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Maintaining Gujarat's Municipal Services
A Long Range Perspective

(Prepared for Gujarat Municipal Finance Board)

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CONTENTS

PREFACE

The National Institute of Urban Affairs was entrusted with a study "to determine the expected level of services (water supply and drainage system, roads, and primary education) in the municipalities of the State and to work out, on a scientific basis, the financial requirements for upgrading the level of services to the said expected levels after taking into consideration the present levels of these services in the municipalities ..." (Annexure 1). The study was undertaken on behalf of the Urban Development and Urban Housing Department of the Government of Gujarat (vide Resolution No. MFB-1083-1545-F dated 12 January 1984).

In order to provide an empirical base for the study and to avoid straying into the realm of pure academics, the National Institute of Urban Affairs and the Gujarat Municipal Finance Board together agreed that (i) the Institute would prepare a questionnaire for collection of basic data on the services mentioned from the 58 municipalities and corporations which were to comprise the universe for the study, (ii) the Gujarat Municipal Finance Board would canvass the questionaire, collect data from the corporations and municipalities, and also scrutinise the same before furnishing it to the Institute, (iii) the Institute would process and analyse the data for purposes of determining the existing levels of services, and (iv) in deciding upon the norms for the (expected) level of

services, the Institute would take into consideration the views of the Board.

It was further agreed that the norms for the services should relate to the year 2001 AD (and 2011 AD, in the case of water supply and sewerage), and consequently the financial requirements for upgrading the levels of services of the corporations and municipalities will relate to the same year.

Central to the study has been the question of the norms for water supply and sewerage, roads, and primary education, in particular, the factors that ought to be used in determining them. The most widespread practice so far has been to use the norms laid down in the 1963 Report of the Committee of Ministers, known as the Zakaria Committee Report on AUGMENTATION OF FINANCIAL RESOURCES OF URBAN LOCAL BODIES. These norms have usually formed the basis for estimating the resources required for providing and maintaining the municipal services.[1]

Taking note of the fact that very few corporations and municipalities have been able to attain the levels as laid down in the Zakaria Committee Report, and that the

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1. Augmentation of Financial Resources of Urban Local Bodies - Report of the Committee of Ministers constituted by the Central Council of Local Self Government, November, 1963, under the chairmanship of Dr. Rafiq Zakaria.

attainment of these levels even if attempted by municipalities, would inevitably impose a heavy, and possibly out-of-reach financial burden on the States and the urban local bodies, the Institute has adopted somewhat lower but more pragmatic and attainable standards of services. In arriving at these standards the Institute has taken into account not only the population size and functional category of the corporations and municipalities, but also their location -within the context of the State, and their capacities to provide and maintain the services. Also, as stated above, the Institute has considered the views of the Gujarat Municipal Finance Board in arriving at these norms.

This study which is titled MAINTAINING GUJARAT'S MUNICIPAL SERVICES : A LONG RANGE PERSPECTIVE, provides, in the final analysis, estimates of resources that would be required by the 58 corporations and municipalities to upgrade their services to the proposed levels. The study also attempts to provide for guidance broad city-wise outlines of services and resource requirements.

In a sense, this study is the joint product of the National Institute of Urban Affairs and the Gujarat Municipal Finance Board. Apart from the sharing of work, the Institute and the Board maintained throughout the period of the study close contacts and a continuing dialogue, sorted out the problems of data inconsistency, wherever necessary,

and worked jointly on the question of norms. The National Institute of Urban Affairs alone, however, is responsible for the analysis and conclusions of the study.

October, 1987

Om Prakash Mathur
Director
National Institute of Urban Affairs

LIST OF TABLES

I APPROACH TO THE STUDY

The approach to the study was guided by two general considerations :

i. the outcome of the study should be realistic; it was important to keep in mind the existing levels of services as well as the resource position of the corporations and municipalities; and

ii. the methodology to be employed in the study should be widely replicable.

Within the ambit of these general considerations, the study was designed in six interrelated phases :

i. Delimiting the scope of the study

At the starting point, the scope of the study was concretised and delimited, particularly in viewi of the fact that it was a complex and wide field and has been the subject of extensive review and examination in the country since 1833.[2] Thus, the study was limited to only four municipal services, namely, water supply and draiange, roads, and primary education which happen to be the most important obligatory functions of the corporation and municipalities under the Gujarat Municipalities Act, 1963. In terms of the spatial coverage, te study was extended to 58 towns and cities* of Gujarat which enjoyed the status of either a corporation or municipality. The remaining 197 towns were excluded from the study.

ii. Preparation of a questionnaire

A questionnaire was developed with two objectives : (a) to clearly indicate the actual levels of municipal services, and (b) to assist in the proper appreciation of the physical and environmental constraints so that the entire question of upgrading the levels of services could be examined within the parameters of those constraints.

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2. Huge Tinker, The Foundations of Local Self Government in India, Pakistan and Burma.

* The terms "towns" and "cities" have been used interchangeably.

iii. Data collection and scrutiny

Along with the preparation of a questionnaire which sought to collect data directly from the towns and cities, the study provided for collection of two other types of data. These included (a) time-series population data of the 58 towns, and (b) information on norms or the levels of services and unit costs proposed by various committees and departments. Scrutiny of data particularly to weed out the inconsistencies formed an important element of the study design.

iv. Data compilation and analysis

In order to gain an indepth understandingi of problems encountered by the 58 towns, the study provided that the entire field data should be compiled and analysed with respect to three variables, namely : (a) population size category, (b) functional grouping, and (c) location of the towns. The purpose was to ascertain the extent to which the levels of services varied by either size or functional category of towns or their location.

v. Determination of the 'norms' for the levels of services

Two sets of data were utilised for dertermining the norms for services for the year 2001 that is (a) the actual existing levels which became available from the questionnaire, and (b) norms proposed by the Zakaria Committee which represented, in a sense, the "desirable" levels that the municipalities of various sizes or types should have. In addition, at least two additional sets of criteria were considered :

- the proposed levels of services should be low-cost and affordable; and

- a gradual upgradation in the levels of services should be preferred over a single-shot jump in the level in the year 2001.

The study also provided for detailed discussions with the technical heads of the various departments of the Government of Gujarat on the technical and administrative feasibility of upgrading the serices to the proposed levels. In addition, norms for the unit costs for upgrading the services were also developed by taking into account the existing levels of costs.

vi. Report preparation

Initially, the Institute provided a draft report for discussions and review by the Gujarat Municipal Finance Board Based on their comments, this report has been finalised and submitted to the Gujarat Municipal Finance Board.

As mentioned above, the study is aimed at estimating the financial requirements for upgrading the services in the 58 corporations and municipalities to the levels proposed. It required the estimates of population for each of these towns for the year 2001, (2011 in the case of water supply and sewerage), and also for the intermediate year of 1991. In order to arrive at the most realistic estimates of population, the population projections carried out by the Operations Research Group (ORG) were also examined by the Institute. Taking note of the fact that the GMFB/State Government have used the ORG's population estimates, the same have formed the base for this study as well. These are given in Table IA. Also shown in the same statement are (i) the changes in the population size classification for the years 1991, 2001 and 2011, (ii) functional classification, and (iii) region of their location.

Table - 1

Population Projection by Size Class (1991-2011)

('000)

Size Class	1981		1991		2001		2011	
	No.of ULBs.*	Pop.	No.of ULBs.	Pop.	No.of ULBs.	Pop.	No.of ULBs.	Pop.
MC & Towns with 200,000+	6	4,601	6	5,717	8	7,617	11	10,036
Class A	6	699	10	1,343	18	2,372	27	3,612
Class B	24	1,565	29	2,109	27	2,019	17	1,296
Class C	22	844	13	534	5	207	3	128
Total	58	7,709	58	9,703	58	12,215	58	15,072

* Urban local bodies.

