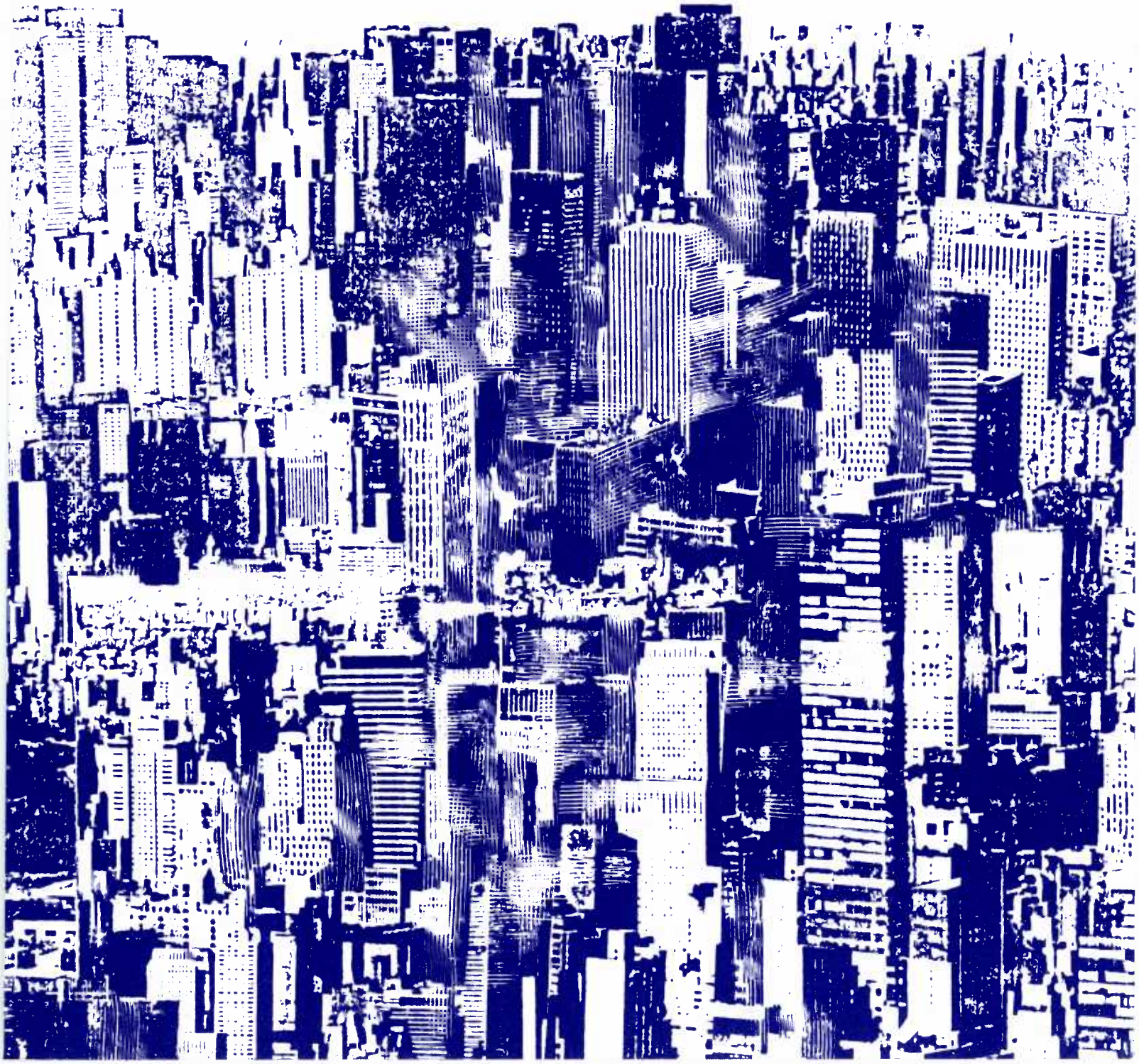
United Nations

Population Growth and Policies in Mega-Cities

MADRAS



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Population Growth and Policies in Mega-Cities

MADRAS

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NOTE

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PREFACE

This publication is one in a series of studies being prepared by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat which focus on the population policies and plans of some mega-cities in developing countries, cities that are expected to have populations of at least 8 million inhabitants by the year 2000.

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

Each of the technical papers in this series follows a common format consisting of five major sections. Section I provides basic information on demographic trends and reviews the use of demographic data in planning for rapidly growing urban populations. Section II presents background information on the city's economic base, the spatial structure

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

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

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

CALCUTTA	(ST/ESA/SER.R/61)
SEOUL	(ST/ESA/SER.R/64)
METRO MANILA	(ST/ESA/SER.R/65)
BOMBAY	(ST/ESA/SER.R/67)
DELHI	(ST/ESA/SER.R/68)
DHAKA	(ST/ESA/SER.R/69)
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Reference to "dollars" ($) indicates United States dollars, unless otherwise stated.

The term "billion" signifies a thousand million.

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

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

A point (.) is used to indicate decimals.

The following symbols have been used in the tables:

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

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

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

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

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

The following abbreviations have been used:

CBD	-	Central Business District
MMA	-	Madras Metropolitan Area
MMDA	-	Madras Metropolitan Development Authority
TNHB	-	Tamil Nadu Housing Board
TNSCB	-	Tamil Nadu Slum Clearance Board

INTRODUCTION

Madras, the fourth largest city in India, with a census population of about 5,000,000 inhabitants in 1981, is relatively poor, with average per capita income well below that of India's other large metropolitan cities. Although it faces many of the same problems as the other large Indian cities, some of them are more acute. For example, it has a small manufacturing base and has had virtually no growth in formal sector industrial activity in recent years. Like Calcutta, Madras has been severely affected by the Government of India's nationwide ban on heavy industry in or near large cities. Moreover, the city has found it difficult to attract new medium-size industry because of chronic power shortages and labour unrest. Madras has also experienced serious water shortages, although, ironically, it is affected by periodic floods. More than 200,000 households live in unimproved slums and a further 360,000 households live in substandard conditions in the city's older areas.

A major impediment to improving these conditions is the fact that about 45 per cent of the city's residents live below the absolute poverty line (the minimum subsistence level), with average monthly incomes of less than Rs 450 (equivalent to about $US 45), and are unable to pay for basic services. An additional 26 per cent of the inhabitants have monthly household incomes ranging from Rs 450 to Rs 800, but are also considered poor and can hardly afford the purchase of even a bicycle (Lakshmanan and Rotner, 1985).

Beginning in the late 1960s, planners in the Madras Metropolitan Area (MMA) began to anticipate the problems that would arise from the continuing concentration of population in the city's central core. In response to these concerns, a strategy was formulated that sought to contain the growth of Madras City and to direct migrants to urban nodes and satellite towns on the periphery and to areas along the major transportation arteries leading out to the satellite towns.

In contrast to the situation in India's other large metropolitan cities, where spatial strategies adopted during the 1960s and 1970s have been periodically revised or, in some instances, superseded by fundamentally different spatial strategies, Madras's basic strategy to decentralize metropolitan growth has been pursued with few modifications for nearly 20 years. However, despite clearly articulated plans and an experienced planning staff in the Madras Metropolitan Development Authority (MMDA), the decentralization which has taken place has been more of a spontaneous process than a result of explicit governmental policies.

I. DEMOGRAPHIC CHARACTERISTICS

A. Population growth

From a population of some 40,000 around 1600, Madras grew to about 400,000 by 1872, the year of India's first census. Madras City doubled in size between 1872 and 1931, reaching 713,000 inhabitants, and doubled again between 1931 and 1951, reaching 1,420,000, due in large part to the influx of more than half a million migrants following partition of the Indian sub-continent in 1947.

