	37010422
	Medium	2.50	-0.45	0.0295	0.1473	39850548
	High	3.00	-1.01	0.0401	0.2007	42913798
2021	Low	2.00	-0.10	0.0210	0.1052	40907826
	Medium	2.50	-0.70	0.0320	0.1601	45173577
	High	3.00	-1.54	0.0454	0.2268	49905719
2026	Low	2.00	-0.23	0.0223	0.1115	45216488
	Medium	2.50	-1.03	0.0353	0.1765	51212639
	High	3.00	-2.29	0.0529	0.2645	58059683

Table No.D Population Projection – Chennai Metropolitan Area 2006 – 2026 Urban Urban Growth Difference (UUGD) Method

Year		Growth Rate in %		D-(CMA GR (-) Rest of Urban TN GR} X 5	Projected Population		
		CMA	Rest of Urban TN		TN Urban	Rest of TN Urban	CMA
2001	Actual				27483998	20450259	7040582
2006	Low	2.00	2.50	-0.025	30295467	22673055	7622412
	Medium	2.50	3.00	-0.025	31018215	23210836	7807379
	High	2.75	4.00	-0.063	31751609	23952801	7798808
2011	Low	2.00	2.50	-0.025	33484836	25202586	8282250
	Medium	2.50	3.00	-0.025	35157207	26454087	8703120
	High	2.75	4.00	-0.063	36910278	28212106	8698172
2016	Low	2.00	2.50	-0.025	37010422	28011984	8998438
	Medium	2.50	3.00	-0.025	39850548	30149315	9701233
	High	2.75	4.00	-0.063	42913798	33216377	9697421
2021	Low	2.00	2.50	-0.025	40907826	31132068	9775758
	Medium	2.50	3.00	-0.025	45173577	34359993	10813584
	High	2.75	4.00	-0.063	49905719	39097431	10808288
2026	Low	2.00	2.50	-0.025	45216488	34597079	10619410
	Medium	2.50	3.00	-0.025	51212639	39159059	12053580
	High	2.75	4.00	-0.063	58059683	46014676	12045007

Table No.E Population Projection – Chennai City 2006 – 2026 Urban -Urban Growth Difference (UUGD) Method							
Year		Growth Rate in %		D {Chennai city GR (-) Rest of Urban TN GR} X 5	Projected Population		
		Chennai City	Rest of Urban TN		TN Urban	Rest of TN Urban	City
2001	Actual				27483998	23140353	4343645
2006	Low	1.00	2.50	-0.075	30295467	25781777	4513690
	Medium	1.50	3.00	-0.075	31018215	26390300	4627915
	High	2.00	4.00	-0.100	31751609	27099216	4652393
2011	Low	1.00	2.50	-0.075	33484836	28784055	4700781
	Medium	1.50	3.00	-0.075	35157207	30207062	4950145
	High	2.00	4.00	-0.100	36910278	31899083	5011195
2016	Low	1.00	2.50	-0.075	37010422	32117765	4892657
	Medium	1.25	3.00	-0.088	39850548	34611731	5238817
	High	1.50	4.00	-0.125	42913798	37628878	5284920
2021	Low	1.00	2.50	-0.075	40907826	35818385	5089441
	Medium	1.25	3.00	-0.088	45173577	39633121	5540456
	High	1.50	4.00	-0.125	49905719	44338989	5566730
2026	Low	1.00	2.50	-0.075	45216488	39925215	5291273
	Medium	1.25	3.00	-0.088	51212639	45356835	5855804
	High	1.50	4.00	-0.125	58059683	52501644	5858039

Table No: F Population Projection UURGD Method Weights Assigned					
Urbanisation Level	W ₁	W ₂	Urbanisation Level	W ₁	W ₂
35	0.325	0.675	52	0.410	0.590
36	0.330	0.670	53	0.415	0.585
37	0.335	0.665	54	0.420	0.580
38	0.340	0.660	55	0.425	0.575
39	0.345	0.655	56	0.430	0.570
40	0.350	0.650	57	0.435	0.565
41	0.355	0.645	58	0.440	0.560
42	0.360	0.640	59	0.445	0.555
43	0.365	0.635	60	0.450	0.550
44	0.370	0.630	61	0.455	0.545
45	0.375	0.625	62	0.460	0.540
46	0.380	0.620	63	0.465	0.535
47	0.385	0.615	64	0.470	0.530
48	0.390	0.610	65	0.475	0.525
49	0.395	0.605	66	0.480	0.520
50	0.400	0.600	67	0.485	0.515
51	0.405	0.595	68	0.490	0.510
			69	0.495	0.505