Table - 1 A

Estimated Population of Municipal Bodies for 1991, 2001 and 2011, together with their Location and Functional Category

(000)

Sl. No.	Municipal Corporation/ Municipality	Population			
		1981	1991	2001	2011
1.	2.	3.	4.	5.	6.
1.	Ahmedabad	2060* AA	2440* AA	2910* AA	3450* AA
2.	Surat	777 AA	940 AA	1260* AA	1600* AA
3.	Vadodara	734 AA	980 AA	1250* AA	1542* AA
4.	Rajkot	445 AA	597 AA	760 AA	964 AA
5.	Bhavnagar	307 AA	390 AA	490 AA	600 AA
6.	Jamnagar	278 AA	370 AA	490 AA	620 AA
7.	Nadiad	143 A	195 A	250 AA	325 AA
8.	Junagarh	119 A	141 A	166 A	195 A
9.	Porbandar	115 A	136 A	148 A	171 A
10.	Bharuch	110 A	138 A	172 A	225 AA
11.	Navsari	107 A	150 A	207 AA	270 AA
12.	Veraval-patan	105 A	138 A	174 A	213 A
13.	Surendranagar	90 A	117 A	149 A	189 A
14.	Godhra	86 A	104 A	125 A	148 A
15.	Anand	84 B	120 A	162 A	227 AA
16.	Patan	79 B	104 A	133 A	165 A
17.	Dhoraji	77 B	98 B	118 A	138 A
18.	Morvi	73 B	95 B	120 A	138 A

Sl.no.	Town	Region	District	Functional category
1.	2.	7.	8.	9.
1.	Ahmedabad	1	Ahmedabad	I
2.	Surat	3	Surat	I
3.	Vadodara	3	Vadodara	I/S
4.	Rajkot	2	Rajkot	I/S
5.	Bhavnagar	2	Bhavnagar	I/S
6.	Jamnagar	2	Jamnagar	I/S
7.	Nadiad	1	Kheda	I/C/S
8.	Junagarh	2	Junagadh	S
9.	Porbandar	2	Junagadh	I/S
10.	Bharuch	3	Bharuch	I/S/C
11.	Navsari	3	Valsad	I
12.	Veraval-patan	2	Junagadh	I/C/S
13.	Surendranagar	2	Surendranagar	I/S/C
14.	Godhra	3	Panch Mahals	S/C/I
15.	Anand	1	Kheda	S/C/I
16.	Patan	1	Mahesana	I/C/S
17.	Dhoraji	2	Rajkot	S/P/C
18.	Morvi	2	Rajkot	I/S

1.	2.	3.	4.	5.	6.
19.	Kalol	70	93	121	150
		B	B	A	A
20.	Mehsana	73	93	121	150
		B	B	A	A
21.	Bhuj	70	87	107	127
		B	B	A	A
22.	Khambhat	69	94	111	129
		B	B	A	A
23.	Gondal	66	76	98	100
		B	B	B	A
24.	Saijpur-Bogha	65	76	100	130
		B	B	A	A
25.	Jetpur	63	88	119	151
		B	B	A	A
26.	Gandhidham	61	87	117	151
		B	B	A	A
27.	Palanpur	61	84	109	137
		B	B	A	A
28.	Amreli	57	62	78	96
		B	B	B	B
29.	Dohad	55	70	87	107
		B	B	B	A
30.	Valsad	54	69	86	105
		B	B	B	A
31.	Upleta	55	68	94	129
		B	B	B	A
32.	Mahuva	54	69	87	107
		B	B	B	A
33.	Siddhpur	52	61	73	87
		B	B	B	B
34.	Dhrangadhra	51	64	81	99
		B	B	B	B
35.	Botad	50	65	85	107
		B	B	B	A
36.	Sawarkundla	50	62	75	91
		C	B	B	B
37	Sardarnagar	50	65	82	104
		B	B	B	A
38.	Viramgaon	48	68	84	103
		C	B	B	A
39.	Petlad	47	54	64	74
		C	B	B	B
40.	Visnagar	47	59	71	86
		C	B	B	B

1.	2.	7.	8.	9.
19.	Kalol	1	Mahesana	I
20.	Mehsana	1	Mehsana	S/C/I
21.	Bhuj	2	Kachchh	S
22.	Khambhat	1	Kheda	I
23.	Gondal	2	Rajkot	S/C/I
24.	Saijpur-Bogh	1	Ahmedabad	I
25.	Jetpur	2	Kachchh	T/C
26.	Gandhidham	2	Kachchh	T/C
27.	Palanpur	1	Banas Kantha	S/I
28.	Amreli	2	Amreli	S/C/I
29.	Dohad	3	Panch Mahals	C/P/S
30.	Valsad	3	Valsad	I/S/C
31.	Upleta	2	Rajkot	P/C/S
32.	Mahuva	2	Bhavnagar	S/C/I
33.	Siddhpur	1	Mahesana	I/C/S
34.	Dhrangadhra	2	Surendranagar	I/S
35.	Botad	2	Bhavnagar	P/I/C
36.	Sawarkundla	2	Bhavnagar	I/P/C
37	Sardarnagar	1	Ahmedabad	C
38.	Viramgaon	1	Ahmedabad	C/T/I
39.	Petlad	1	Kheda	S/I/C
40.	Visnagar	1	Mahesana	C/I/P

1.	2.	3.	4.	5.	6.
41.	Dabhoi	44	64	89	120
		C	B	B	A
42.	Dholka	44	61	83	113
		C	B	B	A
43.	Billimora	44	65	88	114
		C	B	B	A
44.	Deesa	42	61	90	119
		C	B	B	A
45.	Wadhwan	39	51	65	81
		C	B	B	B
46.	Borsad	39	49	61	74
		C	C	B	B
47.	Unjha	38	44	56	72
		C	C	B	B
48.	Mangrol	37	45	58	71
		C	C	B	B
49.	Ankleshwar	36	47	64	86
		C	C	B	B
50.	Kapadwanj	35	40	46	54
		C	C	C	B
51.	Kadi	35	38	58	74
		C	C	B	B
52.	Palitana	34	43	51	59
		C	C	B	B
53.	Anjar	34	40	47	55
		C	C	C	B
54.	Wankaner	32	36	40	43
		C	C	C	C
55.	Mandvi	32	46	59	72
		C	C	B	B
56.	Limbdi	31	41	52	65
		C	C	B	B
57.	Rajpipla	29	34	39	43
		C	C	C	C
58.	Umreth	28	31	35	42

* Metropolitan city

population classification	Region	Functional Classification
AA 200,000 and above	1 North and Central Gujarat	I Industry
A 100,000 to 199,999	2 Saurashtra	C Commerce
B 50,000 to 99,999	3 South Gujarat	S Service
C Less than 50,000		P Primary
		T Transport

1.	2.	7.	8.	9.
41.	Dabhoi	3	Vadodara	C/I/S
42.	Dholka	1	Ahmedabad	I/P/C
43.	Billimora	3	Valsad	I
44.	Deesa	1	Banas Kantha	C/I/S
45.	Wadhwan	2	Surendranagar	I/S/P
46.	Borsad	1	Kheda	P
47.	Unjha	1	Mahesana	C/P/I
48.	Mangrol	2	Junagadh	P
49.	Ankleshwar	3	Bharuch	P/C/S
50.	Kapadwanj	1	Kheda	S/I/C
51.	Kadi	1	Mahesana	S/C/I
52.	Palitana	2	Bhavnagar	S/C
53.	Anjar	2	Kachchh	I/C/S
54.	Wankaner	2	Rajkot	I/C
55.	Mandvi	2	Kachchh	S/C/I
56.	Limbdi	2	Surendranagar	I/S/C
57.	Rajpipla	3	Bharuch	S/C/I
58.	Umreth	1	Kheda	P/C/S

Source: ORG's Report on Population Projections in Narmada Command Basin.

Note: i. Spellings of districts and towns are based on Census of India, 1981

ii. Data for Sardarnagar not available.

II PRESSURE OF POPULATION GROWTH ON URBAN AREAS

If there is one single factor whose impact is immediately felt on the availability of essential services such as water supply and sewerage, roads and education, it is population growth. Experience in India as elsewhere shows that as a result of the disproportionately high population growth rates registered by most urban areas, the overall availability of services seems to have declined. Many studies show that cities are in a crisis as the demand for services which is related directly to population has increased much faster than their supply. This section examines the pressures of population growth on the 58 towns and cities forming part of this study.

The process of urbanisation in Gujarat has been remarkably consistent since the census decade 1961-71 when compared with its trend in earlier decades, and also in comparison with several other larger states. Since 1961, it has maintained its ranking, the third highest urbanised state in the country. During 1971-81, its urban population increased by 41.42 per cent; in the preceding decade, it had risen by 41.0 per cent.

Table - 2

Decennial Growth Rate Percentage - All India
(Selected States)

State	1971-81	1961-71
Gujarat	41.42	41.00
Maharashtra	39.99	40.75
Tamil Nadu	27.98	38.64
Karnataka	35.23	50.65
Punjab	44.51	25.27
West Bengal	28.41	31.73
All India	46.39	38.32

Two features of the process of Urbanisation in Gujarat are particularly important to be noted.

i. While it is a fact that the overall urbanisation process has been consistent, there are sharper variations within the State. For instance, the urban population growth rates in the Saurashtra region covering Jamnagar, Rajkot, Surendranagar, Bhavnagar, Amreli, Junagadh and Kachchh districts are without exception lower than the state average for 1971-81. In comparison, the urban population of Sabar Kantha, Ahmedabad, Vadodara, Surat and Valsad District have registered higher than the state average growth rates for two successive census decades.