Natural increase in Madras has been more or less stable over the past several decades and only recently has shown signs of declining. There have been considerable changes in decennial growth rates, however, which are explained mainly by variations in migration flows. Madras grew rapidly during 1941-1951 because of the net migration of 540,000, and less rapidly during 1951-1961, as net migration declined to only 100,000 (Alan Turner, 1980). However, migration increased significantly during 1961-1971 (net migration was 440,000) because of the combined effects of the return of expatriates from Burma and Sri Lanka and larger rural/urban migration flows. During 1961-1971, Madras grew at an average annual rate of 3.6 per cent, which was the highest rate of growth of any India's nine metropolitan cities. 1/ During 1971-1981, however, Madras experienced a significant slowdown in population growth (table 1). Its average annual rate of growth of 2.8 per cent placed it next to last among the nine metropolitan cities, with only Calcutta (which grew at less than 2 per cent) growing at a lower rate. A fairly rapid decline in natural increase - from 26.3 per thousand population in 1971 to 20.3 per thousand in 1976 - contributed to the slowdown (Alan Turner, 1980).

B. Migration

In spite of the importance of in-migration, which has contributed about the same share as natural increase to Madras's population growth, there are limited data on the origins and characteristics of recent migrants. Analysis of data from the 1971 census showed that a majority of migrants to Madras came from other districts in Tamil Nadu. Of the 550,000 migrants from within Tamil Nadu, 41 per cent were from other urban areas, most of which were located some distance from Madras (Alan Turner, 1980). The remaining 59 per cent were rural/urban migrants, a large proportion of whom came from areas immediately outside the city limits. Indeed, nearly two fifths of the migrants from the state of Tamil Nadu were from two districts, Chingleput and North Arcot, which are located on the periphery of the MMA. In spite of the paucity of data on migration, the limited data that are available have been

Table 1. Population size and rate of growth of selected municipalities and townships in Madras Metropolitan Area, 1961-1981

Madras Metropolitan Area	Population size (in thousands) 1961	1971	1981	Average annual rate of growth (percentage) 1961-1971	1971-1981
Madras U.A.	1 945	3 170	4 289	5.0	3.1
Madras M.C.	1 729	2 469	3 277	3.6	2.9
Tiruvottiyur	38	83	134	8.1	4.9
Avadi	13	77	125	19.5	5.0
Ambattur	11	46	116	15.4	9.7
Alandur	24	65	97	10.5	4.1
Tambaram	34	59	87	5.7	4.0
Pallavaram	21	51	84	9.3	5.1
Mandavaram	-	21	47	-	8.4
St. Thomas Mount cum. Pallavaram Cantonment	16	27	33	5.4	2.0

Source: Census of India 1971. General Population Tables; Census of India 1981. Final Population Totals.

interpreted by planners as being conducive to establishing satellite communities within a reasonable distance of the city, although outside the metropolitan area.

Data from the 1981 census point to a considerable slowing of migration to Madras, as migrants have responded to the lack of employment opportunities in the city. There have been significant short-term influxes, however, particularly of families from drought-stricken areas of Tamil Nadu.

C. Population projections

Population projections for Madras have been prepared since the late 1950s by a number of local government agencies. In 1967, in the course of preparing the Madras Interim Plan, the Directorate of Town Planning (Government of Tamil Nadu) projected the population of 16 city planning divisions, of five peripheral urban nodes, and of other urban and rural areas for the years 1971, 1981 and 1991. The projections were based on the assumption that further large-scale development would not take place within the main urbanized area of Madras, but that population growth would be significant in the urban nodes and in other urban and rural areas. However, because of the fact that the Interim Plan projections under-estimated the 1971 baseline population by some 20 per cent and assumed low rates of growth thereafter, future population growth (up to 1991) was under-estimated by about 40 per cent. A comparison with trend projections subsequently prepared by the Madras Metropolitan Development Authority (MMDA) suggested that the under-estimation was greatest in Madras City, and particularly in the densely populated inner areas. In the rest of the MMA the Interim Plan projections were closer to the trend projections, except that growth in the five urban nodes was exaggerated at the expense of growth in the other urban and rural areas.

In the Traffic and Transportation Plan for Madras Metropolitan Area (commenced in 1971 and approved in 1974), projections of the population of 80 traffic zones also seriously under-estimated the extent of future population growth. Comparison with MMDA's subsequent trend projections suggested that the under-estimation - which was about 30 per cent overall - was most serious in the outer parts of Madras City. In the rest of the MMA the Traffic and Transportation Plan projections were closer to MMDA'S trend projections, except that growth in the outer parts of the transportation corridors was exaggerated at the expense of the inner parts of the corridors and the rest of the MMA.

Projections contained in the Master Plan for Water and Sewerage (1978) were based on the assumption that there would be rapid, uncontrolled growth within the city limits but controlled growth in

peripheral areas. Although closer to the subsequent trend projections than any of the earlier projections, the water and sewerage master plan projections under-estimated population growth in the service area as a whole by about 10 per cent.

In 1974, the newly established Madras Metropolitan Development Authority prepared a series of high-, medium-, and low-variant projections as an input to the Master Plan (tables 2 and 3). In 1978, however, it was concluded that those projections had been overly optimistic in predicting the rate of decline in fertility. In the MMDA's revised high-variant projection (tables 4 and 5), a crude birth rate of 36 per thousand, which was the actual rate recorded during 1961-1971, was assumed to prevail throughout the projection period. In the revised medium-variant projection, the crude birth rate was assumed to decline by 5 per cent every five years, and in the low variant it was assumed to decline by 10 per cent every five years. Similar assumptions were made for the crude death rate and for net migration.

In 1979/80, as an input to the Structure Plan, which was prepared by MMDA in consultation with Alan Turner and Associates, a London-based consulting group, planners prepared a series of trend projections - chiefly in order to provide sufficient services within the city while avoiding the provision of excessive services on the periphery. MMDA's revised 1978 projections and the trend projections prepared for the Structure Plan not only were significantly higher than the earlier projections but also suggested that the distribution of population would be much more concentrated in Madras City. Indeed, the trend projections assumed that 70 per cent of future population growth in the MMA would take place within Madras City; it was anticipated that some development would take place in the transportation corridors but that a significant amount would occur in areas outside the corridors.

Table 2. Population projections prepared by Madras Metropolitan Development Authority, 1974

Area	Projection	Estimated population in millions 1976	1981	1991	2001
Madras Metropolitan Area	High	3.91	4.54	6.02	7.78
	Medium	3.89	4.51	5.82	7.13
	Low	3.87	4.45	5.53	6.53
Madras Urban Agglomeration	High	3.73	4.34	5.76	7.44
	Medium	3.72	4.31	5.56	6.82
	Low	3.70	4.25	5.29	6.25
City of Madras	High	2.90	3.38	4.48	5.79
	Medium	2.89	3.35	4.34	5.31
	Low	2.88	3.31	4.12	4.86

Source: Master Plan for the Madras Metropolitan Area, Madras Metropolitan Development Authority, 1974.

Table 3. Assumptions used in population projections prepared by Madras Metropolitan Development Authority, 1974

Projection	Period	Crude birth rate	Crude death rate	New inward migration	Annual growth rate
		(per thousand)			(percentage)
High	1971-76	36	16	12.5	3.2
	1976-81	34.2	14	10.6	3.0
	1981-86	32.5	13	9	2.9
	1986-91	31.9	11.7	7.7	2.8
	1991-96	30.3	10.5	6.5	2.6
	1996-2001	28.8	9.5	5.5	2.5
Medium	1971-76	36	16	11.8	3.2
	1976-81	34.2	13.6	9.4	3.0
	1981-86	30.8	11.6	7.5	2.7
	1986-91	27.7	9.8	6	2.4
	1991-96	24.9	8.4	4.8	2.1
	1996-2001	22.4	7.1	3.9	1.7
Low	1971-76	36	16	11	3.1
	1976-81	32.4	12.8	8.3	2.8
	1981-86	27.5	10.3	6.2	2.3
	1986-91	23.4	8.6	4.6	2.0
	1991-96	20.9	6.5	3.5	1.8
	1996-2001	18.8	5.9	2.6	1.5

Source: Master Plan for the Madras Metropolitan Area, Madras Metropolitan Development Authority, 1974.

