CHAPTER V

MADRAS CITY - INFRASTRUCTURE
AND ENVIRONMENTAL ISSUES

Infrastructure in Madras City

The larger the city, the higher is the total cost of services. There is a need for balancing population and resources at the regional as well as the national levels. Hence the national policies including foreign policies of governments such as liberalization would have to be considered and developed into micro level policies,\(^1\) to effectively deploy Indian and foreign aid and resources.

Agencies that provide infrastructural services are the municipality - in the case of Madras City, the Corporation of Madras - the State Government, the Union Government with or without the financial assistance from international bodies and voluntary agencies. The core services of metropolitan infrastructure comprises water supply, sanitation, lighting, roads, education, health care, telecommunication, cultural goods, leisure-time services and transport. The first three come under the sole purview of the city government whereas the others

are the shared responsibilities at all levels of Government, local, state and national.

The resources for provision of these utilities are derived from the state and local finances. The payment of fees or charges for these services could meet only part of the total cost incurred for their provision.

Institutions for Infrastructure in Madras City

There are two types of agencies:

(i) within metropolitan jurisdiction and

(ii) agencies with larger jurisdiction which cater only to the city of Madras.

Examples of the former are:

Madras Metropolitan Water Supply and Sewerage Board,
Pallavan Transport Corporation,
Dr. Ambedkar Transport Corporation,
Madras Metropolitan Telecommunications Board and
Madras Metropolitan Development Authority.

Under the latter include:

Tamil Nadu Water Supply and Drainage Board,
Tamil Nadu Housing Board,
Tamil Nadu Slum Clearance Board and
Tamil Nadu Small Industries Development Corporation.
In Tamil Nadu, the Tamil Nadu Town and Country Planning Act provides for preparing and implementing planning schemes and envisages taking possession of minimum land required for major traffic network alone and power of attorney obtained.

Inspite of these specialist agencies, infrastructure problems are persistent in Madras. Major constraint is finance. These have not only eroded the functions and responsibilities of the Corporation of Madras but also make it less responsive to the needs of the people.

**Working of the Corporation of Madras**

Madras city has grown from a small trading and fishing village to one of the largest cities in India.

Madras is the fourth largest city in India and was founded in 1639 by the East India Company; it has always been a capital city; initialy of the then Presidency of Madras and now the State of Tamil Nadu. The Corporation of Madras which is more than 300 hundred years old has its jurisdiction over an area of 172.42 sq.kilometers with a population of 5 million.

The development of Corporation of Madras can be subdivided into distinct phases. The first phase, between 1833 to 1870, witnessed a highly centralised form of Government under the Imperial System of Finance. In the second phase beginning in 1870, a large income as receipts came from local rates

and cesses and management of the income had been entrusted to local bodies. In the third phase between 1907-1908, further decentralisation was carried out. In the fourth phase between 1909-1935 was the inauguration of Provincial Autonomy. Under the Government of India Act of 1935 there was impetus to the development of Local Government, which the Constitution of India, 1950 endorsed.

As per the provisions of the Madras City Municipal Act, 1961, the Corporation of Madras has an elected Council with hundred members. The Council is to be presided by a Mayor to be elected from among the Councillors. The administrative head of the Corporation is a Commissioner, normally drawn from the Civil Services. The City of Madras has been divided into twelve ranges and further sub divided into ten divisions each. There is an Assistant Commissioner for each range and also a District Engineer, City Engineer, Drainage Engineer, Water Works Engineer, City Health Officer, and Accounts Officer. The collection of taxes is undertaken by the Revenue Department. In the present non-functioning of the elected Council of the Corporation of Madras for the last two decades, a Special Officer appointed by the State Government, performs the functions of the Mayor. Various functions are performed by different committees such as: Accounts Committee, Education Committee, Health Committee, Taxation and Finance Committee Town Planning and Improvements Committee, Public Works Committee. For instance, the Health Committee deals with the health problems and the health services. Day to day civic problems and provision of civic amenities to the people demand adequate
attention. The Health Department is headed by the Health Officer. It is divided into various sections and each section provides its services to the citizens. Funds are provided for each division under various heads of accounting according to the needs of the city. The estimates are put up by the respective circles and they are sanctioned by the competent authorities according to the monetary limits as prescribed in the Madras City Municipal Act of 1961. Subject to such rules and the detailed specification of services, it is the duty of the Health Committee of the Corporation to make the provision for carrying out the requirements of the City. The working of all other Committees are more or less on the same pattern as above. Per capita receipts and expenditure of the Corporation of Madras are increasing over the years. But the dismally low and inadequate provision of services are not nearly because of the lack of resources but mainly, because of the non-functioning of the local government in its proper sense.