Table - 3

Decennial Population Growth Rate of Gujarat by Region
(per cent)

Districts	Urban population growth rates	
	1971-81	1961-71
Saurashtra Region		
Jamnagar	32.92	33.63
Rajkot	38.68	33.17
Surendranagar	30.08	22.99
Bavnagar	39.14	27.58
Amreli	30.58	18.36
Junagadh	31.66	38.15
Kachchh	27.94	58.81
Region Average	34.36	32.76
North Central & South Region		
Sabar Kantha	43.04	69.85
Ahmedabad	42.93	44.82
Vadodara	57.58	51.75
Surat	76.89	67.15
Valsad	51.65	41.16
Region Average	52.00	39.06

ii. The population pressure as measured by the growth rate is significantly higher in cities with 100,000+ population. Smaller cities have a comparatively lower pressure as may be seen in the following table (Table 4).

Table - 4

Decennial Growth Rate of Urban Settlements by Census Size Class

Size Class	No. of urban settlements 1981	Urban population 1971-81	No. of urban settlements 1971	Growth rates 1961-71
I	13	67.08	8	55.82
II	23	32.85	17	52.72
III	46	19.75	37	8.21
IV	76	12.76	66	50.84
V	53	-21.06	66	15.29
VI	9	29.51	4	-51.17

The present study is confined to 58 cities and towns of various sizes. They constitute 22.75 per cent of the total number of urban local bodies (225), and 72.7 per cent of the State's urban population of 10,601,653. The distribution of the 58 cities by population size and growth rate is shown below (Table 5).

Table - 5

Decennial Municipal Population Growth Rate by Size Class

Size Class		1981		% Growth Rate	
I	(a) Corporation	6	4,600,593	41.57	45.24
	(b) Others (Grade A municipalities)	6	698,687	29.21	30.85
II	(Grade B municipalities	27	1,564,664	35.02	35.64
III	(Grade C Municipalities)	19	844,655	26.20	21.06
Total		58	7,708,599	37.20	38.46

The pressure of population has been high in at least seven out of the 58 municipalities and corporations of Gujarat which includes Surat and Vadodara corporations, and the four B municipalities of Sahijpur Bogha, Gandhidham, Upleta and Botad. These registered during 1971-81 a population growth rate of over 50 per cent. At the other extreme were 30 towns whose growth rates were less than 30 per cent, suggesting, at least on prima facie considerations, that the population pressure on them for availability of basic services may not have been that intense. The overall distribution of towns according to population growth rates is given in the following table (Table 6).

Table - 6

Distribution of Towns by Size Class

Size Class		1971-81 Decennial growth rate %					
		50+	40-50	30-40	20-30	10-20	<10
I	Corporations	2	1	2	1	-	-
II	Grade A Municipalities	-	1	2	2	1	-
III	Grade B Municipalities	4	5	4	10	1	-
IV	Grade C Municipalities	1	2	4	7	8	-
	Total	7	9	12	20	10	-

On yet another count, population pressure in Gujarat municipalities cannot be said to have caused any undue pressures on municipal services. During the period 1971-81 when urban population increased by an average growth rate of 37.2 per cent,

the municipal incomes and expenditure too recorded an extraordinarily high increase. According to the data contained in Statistics of Municipal Bodies, Gujarat and other sets of data obtained from the Gujarat Municipal Finance Board, the incomes of the municipalities rose by over 173.14 per cent during 1971-72 to 1981-82. The increase in municipal expediture in the corresponding period was 331.08 per cent.

Table - 7

Decennial Income and Expenditure Variation

(Rs. in 000)

Item	1971	1981	Decennial Growth Rate %
Population	5,618,420	7,708,599	37.20
* Ordinary municipal incomes ('000)	581,932	1,597,710	173.14
* Ordinary municipal expenditure ('000 Rs.)	357,011	1,539,009	331.08

* The figures relate to the years 1971-72, and 1981-82

Source : Statistics of Municipal Towns and Cities - Gujarat : 1971-72 and 1972-73; Statistics of Municipal Bodies - Gujarat : 1981 (GMFB)

In six municipalities which experienced relatively high growth rates,** the increase in municipal incomes and expenditure was equally high, in fact, significantly higher than the overall average for the 58 municipalities, as may be seen below (Table 8).

** Surat, Vadodara, Sahijpur Bogha, Gandhidham, Upleta and Botad

Table - 8

Change in Municipal Income and Expenditure between 1971-72 and 1982-83

(per cent)

Town	Income	Expenditure
Surat	370.72	848.76
Vadodara	468.20	888.96
Gandhidham	389.96	497.04
Upleta	145.78	209.37
Botad	215.86	272.59

Source : Same as in case of Table - 7

Increase in salaries and allowances do not seem to be the main factor for this extraordinary increase in municipal expenditure and incomes. Allowance of course, needs to be made for inflation. But on the whole, it can be said that the pace of urban growth in Gujarat has not been such as to have created any special problems for the municipalities maintaining the existing levels of services. Ordinary incomes and expenditures rose at a sufficiently high rate during this period, refuting the oft-repeated notion that the municipalities do not raise their incomes and expenditures, causing a decline in the level of services.

III ACTUAL LEVELS OF SERVICES
A MACROVIEW

Any attempt to assess the actual levels of services is fraught with both methodological problems and problems of data availability. For instance, a town's installed capacity of water may be x million/1d; however, there could be wide variations between the installed capacity and the quantity of water that is released from the system, and the quantity that actually reaches the population. There are leakages and wastages within and outside the system which affect the availability of water for the population of a particular town. The overall area under roads may be as high as 25 per cent of the town's total developed area; however, the effective area may be much less on account of encroachments, and so on. Then, there are very wide variations in the supply of services within the jurisdiction of towns. Besides, there are factors such as the source of water supply, and type of delivery system which also affect the actual levels of services. Therefore, any assessment of the actual services remains, to a very large extent, an approximation.

As stated earlier, this study has covered only four municipal services, namely : water supply, drainage, roads and primary education. In order to gain a proper understanding of the existing levels of services, a set of indicators has been developed and utilised :

Wate Supply

i. Per capita daily average availability of water.

ii. Per capita average availability of size of towns.

iii. Per capita average availability by functional character of the towns.

iv. Per capita average availability by towns located in the three sub-regions of Gujarat namely : North and Central Gujarat, South Gujarat, and Saurashtra and within these sub-regions.

Sewerage

v. Per cent of town's population and area served by underground sewerage system, and surface drainage system : overall and by size.

vi. Per capita sewage (ltrs/day) actually disposed of : overall, and by size.

vii. Per capita garbage (grams) actually collected : oveall and by size.

Roads

viii. Road length per sq. km. of area, total, surfaced and unsurfaced.

ix. Road length per sq.km. of developed and total area by size class.

Education

x. Enrolled students in primary classes as a per cent of total population in 6-11 year age-grop;

xi. Number of students/class room (per shift)

- Student-teacher ratio.

Data with respect to these indications are analysed below.

Water Supply

The Gujarat Municipalities Act, 1963 lays down that it shall be the duty of every municipality to make reasonable and adequate provision for the supply or an additional supply of water, and for the protection of the health of the inhabitants from the insufficnecy or "unwholesomeness of the existing supply, when such supply or additional supply can be obtained at a reasonable cost ....". Accordinaly, all corporations and municipalities in Gujarat carry out this function, adequately or otherwise.

Two preliminary points about the water supply system in Gujarat need to be stated at the outset. The first point is that of the 58 municipal areas, 36 rely on a single source of water, either surface (7) or underground (29). The remaining 22 towns have access to either both sources of water supply or depend on bulk purchases and so on. The second point to be noted is the age of the water supply system in the 58 cities/towns which varies between less than 11 years for two municipalities and over 90 years in the case of three municipalities. The age of the system is shown in Table - 9.

Table - 9

Age of the Water Supply System

Age of the system (in years)	Number of municipalities
<11	2
11-30	33
31-60	16
61-90	3
91+	3
Total	57*

* Data relating to Godhra not available.

The overall average per capita water supply in the 58 municipalities and corporation works out to 139.4 ltrs/day. It ranges between a low of 14.5 ltrs/day for Veravalpatan, a fishing town which presumably relies for its water supply directly on the source, and 203.65 ltrs/day for Vadodara corporation, the thirdi largest city in the state of Gujarat.