Table 4. Revised population projections prepared by Madras Metropolitan Development Authority, 1978

Area	Projection	Estimated population in millions 1976	1978	1981	1986	1991
Madras Metropolitan Area	High	4.25	4.61	5.20	6.36	7.78
	Medium	4.25	4.59	5.14	6.16	7.31
	Low	4.25	4.57	5.09	5.98	6.98
Madras Urban Agglomeration	High	3.88	4.20	4.75	5.80	7.10
	Medium	3.88	4.18	4.69	5.62	6.67
	Low	3.88	4.17	4.65	5.46	6.31
City of Madras (Post 1978 boundary)	High	3.15	3.42	3.86	4.71	5.77
	Medium	3.15	3.40	3.81	4.57	5.42
	Low	3.15	3.39	3.77	4.43	5.17

Source: Turner, Alan and Associates, 1980. Structure Plan for Madras Metropolitan Area. vols. 1 and 2. London.

Table 5. Assumptions used in revised population projections prepared by Madras Metropolitan Development Authority, 1978

Projection	Period	Crude birth rate	Crude death rate	New inward migration	Annual growth rate
		(per thousand)			(percentage)
High	1971-76	36	16	20	4.0
	1976-81	36	16	20	4.0
	1981-86	36	16	20	4.0
	1986-91	36	16	20	4.0
Medium	1971-76	36	16	20	4.0
	1976-81	34.2	15.2	19	3.8
	1981-86	32.5	14.5	18.1	3.6
	1986-91	30.9	13.8	17.2	3.4
Low	1971-76	36	16	20	4.0
	1976-81	32.4	14.4	18	3.6
	1981-86	29.2	13	16.2	3.2
	1986-91	26.3	11.7	14.6	2.9

Source: Turner, Alan and Associates. 1980. Structure Plan for Madras Metropolitan Area. vols. 1 and 2. London.

II. THE ECONOMY

A. Historical background and development of the city's economic base

Before 1600 the area where Madras now stands consisted of a number of small settlements that had grown up around the nuclei of widely scattered Hindu temples. In 1639 the British acquired a coastal site near the present-day Fort St. George to serve as a fortified outpost of the British East India Company, an event that marked the beginnings of the present city of Madras.

Over the centuries, because there were few physical constraints to expansion, apart from periodic flooding in low-lying areas, Madras grew in a dispersed, low-density pattern, leaving large pockets of vacant or under-utilized land within its boundaries. During the late seventeenth and eighteenth centuries, the British community spilled out beyond the confines of Fort St. George and established vacation communities outside the city, first building radial roads linking those communities to the centre, and later constructing a number of connecting roads (Alan Turner, 1980). The city's first pier was constructed in 1862 and, by the late nineteenth century, a number of large manufacturing units such as the Buckingham Textile Mills had been established. However, these developments, and the linking of Madras to the Indian railway network, failed to generate significant industrial growth. Even by 1947, with a population of over 1 million inhabitants, Madras was predominantly an administrative and commercial centre for the south of India.

After partition in 1947, the city's economic and industrial base began to diversify, and a range of modern industries were established, including vehicle manufacturing and coach building for the Indian railways. Between 1960 and 1965 employment in the organized manufacturing sector grew by as much as 20 per cent per year, although it has declined sharply in recent years, partly as a result of the Government of India's 1977 ban on large-scale industry in or near metropolitan areas (Alan Turner, 1980).

B. Recent performance of the economy

Madras has had a poor economic performance in recent years, as shown by various economic indicators. Unemployment is estimated to have at least doubled between 1971 and 1980 (from 8 to about 16 per cent) and is believed to be increasing, while underemployment is perhaps of the order of 25 per cent (Alan Turner, 1980). Marginal and small farms dominate the agricultural sector, with farms of one hectare or less accounting for 80 per cent of all holdings in the outer areas of the MMA. The city's stagnant industrial base lacks diversification (as of

1980, machinery and metal products, and particularly transport equipment, accounted for 50 per cent of capital and value-added) and has been seriously hurt by chronic power and water shortages.

The Madras Metropolitan Area has a relatively low proportion of formal sector employment. Employment growth in the formal sector has been stagnant since around 1971 and has not risen even in absolute terms in recent years. In fact, there has been an absolute loss of manufacturing jobs. The economy has been growing mainly as a result of job creation in the informal sector. In the absence of growth in the formal sector, it is likely that there will continue to be haphazard growth of low-income occupations at the poverty level.

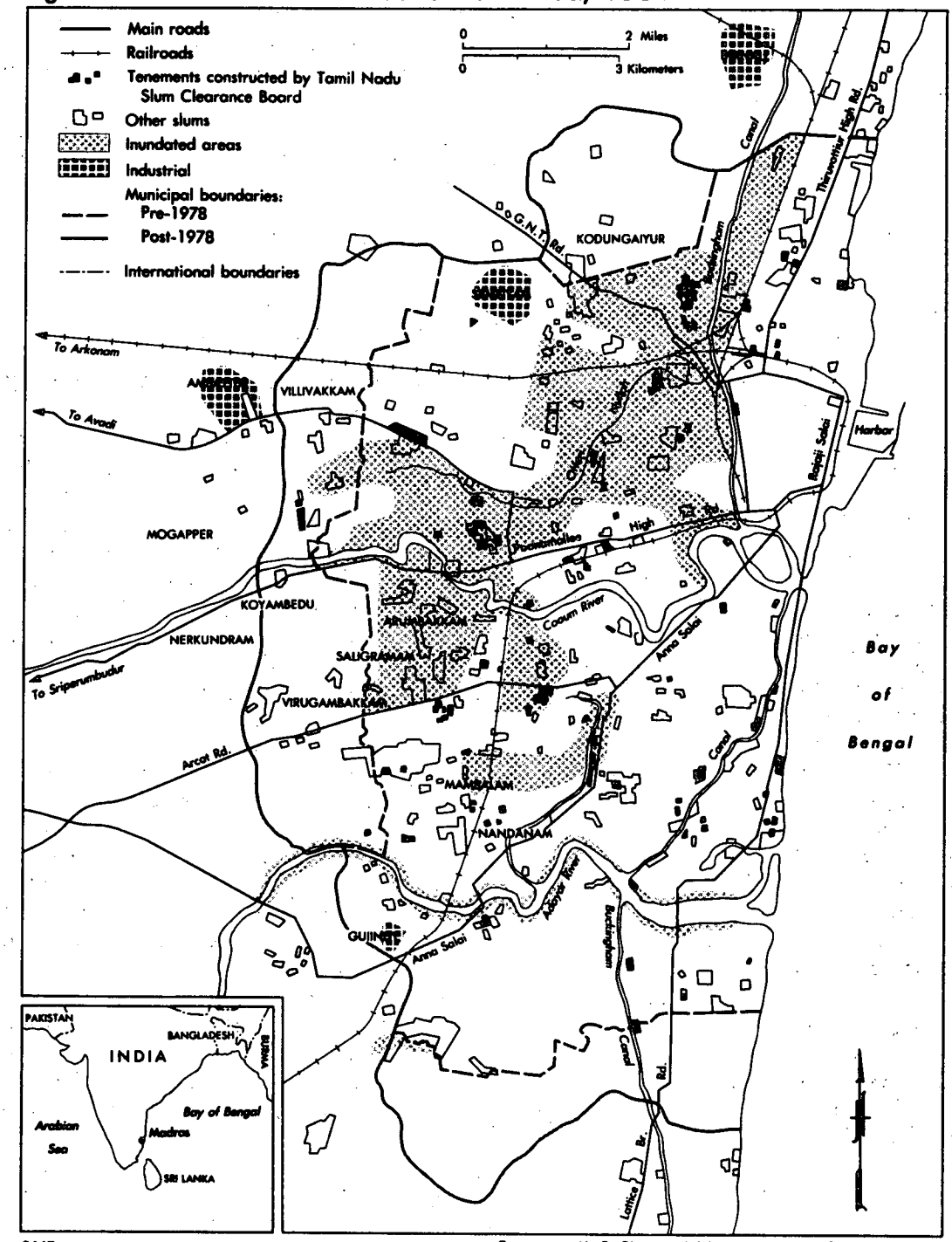
C. Spatial structure of the metropolitan region

Madras City is the 172-square-kilometre core of the Madras Metropolitan Area (MMA), an area of 1,167 square kilometres that consists of the city and its contiguous development, urban areas beyond the limits of contiguous development, and predominantly rural areas on the outer fringes (fig. I). George Town and its extension southwards towards Anna Salai Road, with its mosaic of wholesale and retail activities and banking and financial institutions, constitutes the Central Business District (CBD). However, significant retail and small business development has taken place along Anna Salai in recent years, and that area now functions as a secondary CBD. In addition, several secondary centres of retail and commercial activity, which are mainly based on early settlement nuclei, have been developing spontaneously within the city limits (Alan Turner, 1980).