Table 5.1
RECEIPTS AND EXPENDITURE OF THE CORPORATION OF MADRAS 1988-93

(Rupees in lakhs)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Population</th>
<th>Receipts</th>
<th>Receipts per capita</th>
<th>Expenditure</th>
<th>Expenditure per capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>1988-89</td>
<td>39.32</td>
<td>78.86</td>
<td>200.56</td>
<td>92.56</td>
<td>235.40</td>
</tr>
<tr>
<td>1989-90</td>
<td>40.06</td>
<td>80.48</td>
<td>200.90</td>
<td>80.48</td>
<td>200.90</td>
</tr>
<tr>
<td>1990-91</td>
<td>40.71</td>
<td>90.34</td>
<td>221.58</td>
<td>90.34</td>
<td>221.58</td>
</tr>
<tr>
<td>1991-92</td>
<td>41.40</td>
<td>10.56</td>
<td>225.19</td>
<td>10.56</td>
<td>225.19</td>
</tr>
<tr>
<td>1992-93</td>
<td>42.00</td>
<td>13.12</td>
<td>312.52</td>
<td>12.57</td>
<td>299.31</td>
</tr>
</tbody>
</table>

Power Supply

There exists a chronic power shortage in the city of Madras and in the MMA, which hampers industrial activity. Power cuts ranging from 75% were imposed on High Tension Industries and at present there is power cut of 20% for these industries. Load shedding and low voltage caused many problems for the operation of the grid.

The Ennore Thermal Station (450 MW) is the only generating station within the MMA. Ennore Thermal station has been connected to the 230 KV network and also to the 110 K.V network. The 33 KV system comprises 35 sub-stations with a total transformer capacity of 440 MVA. The 11 K.V. network is operated on radial feeder principle. There are about 82 outdoor switching structures located in MMA. The load consists of mainly domestic, commercial and industrial power loads.

There were 6,83,933 consumers with a connected load of 1379 MW as on 31-3-1987, which includes H.T.Supply, Domestic supply, Public Lighting, Agricultural, Huts, Commercial and others. In 1986-87, the per capita consumption was 416 units and as per projections in 1997-98, it will be 824 units and in 2011A.D. it will be 1000 units.

Tariff is essentially based on cost of generation and supply. The cost is influenced by operation, maintenance and other expenses. There is a good network of transmission and distribution lines, generation mix, i.e. quantum of power from Hydel, Thermal, Atomic sources and purchase of power from other
states. However the tariff structure is not satisfactory. It could be fixed in such a way, that not only the end cost is recovered from the consumers but also a reasonable percentage of profit is made.

Electricity is supplied to the consumers on a long term permanent basis and also on a temporary basis. The tariff for the H.T, L.T, and temporary services are different. In the case of H.T. supplies two part tariff is applied. The tariff for L.T. and temporary services is based on consumption recorded in the meter only. In the case of L.T. consumers, a minimum monthly charge is collected irrespective of whether energy is consumed or not. The tariff for electricity can be notified by the Board itself as per the Electricity Supply Act. But in Tamil Nadu, tariff is fixed by the State Government.