The distribution pattern of per capita water supply shows that 15 municipalities and corporations enjoy an average supply of over 125 ltrs/per day, and another 24 municipalities between 75-125 ltrs/day. Among those where supplies are on the lower side, that is, less than 50 ltrs/day are included 10 municipalities : Veravalapatan (14.5) Mangrol (43.96), Gondal (42.7), Palanpur (43.8), Amreli (31.13), Botad (36.12), Sawarkundla (27.51), Wankaner (44.89), Mandvi (44.57), and Limbdi (24.37). (Table 10).

Table - 10

Water Supply Distribution

Water supply (lpcd)	Number of municipalities
01 - 25	2
26 - 50	8
51 - 75	9
76 - 100	15
101 - 125	9
126 - 150	13
150 +	2
Overall average 139.4	58

In order to properly appreciate what lies underneath these overall averages, and to obtain indicators for developing norms, we have examined five types of questions :

i. Is the per capita availability of water supply higher in relatively large-sized cities? In other words, what exactly is the relationship between the per capita availability and the size of cities/towns?

ii. Does the per capita availability change with the industrial character of the towns? More specifically, is it consistently higher in "industrial towns", and lower in others?

iii. What is the effect of the natural factors on the per capita availability of water? (e.g., abundant versus scarce supply)

iv. Does the per capita availability of water differ with the "source" of water supply?

v. Does it have any connection with the sewerage/water disposal system in vogue in the area?

Data on water supply have been arranged and analysed to address the above questions. Table 11 below gives the data on the availability of water supply by size of cities.

As will be noted, the data substantiate the generally held notion that the per capita availability of water supply is higher in large-sized cities and towns, which declines as the city-size decreases. Proportions are important to note. Per capita availability in cities of 200,000+ size is 1.6 times higher than the availability in 100,000-200,000 sized cities, but this difference narrows down and becomes more or less attentuated as there is a limit below which per capita availability cannot decline, this being the basic minimum for survival.

This pattern is also sustained when domestic supply is taken into account. Domestic water supply averages are higher for the corporations, and lower for relatively small-sized municipalities.

Table - 11

Total and Domestic Water Supply Distribution by Size Class (1983-84)

Size class	Actual quantity supplied (Total)		Actual quantity supplied (Domestic)	
	(mld)	(lpcd)	(mld)	(lpcd)
Corporations	868.79	172	529.24	105
Class A	74.28	98	61.25	81
Class B	154.41	90	106.54	62
Class C	78.23	83	59.24	62
Total	1175.71	139	756.27	89
Number of municipalities	58		49	

mld : million litres per day. lpcd : litres per capita per day.

Variations in the availability of water supply are also noted with differences in functional category. Towns with a pronounced industrial character enjoy an overall average per capita of 179 ltrs/day, almost 1.23 times higher in comparison with multifunctional towns and 1.37 times higher than those whose main function is service (Table 12).

Table - 12

Per Capita Water Supply (Total) by Functional Category

Functional category	Actual quantity supplied	
	mld	lpcd
Industry (8)	616.03	179
Serevice (2)	25.60	124
Primary (2)	5.49	66
Multifunctional (45)	521.93	112
Commerce (1)	7.00	127
Total (58)	1175.71	139

It is also to be noted that on an average, the towns located in the Kachchh of Saurashtra region in particular and the region as a whole which is a water scarcity region, have a lower per capita availability of water supply. The average per day is 86 ltrs for Kachchh District and 108 ltrs for this region as compared to 103 and 141 ltrs for towns in, North and Central Gujarat, respectively and 171 ltrs. for South Gujarat towns.

Table - 13

Per Capita Water Supply Distribution (Total) by Region

Functional category	Actual quantity supplied	
	mld	lpcd
North Gujarat (9)	55.07	103.00
Central Gujarat (12)	510.44	141.00
Saurashtra (22)	234.76	108.00
South Gujarat (11)	355.78	171.00
Kachchh District (4)	20.00	86.00

The conclusions that emerge from the data on actual level of services are that (i) on an average, large-sized cities have higher levels of per capitoa availability of water, (ii) towns

with industrial dominance again have higher levels, and (iii) those towns which are located in the Saurashtra rgion have lower per capitas.

Table - 14

Per Capita Water Supply for Sewered towns by Size Class

Size Class	Water supply for the sewered towns (lpcd)	Overall (lpcd)
Corporations & towns with 200,000+	177	172
100,000 - 200,000	116	98
50,000 - 100,000	75	90
20,000 - 50,000	95	83
Total	149.	139

According to Table 14, there seems to be a positive relationship between the average water supply per capita and the sewerage system in that the average per capita water supply in sewered towns is higher than the overall average except for the class B towns. But the adverse effect of lower per capita water supply in class B towns vis-a-vis the overall higher per capita of sewered towns cannot be ignored as this class bags 11 of the 22 towns having sewerage systems.

Sewerage

The waste disposal system can be divided into three broad categories, namely (i) a sewerage which is meant to collect used water and sullage and other wastes, (ii) a drainage system to collect surface water from the open streets and areas, and (iii) garbage disposal for collection of dry refuse, and solid waste materials.

Of the 58 municipalities in the state, 22 have sewerage systems. Table 15 shows class-wise distribution of the sewerage system.

Table - 15

Sewerage System by Size Class

Size Class	Municiplaities*	
	Total number	Having sewerage system
Corporations	6	4
Class A	6	2
Class B**	27	8
Class C**	19	8
Total	58	22

* Also refer to Table - 47

** These towns are : Anand, Bhuj, Khambhat, Goudal, Gandhidham, Upleta, Mahuva, Botad, Sawarkundla, Sardarnagar, Viramgaon, Dhaboi, Billimora, Borsad, Kapaduanj and Unreth.

With the exception of Rajkot and Jamnagar all the corporations have sewerage systems.

16. Of the 22 municipalities and corporations which have sewerage systems, 21 have furnished data on the population and area coverage.

Table - 16

Area and Population Coverage by Sewerage as per Size Class

Size class	Number of responding municipalities	Population served ('000)		Area Served (sq.km.)	
		Actuals	% to total	Actuals	% to total
M.C.	4	3289	76.10	181.00	51.40
Class A	2	171	62.20	16.60	44.90
Class B	10	31116	48.02	69.54	49.65
Class C	5	128	64.60	30.80	32.70
Total	21	3894	71.62	297.94	48.58

As can be seen the coverage of Gujarat towns and municipalities by the sewerage system is rather low. Even in the four corporations which have furnished data, the sewerage system on an average covers 76.1 per cent of the population, and 51.4 per cent of the area.

That the sewerage system is grossly inadequate is borne out by the fact that only four towns and cities have the minimum per capita water supply of 140 ltrs/per capita per day to efficiently operate the sewerage system. These included the three corporations of Ahmedabad, Surat and Vadodara, and one class B municipality of Valsad. Even if this norm is lowered to 100 ltrs/per capita, only about a fourth of the total number of towns would seem to have effective sewerage system.

It is equally important to note that even with the supplementation of the sewerage system by surface drains, the situation with regard to the overall environmental hygiene cannot be said to be satisfactory in Gujarat's 58 towns and cities. According to the data, the drainage system covers not more than 60 per cent of the area in as many as 26 towns (out of the 38 towns which have responded). More or less the same situation is obtained in terms of population coverage also. Data on a few cities are interesting to take note of.

Table - 17

Area and Population Coverage by Saniation of Select Towns

Name	% of area served		% of population served	
	Surface drains	Underground sewerage	Surface drains	Underground sewerage
Ahmedabad	-	92.00	-	94.00
Surat	6.00	21.00	8.00	53.00
Vadodara	50.00	58.00	34.00	68.00
Rajkot	58.00	-	64.00	-
Bhavnagar	-	30.00	-	35.00
Jamnagar	38.00	-	40.00	-
Nadiad	-	38.00	-	52.00
Junagadh	78.00	-	75.00	-
Porbandar	62.00	-	57.00	-
Bharuch	-	-	96.00	-
Navsari	82.00	82.00*	63.00	74.00
Veravalpatan	57.00	-	59.00	-

* The system is combined.

The three corporatiosn of Surat, Bhavnagar and Jamnagar are not being served well either by surface drainage or by the underground sewerage system. As shown above, only 27 per cent of the city's area in Surat, 30 per cent of Bhavnagar, and 38 per cent of Jamnagar are being serve by either of the two systems. On the other hand, the coverage of the systems in cities such as Ahmedabad, Vadodara, Junagadh, and Navsari appears to be satisfactory.

Roads

Adequate provision of surfaced roads for the movement of men and materials is an essential function of every urban local body.

It is rightly stated that roads constitute the lifeline of towns and cities. In the 58 municipal areas of Gujarat state, the total road length available is estimated to be 5548.77 km. in length of which almost 70 per cent is surfaced while the rest is unsurfaced.