Although several large old-established industries (e.g., the Southern Railway Integral Coach Factory and Binny Textiles) are located within the central city, most recent large-scale industrial growth has taken place on the periphery, either immediately outside the city limits or along the major transportation corridors. On the northern periphery, the area between the Calcutta broad gauge railway line and the coast (from Tir to Ennore) contains the major engineering, rubber and packing and printing establishments, as well as the main thermal power station at Ennore. West of the railway, a number of oil refineries and fertilizer plants are located near the Manali urban node. On the western periphery, the MMA's largest industrial estate (which is dominated by plants producing vehicle components) is located at Ambattur, whereas military tank and vehicle manufacturing plants are concentrated at Avadi. Scattered light industrial development stretches along the south-western corridor from the Guiindy Industrial Estate on the city's periphery to Tambaram. Light industrial growth has also been spreading towards the south. The main residential areas outside the

Figure I

Madras Urban Area, 1984



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Sources: K. C. Sivaramakrishnan and Leslie Green *Metropolitan Management: The Asian Experience* (Oxford, Oxford University Press, 1986).

city are in the south-west along the electrified suburban railway line. Recently, there has been rapid conversion of agricultural land on the periphery into privately-developed housing sites.

As in the case of India's other large metropolitan cities, the different parts of the MMA have been growing at very different rates. The highest rates of growth, although not the largest absolute increases, have occurred on the periphery and along the major transportation corridors, particularly to the west. Ambattur, for example, grew by an average annual rate of nearly 10 per cent during 1971-1981, whereas Avadi grew by around 5 per cent (table 1). However, a considerable amount of infilling has also taken place (Alan Turner, 1980).

D. Sectoral and spatial distribution of jobs

Whereas primary sector activity is insignificant in Madras City and accounted for only 1.5 per cent of employment in 1971, it is quite significant in the remainder of the MMA. Indeed, employment in the primary sector accounted for 28 per cent of total employment in the MMA in 1971, reflecting the predominantly rural character of the MMA's outer fringes (Alan Turner, 1980). Slightly less than one third (32 per cent) of the working population of the city was employed in industry in 1971, nearly the same proportion (33 per cent) as in the MMA. However, the tertiary sector was considerably more important in the city than in the MMA as a whole, accounting for 66 and 37 per cent of total employment. Government and semi-public agencies such as the railways are particularly important in Madras City, where they employed 26 per cent of the population in 1971.

The growth of employment in Madras has been extremely sluggish. During the 1970s, employment in the formal sector grew by only 1.7 per cent per annum, lagging far behind the rate of population growth, which was about 3 per cent. Most of this growth took place in the public sector, which grew at an average annual rate of 2 per cent, in contrast to the virtual stagnation of the private sector, which grew by only 0.6 per cent. Only transport, storage and communication activities, which grew at 3.7 per cent per annum, outpaced population growth; "other services" and construction grew at only modest rates (2.2 and 1.7 per cent, respectively) (Alan Turner, 1980). In contrast, manufacturing declined by 2.2 per cent per year, with public-owned manufacturing declining at an average annual rate of 4 per cent. This translates into an absolute loss of 10,800 manufacturing jobs (from 67,300 to 56,500) during 1971-1979 (Alan Turner, 1980).

With respect to the spatial distribution of jobs, Madras has more jobs, mainly in the tertiary sector, than resident workers. As of 1980, more than 40,000 workers commuted daily to the central city from peripheral areas, with about 60 per cent of the commuters coming from the towns of Tamtaram, Pallavaram and Alandur (Alan Turner, 1980). Outside the central city, Ambattur, Avadi and Madhavaram have been developing very rapidly, mainly because of well-developed road and railway links. Those municipalities now constitute the second most important concentration of industrial activity in the MMA, receiving growing numbers of commuters as well as permanent residents. Kattivakkam and Tiruvottiyur are also gradually developing as receiving areas.

E. The city in the region and in the national urban context

Tamil Nadu, with a population of about 48,000,000 in 1981, is one of the most urbanized states in India. About 30 per cent of its inhabitants live in urban areas, compared to the all-India average of 21 per cent. Although Tamil Nadu has developed three quarters of its irrigation potential, the highest of any Indian state, and has the third highest total rice production, there has been little growth in real agricultural net state domestic product in recent years. The fact that agriculture employs around 60 per cent of the labour force, and that nearly half of all farmers in Tamil Nadu are estimated to be landless, has contributed to migration to the state's urban areas, and particularly to Madras.

Tamil Nadu has a relatively large manufacturing sector, accounting for about 22 per cent of the net state domestic product, whereas trade, storage, banking and insurance contribute 19 per cent, reflecting the predominant role of Madras as the major commercial centre in the south of India. The MMA accounts for about 36 per cent of total capital and 42 per cent of value-added in manufacturing as well as 50 per cent of commercial tax collection and 45 per cent of total bank deposits.

The fourth largest in India, following the mega-cities of Calcutta, Bombay, and Delhi, Madras is the largest metropolitan area in the south of India. Because of India's sub-continental proportions, however, and vast distances, the linkages between Madras and India's other mega-cities have not been strong. Moreover, whereas Madras has traditionally dominated the urban hierarchy in the south of India, the pre-eminence of Madras in the south of India is gradually being eroded, partly by Bangalore, which grew by 5.8 per cent per year during 1971-1981 and which is becoming an important industrial city, and to a lesser extent by other ports - e.g., Cochin, Mangalore, Vishakapattanam and Tuticorin.

III. DECENTRALIZATION AND LOCATION

A. The evolution of spatial strategies

The Government of India's overall spatial policies have evolved gradually over the past three decades. They include a system of industrial licensing designed to promote balanced urban development; direct investment in government-owned enterprises, with preference being given to small towns and cities and rural areas at the expense of the largest cities; policies to equalize delivery prices of such basic products as cement, steel and coal among regions; the promotion of small-scale industries, particularly in small towns and rural areas; and the establishment of industrial estates as a means of dispersing industry from metropolitan areas to small towns and rural areas. Since about 1970 the Government has placed a great deal of emphasis on developing the country's backward districts. Most recently, the draft Sixth Plan (1980-1985) emphasized the need to promote small towns and medium-sized cities and called for a moratorium to be placed on investment in the very large cities. Whereas some of the policies and measures adopted over the past three decades have been successful in dispersing industry from the largest metropolitan areas, their impact on reducing the population growth of the largest Indian cities, including Madras, has been less than their possible damage to economic growth.

The first urban plan for Madras following partition was the General Town Planning Scheme, a physical plan prepared by the Madras Corporation and submitted to the state government in 1957. The Madras Interim Plan (1967) which followed was more comprehensive but was basically a physical planning exercise. It consisted of a land-use plan for controlling development within the city up to 1991, zoning regulations, and target populations for different areas within the city. The Interim Plan also outlined a number of urban renewal projects and recommended the establishment of a metropolitan development authority for Madras.