Power is supplied to the MMA through a distribution network consisting 855 Kms of underground 11 KV cables, 1265 Kms of 11 KV overhead lines, 2483 distribution transformers of capacity ranging from 50 KVA to 500 KVA, 4328 Kms of LV underground cables, and 10,407 Kms of L.V metered lines. Two stage transformation of 110133/11 K.V. shall be adopted in the densely developed inner city. Transformers have a capacity utilisation factor of about 70%.

Total power consumption in the state in 1992-93 was 18,988 m.u. It increased by 11.43% from the previous year. Madras city is the largest consumer of power in the State of about 3504 million units (m.u.) followed by Coimbatore (2775 m.u.). Madras, Coimbatore, Salem, Chengalpattu MGR
and Thiruchirapalli are the five districts which together consumed 55% of the total power consumption in the state in 1992-93. Per capita consumption level of Madras is 710 units whereas at the State level it is 370 units. Power supply to the city is the responsibility of the State Electricity Board and not that of the Corporation of Madras.

Transport Sector: Issues and Options

The present road network is dominated by the radial system and corresponding to railways, there are main arterial roads like, NH5, and NH45. The road network in Madras is about 90 km arterial roads and 470 kilometers of collector-distributor roads. Five predominant radial corridors emanate from the centre of the city. They are supplemented by other radial roads to carry local traffic. This network is not adequate to disperse the heavy traffic smoothly to various parts of the city. The land available for transport is less than 50%. The insufficiency of road network amounts to 35% of the total length of roads, even to meet the current requirements of traffic. The number of motor vehicles registered in MMDA is about 5,17,750 and two wheelers constitute about 52%. George Town is the Central Business District (CBD) of the metropolitan area and attracts and generates the largest number of vehicular trips. The population density generally decreases from the CBD to the periphery from 58,000 per sq.km in CBD to 13,000 per sq.km in the newly developed residential areas.

Madras had the benefit of several major studies for transport planning which included Madras Area Transport Study (MATSU 1968), Integrated

Transport Planning (1977) and MMA Traffic and Transport Study. Some studies have also been made by the different transport corporations covering different transport sectors. As a result of these studies many major projects have been taken up, the most important being the construction of the Inner Ring Road and Mass Rapid Transit System (MRTS) Rail between Beach station and Luz upto Taramani (in due course) taken up by the Metropolitan Transport Project (Indian Railways).

The road traffic builds up from the south through Anna Salai, (Road) from the west through Periyar EVR Salai and from the North through GNT Road and reaches a peak on the periphery of George Town. However, there is a considerable movement of traffic from North to South passing through Wall Tax Road and Rajaji Salai to and from the Southern residential areas to the industrial areas on the north.

The average daily traffic within the city is 41.26 lakh per km of which 48% is along the radial corridors. While the modal split is 55:45 between public and private transport modes, the share of bus and rail in the total mass transportation trips is 84:16. There has been a steady growth in the number of vehicles, especially two-wheelers, which constitute about 52% of the total number of motor vehicles.

The bus system is operated by Pallavan Transport Corporation (PTC) which had a fleet strength of 2202 buses in 1990, and operated along 439 routes of which only 75 routes were considered to be economical in operation. The bus
system is the preferred mode of travel because of lower fare structure on buses, inadequate facilities for inter nodal transfer from bus to rail and vice versa and bus transport operates more as a competitor to rail system rather than complementing it. The growth rate of metro buses has not kept pace with the increasing demand for public transport. Its growth rate of 1.1% between 1981 to 1988 is less than the growth rate of population. Madras has the lowest supply of buses per 1000 population (0.39) as compiled to Bombay (0.45) and Singapore (3.38). The number of goods vehicles in Madras has increased from 6671 in 1980 to 22516 in 1990. At present, the movement of goods vehicles is considered as a nuisance and hazard to other users and several restrictions are placed on their movement which place an economic cost on the city.