The comparison of developed area with the area of roads under circulation presents quite an unsatisfactory picture in that the per cent area under circulation is much lower than even the lower limit of the norms set therefore Only type B municipalities have a somewhat better position but that is so partly due to the lower percentage of developed area to total area. Another feature that emerges from Table - 18 is that city size and the road network are positively co-rrelated. This shows that the road mileage on an area basis is the highest in the case of corporatiosn (6.75 km.) which declines consistently as the size category of towns decreases. It is the lowest in class C towns.

Table - 18

Extent of Area Under Circulation

Category	Total area (sq.km.)	Total road length (km.) sq.km.	Surfaced road/sq. km. (km.)	% to total	Unsurfaced roads/ sq.km. (km.)	% to total	No. of local bodies	Total area (sq. km.)	Developed area (sq. km.) with % to total area	Area under circulation sq.km. with % to developed area.
Corporation	447.15	3024.48 (6.76)	5.42	80.25	1.33	19.75	4	240.74	96.26 (40)	8.54 (8.87)
Class A	109.19	482.92 (4.42)	2.80	63.37	1.62	36.63	6	109.19	50.44 (46)	4.09 (8.10)
Class B	319.31	1377.84 (3.95)	2.23	56.54	1.71	43.46	20	291.33	106.76 (36)	11.41 (10.68)
Class C	297.07	663.53 (2.47)	1.45	58.86	1.01	41.13	19	227.45	92.73 (41)	5.51 (5.94)
All	1172.72	5548.77 (4.73)	3.32	70.33	1.41	29.67	49*	868.71	346.19 (40)	29.55 (8.53)

* Data for 9 towns are not available.

The extent of road coverage and its adequacy can be seen from the fact that about 50 per cent of the urban local bodies have less than four km. of roads for every sq. km. of the town's area. Only about less than one fifth of the municipal areas have road lengths exceeding 8.1 km./sq.km. What is interesting is that even among the corporations and class A municipalities there are at least three (out of a total of 12) that have 2.1 to 4.0 km./sq.km. of roads, and another three between 6.1 and eight km./sq.km. of roads. These could not be said to be satisfactory levels by any standard.

Table - 19

Roads/Sq.km. by Size Class

Municipal roads/sq.km. (in km.)	Corporation	Class A	Class B	Class C	All	% to total
0.1-2.0	-	1	3	6	10	17.24
2.1-4.0	2	1	8	7	18	31.06
4.1-6.0	1	1	8	2	12	20.68
6.1-8.0	1	2	3	2	7	12.06
8.1-10.0	2	-	4	2	8	13.79
10.1 & above	1	1	1	-	3	5.17
All	6	6	27	19	58	100.00

Primary Education

Provision of educational facilties at all levels of life as an essential social infrastructure is necessary to supplement the economic infrastructure created through various development plans. Education holds the key to the overall development of the

society and the state. Government has been giving a high priority for the development of education especially primary education. During the period of the Sixth Five Year Plan 1980-85, emphasis was laid on equalising education opportunities and making education relevant. Primary education was included in the Minimum Needs Programme. The national norms for enrolment during the Sixth Five Year Plan 1980-85, was 95 per cent for the age group of school-going children against the existing position of 77 per cent enrolment in that age group on the basis of 1983-84 figures.

The classwise enrolment in the primary schools in urban Gujarat during the year 1983-84 is given in Table 20. The per cent enrolment in the primary schools to the total school-going population varies significantly from one class of localbody to another, ranging from 72.10 per cent in corporations to 88.75 per cent in class C municipalities. The negative correlation is noticed between the size of municipalities and enrolment in primary education. This is perhaps due to a very large number of students enrolled in the non-municipal schools, particularly in the larger cities.

Table - 20
Primary Education Enrolment by Size Class

Category	Estimate population (1983-84)	Enrolment (1983-84)	% Enrolment to estimated population
Corporations	770,406	555,494	72.10
Class A	113,363	90,747	80.04
Class B	276,590	238,692	86.29
Class C	116,178	103,113	88.75
All	1276,537	988,046	77.40

Fifty-two students on an average are accommodated in one classroom on the basis of the existing position of classrooms against the accepted norm of 40 students per classroom. However, this figure varies significantly from one class of local bodies to another ranging from 50.9 in class C local bodies to 59.5 in class A local bodies.

Table - 21

Student-Classroom Ratio by Size Class

Category	Existing number of classrooms (1983-84)	Number of students per classroom
Corporations	10,867	51.1
Class A	1,524	59.5
Class B	4,511	52.9
Class	2,023	50.9
All	18,925	52.2

The student-teacher ratio is given in Table 22.

Table - 22

Teacher-Student Ratio by Size Class

Category	Number of students per teacher
Corporation	38
Class A	31
Class B	45
Class C	63
All	41

The average number of students per teacher works out to 41 ranging from 31 in Class-A to 63 in class C local bodies. This figure corresponds to the norms laid down in the Sixth Five Year Plan which gives the teacher-pupil ratio as 1:38 and 1:40.

IV STANDARDS AND NORMS

The question as to what levels of services ought to be provided and maintaineid in urban areas of various sizes, dimensions and economic specialisation is not new in urban planning literature. It has been long debated both in India and outside, with experts and practitioners often recommending even the minutest details about the quantiative and qualitative standards of services such as water supply, roads, education and so forth. Some idea of this can be had from the fact that the Central Public Health and Environmental Engineering Organisation (CPHEEO), in proposing the norms for water supply, worked out detailed estimates for domestic needs (drinking, cooling, bathing, washing, flushing of toilets, gardening and individual air conditioning), institutional needs (hospitals, hotels, hostels, restaurants, airports and seaports, stations, offices, factories etc.), public purposes (street washing and watering, flushing of sewers, watering of public parks), industrial and commercial uses, fire-fighting, likely waste among users, and other uses! Standards for quality of water have been added with identical details. Similar is the case for other basic urban services.

What is important in the efforts of CPHEEO and other similar organisations and committees is that the standards as proposed by them have tended to represent the "most desirable levels of services" - a kind of optima, rather than the levels that would be within the reach of the urban localbodies. Very few local

bodies have been able to attain the standards of services as proposed by CPHEEO, or the Zakaria Committee, or the Town and Country Planning Organisation. More often, it has been the constraint of resources which has prevented the governments and local bodies from maintaining such high standards in the provision of services.

An equally significant factor which is becoming increasingly important in India as in other developing countries is that while it has been found possible to provide or instal higher levels of services (such as a per capita water supply of 200 ltrs/day with an underground sewerage system for medium-sized towns), the urban local bodies have not been able to efficiently and effectively maintain them. They have been unable to meet the prohibitively high operational expenses. In fact, there are many instances where services remain underutilised and even go into disuse for want of adequate operaional funds.

Thus, there is, at present, greater pragmatism in the field of determining standards or norms for practicularly the most basic municipal services and facilities, such as water supply, sewerage, roads, and primary education. The increasing numbers of the poor in the urban areas and their inability to pay even small amounts for the services has contributed significantly to this pragmatism.

Evidently enough, the norms for services are governed by demand and supply forces. On the demand side is the population factor, the number, the rate of increase, its compositon by age, occupation and activities, the income brackets and so on. Any

change in either the number of its composition can effectively alter the demand for a given service. The supply side is represented by the availability of funds, both capital and operational, not only at a point of time but over a period of time. As mentioned earlier the prerequistie for issuing any service efectively is the availability of operational funds on a recurring basis. Also, the selection of a system such as a water supply system or a road network will depend on the accessibility of an urban local body to capital resources. Apart from these, there are the localised factors such as the topography, type of region, and so on which may also influence the determination and eventual selection of a particular standard or tye for a service.

Reference may be made here to the general guidelines which the Zakaria Committee kept in view for evolving the standards of urban services. It reads as under :

> In evolving the standards for various grades of townships the important consideration has been the means of the local body to finance and maintain a particular standard of service. The financial position of many local bodies to undertake capital projects are limited and under these circumstances it will become a unworkable proposition if a standard is recommended which will involve subsidies. But the standards suggested here take into account the minimum needs for various purposes to maintain environmental hygiene to a desirable level. For instance in a small town with a population of say about 10,000 it may not be necessary to provide a higher per capita of water supply since it would be possible to meet certain water uses such as gardening, washing of clothes etc. from local sources such as wells, rivers etc., which in the case of bigger towns will have to be provided from the piped water supply. In a bigger city more water is required for public uses such as road washing, maintenance of huge publc open spaces, needs of public institutions and hotels, and for fire fighting etc. In a small town such needs are very much limited. So the differences in standards of services in the hierarchy of towns are based on the actual essential needs. Besides the economic implications of the use of urban land whose value is very high in the case of bigger cities have been taken into account in prescribing standards for certain elements of development. For instance in the case of metropolitan

cities where land values are very high and where the availability of land is scarce, mechanical treatment of sewerage has been suggested, whereas, in the case of small towns land treatment has been prescribed since plenty of land would be available there at cheaper rates. In addition there is an economic size of population for recommending mechanical treatment plants and it may be beyond the means of small local bodies to maintain such plants which will require staff with higher technical expertise. Similarly in the case of storm water drainage, covered drains have been recommended for bigger cities to restrict the size of the drain as compared to small towns where open drains could suffice.