The subsequent Madras Metropolitan Plan (1971-1991) outlined a strategy of urban containment, which was in line with the national urbanization policy outlined in the Fourth Plan, and with attitudes towards urbanization prevalent among Indian planners at that time (Alan Turner, 1980). The Madras Metropolitan Plan sought to control the growth of the central city, mainly by absorbing migrants in outlying satellite towns. Specifically, the strategy proposed to construct satellite towns linked to the central city by a series of radial corridors, patterned after a strategy adopted in the Netherlands. In the case of Madras, the radial corridors were the main roads leading out of the city, along which growth was spontaneously occurring. Located at the end of the radial corridors, at distances of 35-45 kilometres from the core, the planned satellite towns were expected to function

eventually as counter-magnets. In addition, the Plan identified six "urban nodes" which would be located between the satellite towns and the central city, at distances of about 15-20 kilometres.

Both the satellite towns and the urban nodes were conceived as self-contained communities of 200,000-300,000 inhabitants, which would provide up to 90 per cent of employment, housing, and other urban amenities for their inhabitants (Alan Turner, 1980). The Plan estimated that by 1991 the nine urban centres would contain a total of nearly 2 million inhabitants, whereas Madras City would have a population of only about 3,600,000. The target population was based on the assumption that the flow of migrants to the city would be intercepted as the satellite towns and nodes developed, and that the rate of growth of the city would eventually taper off.

In 1974 the Madras Metropolitan Development Authority (MMDA) prepared a Master Plan outlining broad land uses. They were similar to the land uses proposed in the 1971 Plan, in that they were based on the promotion of corridor growth, satellite towns and urban nodes. The Master Plan also contained a series of development control rules but did not discuss how they would be enforced, and recommended that 26,000 hectares of land be acquired and be set aside for future urban development.

In the late 1970s, MMDA and a group of London-based planning consultants - Alan Turner and Associates - began preparations for a structure plan by examining three alternative development strategies. In considering the first strategy - continuation of the Master Plan - planners concluded that for the Master Plan to have a realistic chance of being implemented a massive relocation programme from the city to the urban nodes should have been well under way, and at least 600,000 persons should have been already resettled. In strategy 2, which assumed unconstrained growth, emphasis on the radial corridors was to be reduced and peripheral growth was to be encouraged. The areas to be served by extensions to the water supply and sewerage networks were to be given a high priority, as was the ring railway (which would create a peripheral growth corridor that would connect the inner nodes and would provide the opportunity for new nodes equidistant from the city). Strategy 3, which was the preferred strategy, assumed that the burgeoning growth of the city could not be significantly slowed down over the next decade; hence services should be provided in accordance with the trend. Up to 1985 strategy 3 was not very different from strategy 2, except that the ring railway was not to be constructed, but only the land reserved. After that date, however, it sought to shift public investment to the inner parts of the transportation corridors, with the intention of steering expansion away from further peripheral growth. Development of the outer nodes and the new towns was to be deferred until after 1991.

The three strategies were evaluated on the basis of a review of the investment programmes of various public agencies - e.g., the Department of Highways and Rural Works, the Southern Railway, the Water and Sewerage Boards (MMWSSB), the Tamil Nadu Housing Board, and the Tamil Nadu Slum Clearance Board.

The conclusions drawn from the analysis were that the Master Plan strategy was in need of considerable amendment and that realistic acceptance of growth trends was essential. Strategy 3 was considered to be most likely to respond to the city's future needs. However, it was acknowledged that it would require a great deal of continuing study and refinement in order to achieve the best results. As the planners concluded:

> "Strategy 3 is not a plan for a particular point in the future in the sense of having a finite number of projects and programmes for which an estimate of total investment can be made. The history of urban development shows that such plans have been utopian in nature, have been poorly related to available resources and have not, therefore, been implemented. Strategy 3 aims to provide a framework for expansion related to resources. The main objectives are: to recognize that many growth trends are only marginally responsive to intervention and to plan accordingly; to accept that major decentralization is impracticable, although limited redistribution may be achieved by appropriate policies to review and co-ordinate the programmes of government agencies in order to maximize the effectiveness of investments, recognizing that these investments will be independent of MMDA and that total sectoral resources are unlikely to be changed by the adoption of a plan or strategy; to monitor change and to review policies and programmes accordingly." (Alan Turner, 1980).

B. Current spatial strategies

Reviewing the major committed projects to be implemented in accordance with the Structure Plan, MMDA has long planned to shift the 150 year-old textile, grain and produce market from Kathawai Chavai in the heart of the CBD to a new site at Koyambedu, which is located some 10 kilometres from the CBD at the end of the central transportation corridor. The Master Plan and the subsequent structure plan also proposed shifting the iron and steel hardware market from George Town to the periphery and establishing truck and bus terminals at the ends of the three major transportation corridors, at Koyambedu, Alandur and Mandavaram.

Contingent upon the Government's formulation of a re-use plan (which would ensure that new businesses in the vacated areas would be less labour-intensive, thereby alleviating congestion in the CBD), the World Bank considered providing financial assistance to the market relocation project. Although no re-use plan was formulated and the project was not funded, the municipal government decided to go ahead with the relocation. However, whereas acquisition proceedings commenced in 1981, the case is still in the courts. Similarly, in regard to the proposed decentralized truck and bus terminals, the Alandur site has yet to be selected.

A second major project has been the development of Manali urban node. The first of the six urban nodes to be developed, Manali is an industrial suburb located 20 kilometres from the CBD (and 12 kilometres from the boundaries of Madras City) that developed more or less spontaneously during the late 1960s. Although it was the site of several important heavy industries employing several thousand workers (e.g., Madras Oil Refineries, Madras Fertilizers, Indian Organic Chemicals, Delhi Cloth Mills), Manali had serious housing and infrastructure deficits. Planners therefore concluded that Manali was a logical place to begin development, since the main task involved in developing the site would be to provide shelter and services for industrial workers already in the area, rather than the more difficult task of promoting growth at a greenfield site.

With respect to implementation, a master plan for Manali was prepared in 1973. Nearly 500 acres of land were acquired in the first phase and an additional 940 acres were acquired in 1983. More than 900 ready-built and group housing units financed by the Housing and Urban Development Corporation (HUDCO) were ready for occupancy in 1982/83, with first priority given to industrial workers in the area and second priority to persons whose land had been acquired for the project.

Initially projected to have a population of 250,000 by 1991, Manali's target population was subsequently scaled down to 70,000. However, as of 1983, Manali had a population of only a few hundred persons. Ironically, it has finally begun to take off because of difficulties in the land acquisition process. Specifically, when the sites earmarked for sites and services in the second Madras Urban Development Project (MUDP II) could not be acquired - even by the terminal year of the project - the World Bank acquired substitute sites at Manali. The population of Manali is currently estimated to be about 5,000 inhabitants.

A third major project has been the development of Maraimalai Nagar New Town (known as MM-Nagar) - the first of three proposed new towns intended to serve as counter-magnets to the MMA. Located 45 kilometres south of Madras on one of the major radial corridors, MM-Nagar, unlike Manali, has been developed on a greenfield site. Although 800 acres of government-owned reserve forest land were taken over to start the project, acquisition of the remainder of the land from private owners has been a major problem. Indeed, although acquisition proceedings for MM-Nagar were sent to the Government for a decision in 1979, no decision has yet been taken.

As a means of promoting industrial development, the government of Tamil Nadu extended various incentives - e.g., guaranteed loans, allotment of developed industrial plots on "easy payment terms", reduction in water and power tariffs, and tax breaks to large and medium-size industries. According to a 1983 report by the Madras Metropolitan Development Authority, there has been considerable demand for industrial plots at MM-Nagar. Of the 195 acres designated for industrial development, 139 had been alloted as of 1983 to a total of some 70 firms. In addition, 2,000 houses had been constructed and were scheduled to be allotted, with first priority given to persons whose lands were acquired for the site development and second priority to local workers.