Except for the extension of the Inner Ring Road, there are no new road construction projects. The NH by-pass connecting Tambaram with Red Hills has not reached a stage where construction can start. The efforts to decentralise the city by allocation of wholesale markets and construction of container terminals on the three arterials will also benefit the road traffic in MMA and Madras city.

Even with the massive shift to railway system from present 6 lakhs to 43 lakhs, the road based bus system will have to bear the brunt of future mass transport trips. From the present 34 lakh it will increase to 47 lakhs in 2001 and 66 lakhs in 2011. The World Bank assisted urban development projects have helped the PTC to add additional buses, construct terminals and depots in order to increase its level of services. The increase in passenger transport
both by personalised vehicles and buses would demand segregation of truck traffic in order to create additional capacity for it and reduce the hazards to passenger movement.

Automobile traffic continues to be a major environmental hazard. Non polluting modes of transport, and check on vehicle emissions by drastic action and penalties are some of the strategies suggested. Citizens participation is of utmost necessity in several ways from civic education to watch dog role.\(^4\)

Sanitation in Madras

Sewerage system in city began in 1890; open drains were connected to pumping stations. Local pumping stations discharged the sewerage into the sea.

Though Madras had its sewerage system earlier than other parts of the state, its expansion and coverage have not been commensurate with the growing population. The underground sewerage system based on gravity was first initiated in 1907, became operational in 1920 and it was designed for a population of 6.5 lakhs to be reached in 1961 on the basis of 114 lpcd. (litres per capita per day) The census of 1961 recorded a total population of 17.29 lakhs. From its very inception, therefore, there has been a wide gap between requirement and provision and this gap is widening persistently with the population growth far outstripping the growth rate of basic facility. At present, the extent of

sewerage system is 128.83 sq.km i.e 85% of the city population requirement. Nearly 15 lakhs slum dwellers have very marginal access to this system.

Due to the inadequacy of this system, the overflow from the pumping stations is let out into the waterways of Cooum, Buckingham Canal and Adyar. According to a recent survey, there are 27 outlets discharging about 20 mld (million litres per day) of raw sewerage into Cooum and 8 outlets discharging 14 mld into Buckingham Canal. In addition, the partially treated effluents from the treatment plants from Koyambedu and Nesapakkam, meagre water supply makes treatment complex and the Madras Sewerage is highly concentrated.

The existing system consists of a large number of collection areas or micro systems each with a pumping station conveying flow into five major macro systems. Roughly 85% of the pre-1978 population of the city is covered by a sewerage system. In other areas, water carriage toilet system with individual septic tanks for each house is provided.

Deficiencies in the Sewerage System: (i) Inadequate capacity of sewers and pumping stations; (ii) Incomplete treatment at treatment plants contribute to pollution of waterways; (iii) Entry of storm water into the system during rainy season and thereby overloading the pumping system; (iv) Entry of cattle-waste, chemical effluents, resulting in clogging of sewers and (v) Non service of slum areas at the low-lying and newly extended areas.5

5. Ibid, p. 85.
The traditional method of disposal of city sewerage is to pump it into the sea, which was in practice till the past 20 years. The next alternative was to treat the sewerage to the required standard and divert it to the nearby natural water course, which will ultimately join the sea. For this purpose, four sewerage treatment works were constructed as follows with different capacities.

Kodangiyur, 150 MLD

Koyambedu, 35 MLD

Nesapakkam, 22 MLD

Palliakaranai, 45 MLD

Adequate land was acquired for constructing these plants and the treated effluent is used to grow fodder grass and teak plantations. Recently, a project was started with the assistance of Japanese Government to subject this water to treatment and this treated water can be utilised by industries.