In determining the norms for the study, a three-stage analysis has been carried out. The first stage consisted of an examination of the standards proposed by the Zakaria Committee and other organisations such as the Town and Country Planning Organisation and CPHEEO. In the second stage, these standards were juxtaposed with the existing levels of services (as given in the preceding chapter), with the objective of ascertaining as to how large the gap was between the existing levels and the desirable levels proposed by the various committees and organisations,and whether the urban local bodies were in a position to bridge this gap withinn a give time frame. The third stage consisted of taking a final view on what norms should be prescribed for the various services as far as this study was concerned. In taking a final view, consideration was given to the following factors :

i. Norms should reflect the needs of the various sizes and types of towns and cities. These should also take into account the constraints that the locations of the various towns may impose on the norms.

ii. Norms should be attainable within a given time frame.

iii. Norms should generally be low-cost and affordable.

As stated earlier, an examination of the proposals made by various committees and organisations constituted the first step in determining the norms and standards for the various services. Only a few facts of this examiantion relevant to the four services are presented here.

Water Supply

Among the four services, the one on water supply has been dealt with most extensively in literature. The Zakaria Committee and the Central Public Health and Environmental Engineering Organisation (CPHEEO) have made specific recommendations on the per capita requirements of water supply which are reproduced in Table 23.

Table - 23

Norms for Water Supply

(lpcd)

	The Zakaria Committee		The CHPEEO's Manual	
	Size (population)	Water Supply	Size (population)	Water Supply
A.	Special (2000,000+)	270	50,000+	125-200
A.	500,000-5000,000	202.5	100,00-50,000	100-125
B.	100,000-500,000	157.5	less than 10,000	70-100
C.	50,000-100,000	122.5		
D.	20,000-50,000	67.5		
E.	Less than 20,000	45.0		

Sewerage

The CHPEEO and the Zakaria Committee have recommended more specifically the types of systems for treatment of sewage. No clear directions are available on whether underground sewerage systems should be recommended for installation in cities of all sizes or whether these should be put in only larger cities. The CHPEEO has, however, proposed that underground sewers should be designed for a minimum of 150 ltrs. of water supply per capita per day. It is also stated that not more than 80 per cent of the water supply should be expected to reach the sewers, which means that such systems should be recommended for cities which have per capita daily water supplies of approximately 187 litres.

Roads

As in the case of sewerage the norms proposed for roads relate more to road widths and access standards rather than to the overall area that should be earmarked for roads and circulation. For instance, the Town and Country Planning Organisatio has suggested walking distances to schools, recreations points, health centres etc. which are extrmely important in the Master Planning exercises. The Zakaria Committee's recommendations are also of the same view.

Schools

The Seventh Five Year Plan (1985-90) has suggested that by the end of the Plan period, an overall enrolment of 93 per cent sould be attained for primary education, covering 6-14 years of age-group.

Existing levels of services have been discussed at length in the previous chapter, and here only a brief recapitulation is made in order to draw comparisons with the levels proposed by various committees and organisations.

Table - 24
Water Supply - Present Situation

(lpcd)

Size (population)	The Zakaria Committee	CPHEEO	RN	Existing levels Total	Gaps*
Corporations 200,000+)	202.5)		175	169.1	5.9
100,00-200,000	157.5)	125-200	145	99.2	45.8
50,000-100,000	112.5)		120	91.6	28.4
10,000-50,000	67.5	100-125	100	88.7	11.3
less than 10,000		70-100	100	NA	NA

RN = Recommended Norms (also refer to Table - 28)
* RN - Existing Level
NA = Not Applicable.

Table - 25

Sewerage - Present Situation

Size (population)	Underground sewerage		Average per capita water supply per day	Open rains	
	With 150 or more ltrs/day water supply	With less than 150 ltrs/day water supply		With 150 or more ltrs/day water supply	With less than 150 ltrs/day water supply
Corporations (2000,000+)	2	2	177.50		2
100,000-200,000	1	1	115.70		4
50,000-100,000	-	11	75.42		15
20,000-50,000	-	5	94.55		14
	3	19	149.49	35	

* Data for one town (Morvi) not available.

Table - 26

Roads - Present Situation

Percentage of area (population)	Percentage of area area under roads to total area		Roads/1000 persons (km.)		
	Total	Industrial	Pucca	Kuchha	Total
Corporations (200,000+)	8.28	8.65	0.52	0.12	0.65
100,000-200,000	4.61	7.74	0.43	0.25	0.69
50,000-100,000	2.91	1.23	0.44	0.35	0.80
20,000-50,000	1.27	No	0.47	0.33	0.81
	4.70	5.36	0.50	0.21	0.71

Table 27

Education - Present Situation

Size (population)	Enrolment percentage to total population in 6-11 age-group	Share of non-municipal school (in %)
Corporations (200,000+)	72.10	20
100,000-200,000	80.04	20
50,000-100,000	86.29	20
20,000-50,000	88.75	20
Total	77.40	20

Recommended Norms

A. Water Supply (Terminal year 2011)

Table - 28

Water Supply : General

(lpcd)

Size (population)	Overall	RN	Towns with industrial base	Problem towns
MC and towns with 200,000+	135-210	175	200-210	125
100,000-200,000	115-170	145	170	120-125
50,000-100,000	80-150	120	150	90
20,000- 50,000	75-125	100	-	-

RN = Recommended Norms

1. It is assumed that the requirements of water supply in towns with industrial base would be 1.25 times larger than in other towns.

2. Problem towns are those which are located in water-scarcity zones. These include - Rajkot, Bhavnagar, Jamnagar, Dhoraji, Godal, Jetput, Amreli, Upleta, Botad, Sawarkundla, Mangrol and Limbdi.

3. A technical note is also appended in this regard in Annexure-2.

Table - 29

Water Supply : Slums

(lpcd)

Size (population)	Overall	Problem towns
MC and towns with 200,000+	100	70
100,000- 50,000	90	60
50,000-100,000	80	55
20,000- 50,000	80	55

B. Underground Sewerage (Terminal year 2011)

Table - 30

Underground Sewerage

Size (population)	Norms
MC and towns with 100,000 population	100% population coverage except for percentage of slum population.
50,000-100,000	Only those towns which already have sewerage system.*
20,000- 50,000	Low cost sanitation system.

* Other towns may adopt an appropriate method relating to low cost sanitation.

C. Roads (Terminal year 2001)

Table - 31

Percentage of Roads to Total Developed Areas

Size (population)	*Gradual upgradation of the road network		Pucca to total roads
	1991	2001	
Corporations (200,000+)	20	25	80
100,00-200,000	15	20	70
50,000-100,000	12	15	65
20,000- 50,000	10	15	60

* The gradual upgradation is determined by existing roads 1000 persons/km to be such that does not overspill the percentages shown against each category of local body.

D. Education (Class I to V, age group 6 to 11 years - Terminal year 2001)

Table - 32

Primary Education

(percentage)

Year	Children in the reference age group to total population	Enrolment of children in 6-11 years	Share of non-municipal schools
1991	19.9	93	20
2001	16.9	93	20

In addition to the standards and norms for services norms for the unit cost of adding to the services have also been established. Unit costs proposed below are at constant prices.

A. Water Supply

Table - 33

Water Supply : Per Capita Unit Cost

(Rs.)

Size	Capital cost*		Operating Cost**
	Unit cost (general)	Unit cost problem towns	Average unit cost annual
MC and 200,000+	300 to 350	600 to 700	29
100,000-200,000	-do-	-do-	22
50,000-100,000	-do-	-do-	12
20,000- 50,000	-do-	-do-	11

* Unit cost for 150 lpcd approximately. In both the cases the average unit cost has been taken as norms such as Rs. 325 for general category and Rs. 650 for problem towns.

** This rate applies to problem towns also as the per capita cost in these towns works out to be much less than the above cost mainly due to lower existing actual water supply levels.

B. Sewerage

Table - 34

Sewerage and Garbage Collection : Per Capita Unit Cost

(Rs.)