Table No G Population Projection Chennai Metropolitan Area, Urban- Urban Rural Growth Difference Method - 2006-2026									
Year	Growth Rate in %		D ₁ CMA GR (-) Rest of Urban TN GR	D ₂ CMA GR (-) TN Rural GR	Projected Population				
	CMA	Rural TN %			TN Total	TN Urban	TN Rest of Urban	TN Rural	CMA
2001									
Actual					62405679	27483998	20450259	34921681	7040582
2006									
Low	2.00	0.18	-0.025	0.0912	65605287	30295467	22591279	35309820	7704188
Medium	2.50	-0.08	-0.025	0.1288	65934134	31018215	23129715	34915920	7888500
High	2.75	-0.34	-0.063	0.1545	66264631	31751609	23781891	34513022	7969718
2011									
Low	2.00	0.10	-0.025	0.0952	68968942	33484836	25038579	35484106	8446257
Medium	2.50	-0.24	-0.025	0.1371	69662091	35157207	26294682	34504884	8862525
High	2.75	-0.63	-0.063	0.1691	70362207	36910278	27855103	33451929	9055175
2016									
Low	2.00	0.00	-0.025	0.0998	72505055	37010422	27752133	35494633	9258289
Medium	2.50	-0.45	-0.025	0.1473	73600828	39850548	29893713	33750280	9956835
High	2.75	-1.01	-0.063	0.1882	74713162	42913798	32623068	31799365	10290730
2021									
Low	2.00	-0.10	-0.025	0.1052	76222468	40907826	30761041	35314643	10146785
Medium	2.50	-0.70	-0.025	0.1601	77762264	45173577	33986861	32588688	11186716
High	2.75	-1.54	-0.063	0.2143	79333166	49905719	38206418	29427447	11699301
2026									
Low	2.00	-0.23	-0.025	0.1115	80130478	45216488	34097620	34913990	11118868
Medium	2.50	-1.03	-0.025	0.1765	82158991	51212639	38642934	30946352	12569705
High	2.75	-2.29	-0.063	0.2520	84238855	58059683	44750479	26179172	13309204

Table No H Population Projection Chennai City Urban - Urban Rural Growth Difference Method 2006-026									
Year	Growth Rate in %		D ₁ Chennai City GR (-) Rest of Urban TN GR	D ₂ Chennai City GR (-) TN Rural GR	Projected Population				
	Chennai City	Rural TN			TN Total	TN Urban	TN Rest of Urban	TN Rural	Chennai City
2001									
Actual					62405679	27483998	23140353	34921681	4343645
2006									
Low	1.00	-0.18	-0.08	0.041	65605287	30295467	25685542	35309820	4609925
Medium	1.50	-0.08	-0.08	0.079	65934134	31018215	26294065	34915929	4724150
High	2.00	-0.34	-0.10	0.117	66264631	31751609	26945380	34513022	4806229
2011									
Low	1.00	0.10	-0.08	0.045	68968942	33484836	28587362	35484106	4897474
Medium	1.50	-0.24	-0.08	0.087	69662091	35157207	30012375	34504884	5144832
High	2.00	-0.63	-0.10	0.132	70362207	36910278	31581463	33451929	5328815
2016									
Low	1.00	0.00	-0.08	0.050	72505055	37010422	31806986	35494633	5203436
Medium	1.25	-0.45	-0.09	0.085	73600828	39850548	34284586	33750280	5565962
High	1.50	-1.01	-0.13	0.126	74713162	42913798	37089749	31799365	5824049
2021									
Low	1.00	-0.10	-0.08	0.055	76222468	40907826	35377821	35314642	5530005
Medium	1.25	-0.70	-0.09	0.098	77762264	45173577	39149126	32588687	6024451
High	1.50	-1.54	-0.13	0.152	79333166	49905719	43536872	29427447	6368847
2026									
Low	1.00	-0.23	-0.08	0.062	80130478	45216488	39338796	34913990	5877692
Medium	1.25	-1.03	-0.09	0.104	82158991	51212639	44688513	30946352	6524126
High	1.50	-2.29	-0.13	0.189	84238855	58059683	51092126	26179172	6967558