Under the guidance of the Department of Environment and Forests, a detailed study was conducted on the extent of pollution in the Cooum, Buckingham canal, and Otteri Nallah. All these water courses are charged with stiff consolidated sludge which are nearly 40 years old. This is due to various reasons like slums on the banks, dumping of debris and solid waste. The removal and transporting and disposal of this waste is a big problem and various alternatives are considered for its disposal. After implementing these
schemes, they have to be maintained properly with the cooperation of the public. In 1981, the per capita supply of water was 40 gallons per day. It was 17.5 gpd in 1961.

**Water Supply**

Presently, water supply to the city is provided mainly from three reservoirs namely (i) Poondi, (ii) Sholavaram, and (iii) Red Hills. This surface water is supplemented from ground water drawn from the five wells located at (i) Minjur, (ii) Panjetty, (iii) Kannigaipar, (iv) Tamarapakkam, and (v) Poondi. A major portion of this ground water is supplied to large industries in North Madras and only a small quantity is diverted to the city supply. Another shallow ground water source along South Madras coastal belt is also tapped to supply water to South Madras.

The present rate of daily water supply to the city is about 250 mld, but all this water is not available to the citizens, since the percentage of leaks is about 15 to 18% in some areas. The authorities are taking steps to control this. Industrial belt in North Madras is being supplied about 55 mld of water during the normal period. To meet the increased demand, water supply authorities, are treating the sewerage to required standard and are supplying about 45 mld for industrial use.

Madras city had the first public water supply system in Tamil Nadu since 1782. The present water works commenced operation from 1872. The present rate of supply at 70 lpcd is very low considering the growing population.
Recording additional ground water, a study with the help of United Nations Department of Technical Education, was carried out and a possibility of extracting 200 mld was found out. To increase the water supply, the Krishna Water Supply Project was started by which 15 TMC of water will be delivered to Tamil Nadu, from where it will be conveyed to Poondi Reservoir.

The requirement of water for Madras is 595 mld in 1990, assuming that per capita requirement is 85 lpd. For industrial use 55 mld of water is required. This works out to a total of 650 mld for the current period. The fact that water distribution system is more than 50 years old explains the poor quality of water. Only 30% of the distribution system is less than 20 years old. The incrustation in water pipes makes Madras water a highly suspect quality. Due to the absence of proper sewerage facility, piped water is open for contamination, especially in peripheral areas. Water samples show the presence of high value of nitrates and dissolved solids. The main reason is garbage decay and indiscriminate sewerage disposal.6

The water treatment facility at Kilpauk Water Works has been increased. A new water treatment plant has been set up at Red Hills and another one at Chembarambakkam. With all these schemes, the city water supply will be:-
(a) Red Hills Treatment Facility 327 mld. (b) I Phase Krishna Project (Red

Hills Treatment) 300 mld, and (c) II Phase Krishna Project (Chembarambakkam) 530 mld.

It is also proposed to have pumped water storage system in cylindrical tanks to be constructed along the coast to catch the surplus water now entering the sea. A sum of 8 suitable locations with capacity to hold 50 million cubic metres is proposed and the preliminary project was financed by Metrowater and Overseas Development Agency.

Water supply and sanitation projects should be taken simultaneously in order to provide a hygienic atmosphere. This point has been taken into account in working out the Master Plan of the city and various aspects like land use pattern, growth of population, industrialisation of the urban and sub-urban areas. Problem of pollution is thus considered. The provision of sewerage has been completed for about 75% of the populated area. But in some areas only about 40% of the residents came forward to have sewerage connection, because of the high cost involved, but they forget its advantages.

The Madras Metropolitan Water Supply and Sewerage Board (MMWSSB) formed under Act No.20 of 1978 is the major organisation of water supply and sanitation in Madras city and the metropolitan area. It is responsible for planning, construction, operation, and maintenance of all water supply and sewerage systems.

Total availability of water excluding industries is 127.5 m.litres per day (mlpd) which works out to a gross per capita availability of 32 lpcd. Desirable
minimum requirement is 150 lpcd. The city is generally flat and water supply to end areas and high level pockets is highly irregular. Water is transported to these areas by lorries at a very high cost. Water transport costs about Rs.15 per 1000 litres whereas the cost of production, transmission and distribution through pipe line costs about Rs.3.50 per 1000 litres.