Size population	Capital cost Average unit cost	Operating cost Average unit cost annual	
	Sewerage	Sewerage	Garbage*
MCD & towns with 200,000+	400 to 450	19	18
100,000-200,000	-do-	18	14
50,000-100,000	-do-	6	11
20,000- 50,000	-do-	10	8
Low cost sanitation	300 to 350	-	-

* The per capita cost of garbage collection is high as it includes the cost of tools and implements also.

C. Roads

Table - 35

Roads : Cost Per Km.

(Rs.)

Size (population)	Pucca roads		Kuchha roads capital cost
	Capital* cost (in lakhs)	Annual operating cost	
MC & towns 200,000+	7.5	60,000	40,000
100,000-200,000	5.0	40,000	-do-
50,000-100,000	4.0	30,000	-do-
20,000- 50,000	3.0	20,000	-do-

* This is good for even the towns in heavy rain prone area of South Gujarat where the high material cost balances the high labour cost in other (Saurashtra Region) towns.

D. Education

Table - 36

Primary Education : Cost

(Rs.in lakhs)

Size (population)	Annual operating cost/1000 students
MC & towns with (200,000+)	3.15
100,000-200,000	2.95
50,000-100,000	2.15
20,000- 50,000	2.64

Capital cost/class room Rs.50,000 for a room of 18'x22'

V GUJARAT'S MUNICIPAL SERVICES A LONG RANGE PERSPECTIVE

1. A brief recapitulation of the purpose of the study is called for at the outset of this chapter. The study's main purpose was to make an estimate of the total requirements of the four basic services of the 58 towns and cities of the Gujarat State, for the year 2011 AD in the case of water supply, and sewerage, and 2001 AD for roads and education.[1] The purpose was to also make an estimate of the requirements of financial resources, both capital and operating, for meeting the basic services needs of these towns.

2. The study involved essentially three steps, namely:

i. making estimates of population of these 58 towns and cities for the years 1991, 2001 and 2011;

ii. determining norms of services for the years under reference

iii. deciding upon the unit costs for adding to the existing stock and flow of services.

Details of the three steps have been given in the earlier chapters and therefore, only such details as are necessary for purposes of estimation will be referred to here.

3. According to the population projections (the preferred (ORG) model), the total population of the 58 towns and cities will increase to 12.2 million by the turn of the century (the year 2001 A.D.) and 15 million by the year 2011. Though the share of

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1. A longer time frame for water supply and sewerage was considered necessary as provision of these services often requires an integrated or quasi-integrated system. Planning for such a system requires a longer time frame. As against these smaller increments are possible to roads and education services as those happen to be largely divisible.

these towns in the total urban population is expected to decline with the passage of decades (as the urban base would expand), these towns will assume greater demographic significance in the State on account of their larger size. As may be seen in Table 37 there will be eight (as against six as of today) towns and cities with a population of 200,000+ and 18 cities in the size category of 100,000-200,000 population in 2001.

Table - 37

Population Estimates - 2001 & 2011

Size (population)	1981		2001		2011	
	No.of towns	Population ('000)	No.of towns	Population ('000)	No.of towns	Population ('000)
200,000+	6	4,601	8	7,617	11	10,036
100,000-200,000	6	699	18	2,372	27	3,612
50,000-200,000	24	1,515	27	2,019	17	1,296
50,000	22	944	5	207	3	128
Total	58	7,709	58	12,215	58	15,072

A second aspect that has a direct bearing upon the estimation of services is related to the area of 58 towns and cities and in this regard it is assumed that the total area of towns and cities as also the developed area will not undergo any changes. The details of area by size class of towns is given in Table 38.

Table - 38

Percentage of Developed Area

Size (population)	1982-83	
	Total area (Sq.Km.)	Developed area as % of total area
Corporations (200,000+)	447.15	40
100,000-200,000	109.19	46
50,000-100,000	348.01	36
20,000- 50,000	268.37	41
Total	1,172.72	40*

* Data relates to only 49 towns.

The third aspect relates to the estimated number of children in the 6-11 age-group by the terminal year of the study (2001). According to the 1983-84 age-tables, 16.5 per cent of the total urban population of Gujarat was in the relevant age-group for primary education. As per the estimate made on the basis of the findings on the age-wise returns made by the Expert Group on Population set up by the Planning Commission, more or less then same percentage (16.9) is expected to persist at least in the decade between 1991-2001, and 19.9 per cent for the intermediate year 1991. The total number of children needing primary education will be 2,064,355 (Table 39).

Table - 39

Estimated population in age-group 6-11 years

Years	1983-84 population	% to total population of 58 towns	2001 Estimated population	Estimated enrolment as per the 7th* Five Year Plan
6-11 years	12,79,800	16.5	2,064,335	1,919,831

* Seventh Five Year Plan for Gujarat State envisages 93 per cent enrolment of the reference age group for primary education. The same has been kept for the year 2001.

Water Supply

The estimated total requirements of water supply in the terminal year (2011) for the 58 municipalities and corporation work out to be 2544.81 (mld). However, the existing capacities (actual supply) are only 1176.05 (mld). Thus the gap during the terminal year works out to 1368.76 (mld) of water supply. (Table - 47)

Table 48 indicates the additional requirements for each town in terms of both investment and maintenance purposes. In the terminal year 1.e. 2011 all the towns require capital support for investment purposes for augmenting the existing system. Similarly in case of maintenance gap, all the towns except Anjar will need a substantial amount varying from Rs.34,000 to 6,79,30,000 (Table 49A)

All the 58 towns require additions in their existing systems varying from .30 mld to 267.25 mld in order to make them able to meet the requirements at the level of 2011 AD (Table - 48).

Only in case of Rajpipla it was found that the presently utilized capacity will be able to meet the requirements up to 2001. However, this town also will need an augmentation from 2001 onwards.

Three towns namely Palanpur, Ankleshwar and Anjar do not seem to have maintenance gap in the year 1991 owing to the better level of their per capita income which is Rs. 17, 12 and 13 respectively. This income is slightly higher than the respective class average taken as a norm for projecting maintenance requirements in these towns. However, in 2001 only one town i.e. Anjar maintains this ability to not to have a gap for operating cost.

Table 40 gives the cumulative requirements of financial resources for providing water supply of the above magnitude for maintaining the population level of 2011.

Table - 40

Water Supply : Financial Requirements by Size Class by 2011.

(Rs. in lakhs)

Size class	Financial resources requirements		
	Capital	Operating	(Annual)
MC and towns with 200,000	21,469.50	1997	
Class A	7,574.18	608	
Class B	4,947.26	82	
Class C	499.66	10	
Total	34,490.60	2,697	

Sewerage

According to the norms proposed in the preceding chapter, 48 towns should be eligible for underground sewerage system. The distribution of these towns by size is given below in Table 41.

Table - 41

Sewered Towns by 2011

Size (population)	Total number
Corporations (200,000+)	11
100,000-200,000	27
50,000-100,000	8
20,000- 50,000	2
	48

According to Table 49 A which gives the details of costs on a town-wise basis, the total capital resources required to cover these towns with underground sewerage will amount to Rs. 320.2 crores. The summed up results are indicated in Table 42.

Table - 42

Underground Sewerage : Financial Resources Requirement by Size Class by 2011

(Rs. in lakhs)

Size class	Financial resources requirements	
	Capital	Operating (Annual)
MC & towns with 200,000	8011.2	3,713.32
Class A	394.00	1,155.84
Class B	595.20	220.32
Class C	72.00	23.04
Total	9072.4	5,112.52

Roads

Table 43 deals with the cost of laying new roads and maintaining them along with the already existing stock. The road lengths in the year 2001 elevate the level of percentage of roads under circulation to total developed urban area from 8 to 16 at a cost of Rs.287.84 crores.

Table - 43

Roads : Financial Resources Requirements by Size Class by 2001

(Rs. in lakhs)

Size class	Financial resource requirements	
	Capital	Maintenance (Annual)
MC & towns with 200,000+	19050.99	3045.41
Class A	2921.93	459.48
Class B	2572.46	323.55
Class C	353.97	36.53
Total	24919.35	3864.97

Education

Table 44 gives the financial requirements to bring into the fold of education, 1.5 million children, expected to go to municipal schools for primary education by the turn of the century. As per the target of 93 per cent coverage of school-going children set in the Seventh Plan, it was felt that out of this 20 per cent of the children are likely to go to public schools and proportion of the school-going children (municipal schools) has been worked out accordingly at a cost of Rs.92.43 crores.