IV. ISSUES AND SECTORS

A. The labour market

Madras has had a low participation rate (28 per cent in Madras City and 31 per cent in the MMA in 1971) compared with Bombay (37 per cent) and Calcutta (33 per cent), a phenomenon that is probably explained by the lack of employment opportunities in a static economy. Employment generation in Madras has not kept pace with population growth. Most employment has been generated in the tertiary sector, and the industrial sector has had negative growth. The small-scale sector (i.e., businesses employing less than 10 persons) has generated more than 40 per cent of all jobs in the MMA (Alan Turner, 1980). It pays very low wages, however, because of its low productivity, which is one of the major explanations for the city's low household incomes.

Most of the growth in employment in Madras has occurred in the informal sector, which employs between 50 and 70 per cent of the labour force. In the industrial sector, informal-sector activities consist mainly of household industries which use simple tools and family labour to produce products such as food, plastic goods, metal products and children's garments. In the tertiary sector, informal-sector activities are mainly low paid lines of trade or services - e.g., occupations such as construction worker, coolie, porter, animal handcart puller, rickshaw puller, petty trader, cobbler and scavenger (Alan Turner, 1980).

Efforts have been made to improve the efficiency and productivity of the informal sector in Madras and to integrate informal sector activities into the market economy, mainly by providing workspaces, extending credit at reasonable rates of interest, and improving access to raw materials and marketing facilities. In addition, a number of pilot training programmes were conducted during the 1970s to upgrade the skills of slum dwellers (in such areas as car driving, machine operation and handicrafts), as only 11 per cent of workers in Madras in 1971 were estimated to be skilled, compared with more than 30 per cent of workers in Bombay. Although 3,000-4,000 persons were trained during 1976-1982, the pilot programme was subsequently discontinued, partly because of attrition (thought to be brought about by unfulfilled expectations, because wages received in the training programme were higher than those later received in the open market).

B. Urban land

Land acquisition in Madras - which has been traditionally governed by the Government of India's Land Acquisition Act of 1894 - has typically been a very slow process, sometimes taking as long as 10 years

between notification and final purchase. In 1985, as a means of facilitating the acquisition process, a new land acquisition act was adopted. The procedure is as follows: once a parcel of land has been notified, the Government has to acquire it within three years. Indeed, the proceedings are terminated if not completed within this time period. The rationale was that a three-year time limitation would bring the level of compensation at the time of purchase closer to the market value, thereby reducing the number of challenges from landowners. Ironically, the new act may actually lengthen rather than shorten the duration of the procedures, making it more difficult for the Government to acquire land. For example, whereas objections were previously heard by the local authorities, under the new act the Government must decide at the outset about the merits of the objections. In effect, this requires local authorities to transmit records to the Government at two stages rather than one. Given the volume of acquisition cases, the minimum decision time required by the Government is now about one year.

A related problem is that there are complicated links with existing legislation. To cite one example: under the new land acquisition act, land within the urban centre cannot be acquired without clearance from the Urban Land Ceiling Authority. The logic behind this is that land acquired by the Government under the ceiling act would be cheaper. In practice, however, ceiling proceedings typically take about twice as long as regular land acquisition proceedings. The new act may also make it harder to acquire land for slum improvement programmes. Whereas the slum clearance act of 1959 made provision for the Government to acquire land and to undertake improvements when there was a threat to public hygiene, the slum clearance act has recently been struck down on the grounds that the procedures are potentially less favourable to the landowners, who have only one opportunity to state their objections, as compared with two in the new land acquisition act. However, perhaps the major problem with the new land acquisition act is the method of compensation, which consists of adding 15 per cent to the registered value of comparable land. Because the registered value is typically only about 50-60 per cent of market value, this is still a long way from the market value.

Finally, as in many of the world's mega-cities, speculation is a major land-related problem in Madras, with agricultural land in particular becoming a prey to speculators. Chiefly as a means of safeguarding land for food production, the government of Tamil Nadu decided that it would no longer acquire irrigated land. Moreover, the Tamil Nadu Housing Board (TNHB) has been banned from developing house sites on agricultural land. However, agricultural land on the periphery of the city - particularly in the south - is being rapidly developed by private landowners, who have been quick to realize large capital gains. For example, land on the southern periphery which in the records is still classified as agricultural land currently sells at very high prices.

C. Housing

There has been a low annual output of housing units in Madras (some 6,000 legal units have been produced annually by governmental housing agencies and the private sector, against estimated annual demand for 30,000-40,000 new units). Because of longstanding neglect of housing programmes for the urban poor, one of the most serious problems facing planners has been the proliferation of slums and squatter settlements (Alan Turner, 1980). As of 1976, more than 200,000 households, about one quarter of the city's total population, were estimated to be living in slum areas, which were growing at an average annual rate of 4.5 per cent (D'Souza, 1985). Another 361,000 households were estimated to be living in over-crowded tenements, bringing the total number of persons living in substandard housing to around 3,200,000 - more than three quarters of the city's total population.

During the 1970s, the major emphasis of the Tamil Nadu Slum Clearance Board (TNSCB) was on clearing slums and relocating slum dwellers. Under the current slum clearance scheme, multistoreyed buildings are erected for the slum dwellers on the same site, with necessary services and communal facilities. However, a major problem has been the fact that slum families have sold off their rights and moved back to their villages (hence TNSCB has, in effect, been subsidizing urban households with higher incomes than the intended beneficiaries). Mainly because of the high cost of clearance programmes and the large subsidies required to provide new housing for the relocatees, there has been a growing emphasis on improving rather than on clearing slums (e.g., by providing water, sanitation, electricity, granting security of tenure, setting up self-employment schemes). This approach crystallized in the World Bank-assisted Madras Urban Development Programme (MUDP I), which was approved in 1977 and which focused on three sites and services areas. The subsequent MUDP II was approved in 1979 and is currently being implemented on four sites. Taken together, the two IDA-supported projects were designed to provide 28,500 new sites and services plots and to improve slum neighbourhoods housing 73,000 households. In terms of actual performance, about 5,000-6,000 sites and services plots have been developed annually, whereas 8,000-10,000 plots have been improved, with tenure granted to about half of the beneficiaries.

In the sites and services component of MDUP I and II, which aimed at providing low-cost affordable shelter on a significant scale, the Government restricted its role to acquiring land, laying out plots, providing infrastructure (e.g., access roads, drainage, sewerage and water supply), constructing community facilities such as schools and clinics, and setting up small-scale industries and workshops to create new employment. In order to achieve the difficult objectives of

supplying 60-70 per cent of the plots to households below the poverty line (i.e., to households below the 45th percentile in income distribution) and recovering the full project costs, packages combining mixed land uses, standards and prices were put together for each project site. Standards and costs were kept low on plots set aside for the poorest households, and the land was sold to the beneficiaries at less than its development cost. The remaining larger, better located plots were then sold to residential and commercial customers at market prices, with the profits used to cross-subsidize the low-priced lots (The Urban Edge, 1985).

An important feature of sites and services projects in Madras has been the ability to adjust elements within specific projects in response to changing economic conditions. To compensate for rising land and construction costs, for example, the minimum size of the plots was reduced from 40 to 35 square metres. To cut project costs still further, the roof now has to be built by the owner. Experimentation has also taken place in designing plot sizes and core structures for various income groups. At the outset, options ranged from 35- to 47-square metre plots and from a core with a toilet and washroom to a small completed structure. Over time, the various options were adjusted in response to demand (which was determined by the number of applications for different types of plots).

With respect to housing finance, the various low-cost combinations in Madras sites and services projects typically come with an optional home improvement loan. Recently, a number of commercial banks have agreed to set aside a small line of credit for housing construction loans for low-income families. In addition, the Tamil Nadu Housing Board (TNHB) has been borrowing funds from the Housing and Urban Development Corporation (HUDCO) and then lending them to low-income project beneficiaries. For construction on higher-income plots, private housing construction finance is available from HUDCO. Because of MMDA's commitment to a policy of cost recovery, 90 per cent of total monthly receipts are currently being collected in sites and services projects. (The revenue is deposited in a revolving fund that was set up as part of MUDP I to finance future sites and services projects.)