Rivers Cooum and Adyar are heavily polluted. Raw and semi-treated sewage, cattle waste, garbage and industrial effluents are discharged into these waterways. This is made still worse by proliferating slums and small unauthorised manufacturing units on river and drainage channel banks.

Housing in Madras

In 1600s, Madras was formed of scattered settlements separated by long distances. Each settlement grew around a nucleus of temple. The most important part at that time was Mylapore. The Portuguese settled in 1522 at Santhome by constructing a church. Mylapore was an adjacent settlement with a newly constructed temple. Triplicane was a separate village by itself. At that time, there were small settlements in Purasawalkam, Egmore, Nungambakkam, Saidapet and in the suburbs Velachery, Pallavaram, Tambaram, Mangadu, Villivakkam and Ambattur. Important lines of communications linked these settlements.

The population in Madras, is expected to cross the 9 million mark by 2011. Between 1990 and 2011, 3.5 million people will be added to MMA. Of these nearly 2 million will be added to the City population and the remaining to the other areas within MMA.
As per the 1981 Census, the Madras Metropolitan Area had 9.04 lakh residential units in which 5.67 lakhs were pucca, 1.02 lakhs were semi-pucca, and 2.35 lakhs were kutcha. In addition, there were 10,000 families without any form of shelter.

There is persistent housing shortage in the city. The ratio between incremental households and formal conventional supply of housing units remains around 1:3 in the last 20 years. There is an increasing cumulative backlog of deficits to an extent of 26%. The housing problem is accentuated by the uncontrolled growth of slums over different parts of city. Nearly 70% of the slums are within the city, amounting to about 1,500 slums. The location of slums is mostly in unauthorized places. 1/3 of the slums is located in private lands. The remaining is located on public lands mostly on road-margins, canal banks and riversides. The problems of basic urban facilities and environmental pollution are compounded by the slums of Madras.

Slums in Madras

With a view to eliminate slums in a phased manner, the Government of Tamil Nadu constituted a Slum Clearance Board in 1971 under the Tamil Slum Area (Improvement and Clearance) Act 1971 with the following objectives

(i) To clear slums which are unfit for human habitation;
(ii) To provide certain basic amenities such as streets, water supply and drainage in other slums;
(iii) Removal of unhygienic and insanitary conditions prevailing in the slums;
(iv) To provide better accommodation and improved living conditions for slum dwellers; and

(v) To acquire land for the purpose of improving and redeveloping slum clearance areas and rehabilitating slum dwellers.

The activities of the Slum Clearance Board are restricted to slum dwellers of selected cities. The two major schemes undertaken by the TNSCB are the Slum Clearance Scheme and the Slum Improvement Scheme. Under the Slum Clearance Scheme, multi storey buildings are erected on the same site for the slum dwellers and under Slum Improvement Scheme, slums are provided with basic amenities such as pathways, street lighting, water supply, drainage, paths and latrines.

A number of hutments have paved their way on the banks of the river Adyar, Cooum, Otteri Nallah and Buckingham canal. The projected number of residences in 1994 alongside waterways was about 30,000.

According to the records of the Corporation of Madras, there were just 187 slums-clusters in 1938, which became 1202 in 1971. A study by the MMDA pointed out that about 996 slums were left in the lurch by the Slum Clearance Board. In 1986, Madras was burdened with 1.27 lakh families and a population of 6.51 lakhs in slum areas. The estimated slum population in Madras for 1990 was around 14.60 lakhs and in the peripheral areas it was about 3.01 lakh. The overall slum population in Madras Metropolitan Area was 17.61 lakhs.
### Table 5.2

**SLUMS IN MADRAS METROPOLITAN AREA (MMA) - 1986**

<table>
<thead>
<tr>
<th></th>
<th>Extended area in (no.)</th>
<th>South Madras (no.)</th>
<th>North Madras (no.)</th>
<th>Total City</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporation Divisions</td>
<td>8</td>
<td>69</td>
<td>73</td>
<td>150</td>
</tr>
<tr>
<td>Slums</td>
<td>68</td>
<td>437</td>
<td>491</td>
<td>996</td>
</tr>
<tr>
<td>Shelter units</td>
<td>11,289</td>
<td>34,570</td>
<td>43,721</td>
<td>89,580</td>
</tr>
<tr>
<td>Families</td>
<td>15,253</td>
<td>50,373</td>
<td>61,555</td>
<td>1,27,181</td>
</tr>
<tr>
<td>Population</td>
<td>77,790</td>
<td>2,46,828</td>
<td>3,26,242</td>
<td>6,50,859</td>
</tr>
<tr>
<td>Families/Shelter Unit</td>
<td>1.40</td>
<td>1.50</td>
<td>1.40</td>
<td>1.50</td>
</tr>
<tr>
<td>Average Family Unit</td>
<td>5.10</td>
<td>4.90</td>
<td>5.30</td>
<td>5.10</td>
</tr>
</tbody>
</table>

Source: *Survey of Slums in Madras Metropolitan Area*, by Economists Group, Madras, 1986

### Table 5.3

**LIVING CONDITIONS IN SLUMS — MADRAS METROPOLITAN AREA - 1986**

<table>
<thead>
<tr>
<th></th>
<th>Zone I</th>
<th>Zone II</th>
<th>Zone III</th>
<th>Zone IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tot. No. of Slums</td>
<td>68</td>
<td>417</td>
<td>437</td>
<td>491</td>
</tr>
<tr>
<td>Public Water Supply</td>
<td>16</td>
<td>143</td>
<td>76</td>
<td>108</td>
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<tr>
<td>Public Tap</td>
<td>44</td>
<td>306</td>
<td>328</td>
<td>355</td>
</tr>
<tr>
<td>Public Handpump</td>
<td>32</td>
<td>284</td>
<td>116</td>
<td>167</td>
</tr>
<tr>
<td>Public well</td>
<td>46</td>
<td>248</td>
<td>278</td>
<td>345</td>
</tr>
<tr>
<td>Public Latrine</td>
<td>53</td>
<td>361</td>
<td>283</td>
<td>73</td>
</tr>
<tr>
<td>Street Lights</td>
<td>33</td>
<td>131</td>
<td>73</td>
<td>83</td>
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</table>

A very significant aspect of developing nations is a conspicuous migration of population to the cities much above the absorptive capacity in the urban economy. This has naturally resulted in the deterioration of environmental conditions outside and within the dwelling unit. A concrete example of such a condition can be found in India and Madras city. The quantitative and qualitative deficiencies in basic amenities and the ever increasing gap between the demand and the supply for the same have reached alarming proportions. The position of housing in respect of the urban areas is highly distressing and poses one of the thorniest problems of the rapidly growing urban areas in India. As per the 1981 census, the total number of houseless households was 6 lakhs (4 lakhs in rural and 2 lakhs in urban areas) in India and the steady increase in urban population at the rate of 3 to 4% a year over a last two decades adds to the gravity of the problem. The increase in the percentage of urban population to the total population from 50.2% in 1961 to 69.4% in 1981 has led to an increase in congestion, overcrowding, steady growth of slums, squatter settlements and a heavy strain on the infrastructure and services in these prime urban agglomerations.

While the percentage of slum population to the total urban population in 1981 was 18.75%, the percentage of population living in slums in Metropolitan cities in the same year was estimated to be about 31%.