The slum improvement component of MUDP I and II has aimed at granting security of tenure (patta) to the residents of slums located on government or corporation land. Slum dwellers located on private land who constitute 45 per cent of the total and residents of areas where improvement is not a realistic possibility (e.g., along river banks) cannot be given tenure. In areas to be upgraded, basic infrastructure improvements generally include: broadening roads and paths; street lighting; refuse collection; provision of communal water and sanitary facilities - at a ratio of one per every 10 households; construction of

primary and secondary schools; and establishment of cottage industry centres at a ratio of one per every 365 households. Although there is no income criterion for the beneficiaries of slum improvement programmes, in contrast to sites and services, one of the most difficult aspects of the slum upgrading schemes has been cost recovery (Lakshmanan and Rotner, 1985). The rate of collection, which began at nearly zero, has improved steadily, however, through the use of an incentive scheme for local tax collectors.

D. Water supply and environmental problems

Madras faces a perennial scarcity of water. The present supply, which is about 40 per cent below requisite levels, depends on a single monsoon. If the monsoon fails, even for a year, there is serious drought. (In 1981, following a two-year drought, the situation was so severe that the Chief Minister of Tamil Nadu proposed transferring the city to the banks of the Cavvery River some 125 kilometres south - a proposal that was quickly dismissed by the media and opposition parties.) About 80 per cent of Madras's water supply comes from reservoirs recharged by surface water. The remainder comes from local wells within the city limits. Among the major problems are heavy losses through evaporation, seepage and leakage, and a limited and aged distribution system. Indeed, the core of Madras's present distribution system was designed in 1911 for a projected 1961 population of 660,000 (a target that was reached some two decades earlier). Limited to the city proper, the distribution network will not allow for new developments to be connected to the existing mains.

According to World Bank estimates, only about 42 per cent of the 5 million residents of metropolitan Madras are connected to the piped water distribution system (Lakshmanan and Rotner, 1985). More than 2,800,000 persons depend on public standpipes, in some instances at a ratio of 240 persons to a pipe. Although a major water supply project was approved for Madras in 1978, it was never implemented. The Government's most recent effort, which is likely to be supported by a $US 100,000,000 loan from the World Bank, is an immediate augmentation project. The project, which involves drilling well-fields in an underground aquifer 80 kilometres to the west, is expected to increase the supply by 30-40 per cent. It mainly involves undertaking works to improve the re-charge from river runoff during the rainy season and implementing programmes of water management and leak detection.

The Madras sewerage system, which was designed in 1910 for a projected 1961 population of 660,000, is seriously deficient (Alan Turner, 1980). The collection network is limited and does not extend beyond the city boundary into the metropolitan area. The treatment

capacity is also inadequate, hence raw sewage flows freely into the natural water courses. Only 1,600,000 residents of the MMA are served by the existing piped system. However, there are plans to extend the distribution system as part of the World Bank's forthcoming loan. Solid waste disposal is another serious problem in Madras. An estimated 4.5 lakh tons of solid waste are collected annually by the Madras Corporation. Carried by bullock-carts and lorries, the solid waste is conveyed to several dumping sites to be used for landfill. Because there is no centralized treatment, the solid waste is not converted to a stable form prior to being used as landfill. This creates problems of pollution and waterlogging in surrounding areas.

E. Power

For its power supply, Madras is dependent upon three thermal stations and 18 hydro stations, the latter of which depend upon the monsoon to fill up their reservoirs. Frequent failures of the monsoon, however, have left the reservoirs only partially full. In recent years, Madras has experienced severe power failures as well as loadshedding and peak-hour load restrictions. These difficulties have caused a drop in industrial output, discouraged the establishment of new industrial units, and necessitated sometimes drastic rationing. In January 1983, for example, following a 15-day total power stoppage, the Tamil Nadu Electricity Board (TNEB) offered industries the alternative of 50 per cent power for one shift daily or 20 per cent power for all three shifts.

As a result of the recent purchase by Tamil Nadu of power from the state of Kerala, the supply situation has improved somewhat for industrial users, although electrical power remains a serious long-term problem.

F. Health and education

Until recently, the health care system of Madras, like that of Calcutta, was mainly curative and hospital-based. Lower-tier facilities were poorly distributed and provided inadequate health care services. An important component of the second Madras Urban Development Programme (MUDP II) is to limit and upgrade the functions of the city's large hospitals and to shift the emphasis from curative to preventive, primary health care, involving supplementary nutrition, immunization, health and nutrition education, and functional literacy training programmes. A pilot preventive health care project, which had a target population of 22,000 families has also been implemented.

Several studies have shown that the acceptance rate of family planning among low-income households in Madras, and particularly among the city's slum dwellers, has been very low. In 1985 a two-month intensive family planning campaign, which aimed at creating awareness of the benefits of adopting the small family norm, was undertaken by the government of Tamil Nadu. As part of the related publicity programme, government officials flew over slum areas, dropping pamphlets which promoted the benefits of the small family norm and provided information on financial and other incentives offered to couples who agreed to adopt family planning. It was reported that during the campaign hundreds of sterilizations - and particularly tubal ligations - were performed each day in the city's hospitals and clinics (Population Headliners, May 1985).

There are serious deficiencies in the city's educational system, particularly for younger children. During the late 1970s, it was estimated that, although some 80,000 children aged 6-14 were not enrolled in school, the city's primary schools were still overcrowded. Another area requiring improvement is vocational training. Out of 147,000 applicants in Tamil Nadu in 1979/80, only 7,700 were admitted to training courses (Alan Turner, 1980).

G. Transport

Buses are the principal means of public transport in Madras. Carrying an average of 1.7 million passengers daily, they accounted for 42 per cent of total person trips in 1980. The average increase in ridership has been more than 7 per cent per annum. (Following a sudden increase in gasoline prices, which caused car and taxi users to change to buses, the number of passengers increased by 46 per cent during 1973/74.) Buses are severely overcrowded during peak periods.

The Pallavan Transport Corporation, which is the sole operator of buses in the MMA, operated quite efficiently for many years, winning an all-India productivity award. Difficulties arose, however, when rising fuel costs resulted in significantly higher operating costs. Because the government of Tamil Nadu was unwilling to raise public bus fares, the World Bank suspended an already approved transportation loan for the replacement of nearly 500 aged buses. After more than a year of negotiations, the state government decided that it would raise the fares by about 40 per cent.

Because of its low levels of per capita income, Madras has relatively low levels of automobile ownership. As of 1977 there were some 24,000 cars. Although the number has been increasing, the increase has not kept pace with population growth. In addition, there are some

33,000 motorcycles and scooters, 3,500 taxis, 1,700 auto rickshaws and 6,000 cycle rickshaws in Madras. Because there is no licensing system for bicycles, there is no accurate record of their numbers. Bicycles are an extremely important transportation mode for the city's poorer residents, however, accounting for more than 20 per cent of total person trips (Alan Turner, 1980).

The road network in Madras is functionally incomplete. Moreover, many roads have poor surfaces and inadequate storm water drainage. Investment in the transportation sector in recent years has been mainly in road construction, road improvement schemes, and the construction of flyovers and bridges. There has been growing awareness, however, of the role of the informal transportation sector (e.g., walking trips, bicycle trips, the movement of goods by cycle rickshaw and bullock cart) in meeting the transportation needs of the city's poor. As a result, current projects include improvement of some 200 kilometres of footpaths, 50 kilometres of cycle paths, and the construction of pedestrian subways.