Madras city has now become known for its extensive slums which sadly lack even the minimum basic amenities of lighting, water supply, drainage, and the likes. With the ever increasing population, the city limit has expanded.
The number of slums in the city has increased from 1202 in 1971 to 1428 in 1981 and the slum population from about 7 lakhs in 1971 to 12 lakhs in 1981. All these factors have made the demand for basic necessities rise far in excess of the available supply and the lack of facilities for supply of safe water and sanitary disposal of waste have always been a threat to living. Water borne diseases such as Cholera, Typhoid, and dysentery are always reported.

**Slum Clearance Schemes**

Under the scheme, huts put up in slums with materials like thatches, gunny, tin sheets are pulled down and multi-storyed buildings constructed. The following procedure is followed in the execution of this project:

(i) The slums are identified and photograph of each of the family is taken and a Pass Book issued to each family.

(ii) The slums are chosen for clearance every year and a priority list is drawn.

(iii) The families are persuaded to move to alternative sites in nearby location.

(iv) A sum of Rs.100 is paid to each family towards reerecting huts temporarily.

(v) Construction of tenements is started in the land got vacated.

(iv) After completion of tenements, allotment is made to the families by
drawal of lots as to who should occupy which tenement and the temporary sheds are dismantled. The Board makes sure that the transit camp is cleared and all the people are given allotment in the tenements.

(vii) Only those who have documentary evidence of residence in slum areas are eligible for allotment.

The tenements constructed in Madras City alone is 47,421 upto March '90 (excluding fire proofed tenements). A total of 8,046 tenements have already been allotted on hire purchase basis. Environment Improvement schemes on a hire purchase basis was implemented in Madras City, benefiting 54,654 families. Improvements at the following standards are provided at a cost of Rs.800 per family.

1. One bath or F.O.L per 5 families;
2. One public fountain per 10 families
3. One street light per 40 metre length of road.

To accelerate Slum Improvement Scheme, facilities at the following standards were provided at a cost not exceeding Rs.1,250 per family.

1. One P.C. for 10 families
2. One water tap for 20 families
3. One street light per 40 metre length of road.

In all 56,993 families were benefited at a cost of Rs.412.47 lakhs upto March 1990.
Basic Services for Madras in 2000 A.D.

1. Water Supply: A modest 150 lpcd within city limits and 100 lpcd outside it apart from industrial, commercial, and industrial uses. This requires water from the Krishna River; without it only one third of the demand would be met.

2. Sanitation: The alternative methods of sanitation for wide usage in India are (a) underground sewerage system; (b) the oxidation pond; (c) the septic tank; and (d) the two pit pour flush latrine.

Small bore systems of sullage, individual septic tanks for night soil, two pit latrines, pools with regular evacuation by tankers, shifting of cattle away from sanitation system and their effective disposal of their waste shifting of tanneries; stringent treatment of industrial waste before entering the sanitation system are all possible within the resource constraints futurological bodies, like SULABH International have introduced new technology to recycle waste into gas and manuer. This holds the key for 21st century.

The Role of MMDA

MMDA was established in 1972 on an ad-hoc basis but received statutory backing with the modification of the Town and Country Planning Act in 1975. Its functions and powers are:

(i) to survey metropolitan planning area and prepare a report;

(ii) prepare a master plan and other related documents;
(iii) prepare an existing land use map and other relevant maps;

(iv) to carry out such works as are recommended in any development plan; and

(v) to designate the whole of the metropolitan planning area as a new town to prepare new town development plan, secure the lay-out of this new town, acquire and dispose land and other functions.

Since its creation, it has prepared a master plan for the Madras Metropolitan area. The MMDA is experiencing a number of problems because of the rapid increase in population and the economy lagging behind. There is a growing pressure on the limited utility services available. There is an acute problem of shelter and the same is the case with all other infrastructural facilities. For effective management and setting of priorities, a structure plan has been designed to suggest directions for changes with emphasis on performance.

The structure plan covers the following themes: (i) the existing situation; (ii) guidelines for growth; and (iii) technical appendices and working papers. The report submitted by it suggested a comprehensive development plan to be implemented stage by stage, and it also set out priorities and policies for MMDA.