V. RESOURCES AND MANAGEMENT

A. Public investment

Before 1970/71 annual investment in Madras averaged about Rs 100 million. With the start of the MUDP I it rose to Rs 300 million, and under MUDP II it rose to Rs 920 million. In the late 1970s, housing received about one third of total expenditure, followed by roads (14 per cent), communications (12 per cent), bus transportation (11.5 per cent), sewerage and drainage (8.8 per cent) and public health (8.5 per cent) (Alan Turner, 1980). Water suply received an average of only 5.7 per cent of total expenditure. Unlike the situation in Delhi and Calcutta, the Madras Metropolitan Development Authority (MMDA) has no budgetary powers. Investment decisions are made by the various sectoral agencies, although they are closely supervised by the government of Tamil Nadu.

B. Resource generation

In 1979/80 annual revenue of the Madras Corporation was Rs 204.5 million, of which governmental grants accounted for only Rs 12.3 million. Unlike Bombay and Delhi, which rely mainly on octroi (a duty levied on goods entering the city) as a source of revenue, Madras's major source of local revenue is property taxes, which account for more than half of the total. Because of under-assessment and poor collection, property taxes have declined in recent years, despite rapidly rising land values. The MMDA has explored the possibility of increasing property taxes by basing them on an assessment of what the land would be worth on the open market. However, no decision has yet been taken by the state government. Other sources of revenue at the local level are the tax on professions, the company tax and the advertisement tax, as well as a surcharge on the state sales tax.

In an effort to promote cost recovery, metering of the water supply in Madras was introduced on an experimental basis in 1982 in new areas under construction. However, because of continuing water shortages, the feasibility of metering was re-evaluated, determined to be impractical, and therefore discontinued. Alternative measures such as tap charges and/or restricting metering to heavy users are currently under discussion.

C. The institutional context

The responsibility for the operation of urban services and the implementation of urban projects in Madras lies with more than 50 governmental, parastatal and municipal organizations. The Madras

Corporation, which was established in 1919 and is one of the oldest city governments in India, is primarily responsible for water supply, sewerage and drainage, solid waste disposal, elementary education, and general urban services. It shares the responsibility for providing public health care services and shelter with the government of Tamil Nadu. Policing, mass transportation, electricity and telephones are controlled by the government of Tamil Nadu and the central Government.

The Madras Metropolitan Development Authority (MMDA) was established on an ad hoc basis in 1972 and became statutory in 1974. In its first several years of operation, MMDA concentrated mainly on physical and land use planning. When entrusted with the task of putting together a multisectoral project for World Bank assistance, it began to expand its activities into development programming and administration (Sivaramakrishnan and Green, 1983). Currently, MMDA is a planning and co-ordinating agency which is charged with formulating master plans, preparing detailed development plans for the urban nodes and the satellite towns in the MMA, overseeing land use controls, co-ordinating urban development projects, and monitoring and evaluating World Bank-assisted programmes. It consists of a structure plan division, a new towns division, and divisions concerned with special projects (e.g., relocation of the wholesale market complex), slum improvement, finance, and sites and services. The MMDA lacks budgetary powers (its only sources of revenue are a small surcharge on municipal taxes and contributions from local authorities) and has no implementation wing. However, in a city with a strong tradition of interagency co-operation, it is probably the "first among equals," serving as the conduit for funds from international donor agencies such as the World Bank. The MMDA has a capable planning staff and the World Bank has recommended that it be strengthened and given budgetary powers. With respect to the implementation of urban projects, various departments and statutory bodies controlled by the government of Tamil Nadu (e.g., the Madras Metropolitan Water Supply and Sewerage Board, the Tamil Nadu Slum Clearance Board, the Tamil Nadu Housing Board) are responsible for the management of specific sectors.

Overall, municipal government in Tamil Nadu (and in India's southern states on the whole) is more integrated with the state administration than elsewhere in India. This is shown by the supervisory powers of the government of Tamil Nadu, which include detailed financial control over municipal taxation, budgets, expenditure and accounts, as well as a state-wide unified cadre of personnel.

CONCLUSION

The process of urbanization over the past decade in Madras has been quite different from that envisioned in the earliest plans for the city (e.g., the Madras Metropolitan Plan and the subsequent 1974 Master Plan), which aimed at attracting migrants to urban nodes and satellite towns outside the core. Only one of the proposed satellite towns (MM-Nagar) and one of six proposed urban nodes (Manali) have been constructed, and their combined populations are still less than 10,000 inhabitants. If the Master Plan strategy had been on target, a massive relocation programme from the city to the urban nodes should have been under way for a number of years, and about 600,000 persons should already have been resettled.

One of the major constraints to the development of the satellite towns has been the slow pace of acquiring public land. Another is the fact that housing - which was the major public investment in the satellite towns - was not a sufficiently strong incentive to attract middle-income families, whereas standards were too high for most lower-income households. Moreover, in both Manali, which had some pre-existing industrial activity, and MM-Nagar, which has been developed on a greenfield site, there has been little emphasis on creating employment. More fundamentally, given the deceleration of the city's population growth (and the lack of stimuli from outside the region, whether in terms of the entry of new firms or the arrival of new migrants), there is not much pressure for sub-centre growth.

Growth has occurred in Madras where it was meant to be prohibited. Continuing densification of development within central areas of the city has occurred, despite the intention of the plans to limit such a build-up. Likewise, the limits of the urbanized area have been expanding steadily outward, not only in the linear corridors designated for development but also in the areas between them. Throughout the region several unplanned local centres have been growing in response to market forces. Although they currently perform mainly lower-order retail and commercial functions and their expansion into sizeable local centres may take a number of years, they have clearly been competing with the planned satellite towns and urban nodes (Alan Turner, 1980).

One of the major reasons for this spontaneous growth is that land-use controls aimed at restricting development in certain areas have been widely evaded. A current example is the ban on development south of Thiruvar in order to preserve the water aquifer belt, which has been enforced for public agencies but not for private developers. Another is that restrictive industrial location policies such as the Government of India's 1977 ban on large- and medium-scale industries, although aimed at reducing the number of industrial jobs and thereby reducing

concentration in the central city, have had effects different from those intended. Indeed, the net effect of such policies has been to throw greater emphasis on informal sector employment rather than to reduce the absolute number of jobs. The recent growth of Madras, sluggish though it has been, owes more to private sector initiative and market forces than to metropolitan planning and government policies.

REFERENCES AND SELECTED SOURCES

Government documents

Madras Metropolitan Development Authority (1980). "Development of Maraimalai Nagar New Town".

Madras Metropolitan Development Authority (1982a). "Manali Urban Node: a brief summary".

Madras Metropolitan Development Authority (1982b). "Madras: facts and figures".

Madras Metropolitan Development Authority (1982c). "The plan for a better city".

Tamil Nadu Slum Clearance Board (TNSCB) (1982). The physical and financial progress report for the quarter July-September.

Other sources

Bradnock, R.W. (1981). "India's cities: hope for the future?", Geography, vol. 292, No. 66, part 3 (July), pp. 208-219.

D'Souza, Neela (1985). Providing shelter for low-income groups: project in Madras", The Bank's World (July), pp. 16-18.

Economic and Social Commission for Asia and the Pacific (ESCAP) (1985). Population Headliners (May).

Gupta, Devendra B. (1985). Urban Housing in India. World Bank Staff Working Paper No. 730. (Washington, D.C., World Bank).

Lakshmanan S. and E. Rotner (1985). "Madras, India: low-cost approaches to managing development", pp. 81-93 in John P. Lea and John M. Courtney (eds)., Cities in Conflict: Studies in the Planning and Management of Asian Cities (Washington, D.C., World Bank).

"The Madras experience: hard-won successes in sites and services upgrading projects" (1985). The Urban Edge, vol. 9, No. 10 (December), pp. 8-10.

Sivaramakrishnan, K.C. and Leslie Green (1986). Metropolitan Management: The Asian Experience. (Oxford, Oxford University Press).

Turner, Alan (1980). Structure Plan for Madras Metropolitan Area. Vols. 1 and 2. (London, Alan Turner and Associates).