Table - 44

Education : Financial Resources Requirement
by Size Class by 2001

(Rs. in lakhs)

Size class	Financial resources requirement	
	Capital	Estimate and other costs (Annual)
MC & towns with 200,000+	2941.50	3018.06
Class A	772.50	879.06
Class B	878.50	506.64
Class C	178.50	68.52
Total	4771.00	4472.63

Table - 45

Water Supply : Base

Name*	Water supply (mld)			Augmentation					Water supply* (lpcd)		Sewerage	Problem towns	Per capita (1982-83) (Rs.)	
	Installed	Total	Domestic	Nos.	Years (1900+)	Planned	In progress	Design capacity (mld)	Total	Domestic			Income	Expenditure
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Ahmedabad (2200)	440.00	440.00	331.00	3	1,276,84	No	Yes	650.00	200.00	150.45	Yes	No	9.31	42.02
Surat (871)	158.90	122.85	N.A.	2	81,4	No	Yes	317.80	141.02	0.00	Yes	No	10.42	23.27
Vadodara (820)	167.00	167.00	83.50	1	N.A.	No	Yes	117.00	203.65	101.80	Yes	No	13.47	21.90
Rajkot (520)	65.80	65.80	60.00	2	747,7	No	Yes	22.50	126.53	115.30	No	Yes	0.10	19.75
Bhavnagar (336)	37.40	37.14	30.44	2	656,8	No	Yes	60.00	110.37	90.59	Yes	Yes	8.30	16.09
Jamnagar (297)	36.00	36.00	24.30	1	80-81	No	Yes	26.00	121.30	81.80	No	Yes	13.31	11.44
Nadiad (157)	54.00	14.08	12.55	1	N.A.	No	Yes	19.60	89.80	80.00	Yes	No	5.00	17.00
Junagadh (130)	25.10	17.00	11.90	1	N.A.	No	Yes	N.A.	130.70	91.50	No	No	1.35	19.38
Porbandar (122)	12.00	12.00	9.00	1	N.A.	No	No	Nil	98.36	73.70	No	No	6.82	9.46
Bharuch (117)	11.60	11.60	8.50	1	N.A.	No	Yes	17.40	99.26	72.70	No	No	13.60	46.59
Navsari (120)	20.00	18.00	18.00	1	N.A.	No	Yes	0.40	150.08	150.08	Yes	No	4.02	35.37
Veralpatan (111)	1.60	1.60	1.30	No	No	Yes	No	N.A.	14.51	11.70	No	No	3.58	8.99
Surendranagar (93)	10.00	10.00	N.A.	N.A.	N.A.	Yes	No	9.00	108.00	0.00	No	No	6.75	6.06
Godhra (87)	6.10	5.50	5.20	N.A.	N.A.	No	Yes	50.00	63.13	59.60	No	No	N.A.	N.A.
Anand (96)	8.15	7.69	6.59	1	N.A.	No	Yes	5.30	80.00	68.64	Yes	No	8.46	9.45
Patan (82)	12.00	12.00	8.00	1	N.A.	No	Yes	1.40	146.10	97.40	No	No	10.97	12.56
Dhoraji (79)	4.51	4.50	4.50	1	N.A.	No	Yes	9.00	56.74	56.74	No	Yes	4.93	5.00
Morvi (77)	14.05	10.20	N.A.	No	No	No	No	0.00	131.82	0.00	N.A.	No	9.50	17.43
Kalol (77)	10.35	10.35	9.35	1	N.A.	No	Yes	0.50	135.21	122.10	No	No	1.40	14.63
Mahesana (77)	11.50	9.49	9.10	1	N.A.	No	No	0.00	123.20	118.00	No	No	8.08	16.86

* Figures in the brackets indicate the estimated population of respective towns (in thousands) during the year 1983-84 on whose basis the per-capita supply has been worked out.

Contd....

Table - 45 (Contd.)

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Bhuji (76)	9.50	8.60	8.30	1	N.A.	No	No	Nil	112.59	109.21	Yes	No	N.A.	21.75
Khambhat (85)	9.60	9.60	6.50	1	N.A.	No	Yes	12.90	112.94	76.90	Yes	No	4.56	8.07
Gondal (70)	3.00	3.00	2.10	1	N.A.	No	No	0.00	42.70	29.90	Yes	Yes	1.08	8.41
Sahijpurbogha (68)	6.40	6.40	5.60	1	N.A.	No	No	Nil	94.11	82.35	No	No	1.56	7.01
Jetpur (73)	7.00	7.00	5.70	No	No	No	Yes	19.00	96.33	78.40	No	Yes	5.57	13.81
Gandhidham (73)	5.50	5.00	4.70	2	81,84	No	No	Nil	68.70	64.50	Yes	No	5.67	14.43
Palanpur (68)	3.00	3.00	2.70	1	82,83	No	No	Nil	43.80	39.70	No	No	17.15	13.91
Amreil (64)	2.00	2.00	1.70	1	79	No	Yes	10.00	31.13	26.40	No	Yes	4.01	20.64
Dohad (62)	6.80	6.80	6.60	1	820,83	No	Yes	0.10	110.19	106.90	No	No	8.62	13.63
Valsad (56)	8.20	8.29	N.A.	1	N.A.	No	Yes	2.00	148.55	0.00	No	No	9.95	31.28
Upleta (65)	3.60	3.60	3.50	4	55,69 73,76	Yes	No	0.00	55.34	53.80	Yes	Yes	5.34	7.58
Manuva (58)	6.70	5.55	2.20	2	68,69 82,83	No	Yes	8.00	95.14	37.93	Yes	No	1.63	4.03
Sidhpur (52)	3.10	3.10	2.90	1	83,84	No	Yes	10.08	59.40	53.90	No	No	4.65	6.82
Dhrangadhra (55)	4.00	3.60	3.60	1	N.A.	No	No	0.00	65.06	65.06	No	No	4.94	12.14
Botad (59)	3.50	2.14	2.00	1	N.A.	No	Yes	11.58	36.12	33.76	Yes	Yes	1.87	10.86
Sawarkundla (55)	1.80	1.50	N.A.	1	78	No	Yes	12.17	27.51	0.00	Yes	Yes	3.89	16.78
Sardarnagar (55)	7.00	7.00	5.70	1	79	No	No	Nil	126.50	103.00	Yes	No	3.18	11.13
Viramgaon (50)	4.23	4.23	4.10	1	N.A.	Yes	No	13.50	84.60	81.60	Yes	No	0.12	8.61
Petlad (51)	9.70	6.88	4.70	1	N.A.	No	No	Nil	134.74	92.15	No	No	3.17	10.09
Visnagar (52)	4.50	4.58	3.80	1	N.A.	No	Yes	0.45	88.82	73.70	No	No	0.43	17.83

Contd....

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Dabhoi (47)	4.50	4.50	4.02	1	N.A.	No	Yes	24.00	96.32	85.53	Yes	No	8.94	8.84
Dholka (48)	4.20	4.20	2.45	2	55,72	No	Yes	8.05	88.09	51.30	No	No	2.73	6.72
Billimora (53)	2.59	2.69	2.50	1	N.A.	No	Yes	14.80	50.66	47.10	Yes	No	4.66	9.84
Deesa (48)	5.00	5.00	2.50	No	No	No	No	0.00	104.69	52.30	No	No	3.64	12.57
Wadhwan (42)	4.20	3.73	3.73	No	No	No	No	0.00	88.75	88.75	No	No	5.52	6.54
Borsad (42)	4.40	3.69	3.00	1	N.A.	No	Yes	5.00	88.36	71.80	Yes	No	4.08	8.29
Unjha (41)	5.10	4.05	3.75	1	71,72	No	Yes	1.33	98.79	91.40	No	No	8.46	21.81
Mangrol (41)	2.10	1.80	1.69	1	85	No	No	Nil	43.96	41.20	No	Yes	3.81	6.25
Anklesvar (38)	5.40	4.50	4.00	1	N.A.	Yes	No	1.80	118.27	105.13	No	No	11.61	18.31
Kapadvanj (37)	5.40	4.82	4.30	1	N.A.	No	Yes	7.50	131.13	117.10	Yes	No	5.15	24.59
Kadi (37)	3.50	3.50	1.50	No	No	Yes	No	N.A.	94.20	40.30	No	No	5.71	9.86
Palitana (37)	5.80	3.60	2.50	1	N.A.	No	Yes	0.68	96.78	67.20	No	No	6.79	10.22
Anjar (36)	4.20	4.20	2.00	2	71,83	No	Yes	0.20	116.63	55.53	No	No	13.38	16.07
Wankaner (49)	2.20	2.20	2.00	1	N.A.	No	Yes	7.05	44.89	40.80	No	No	3.14	6.96
Mandvi (49)	2.50	2.20	1.50	1	N.A.	No	Yes	N.A.	44.57	30.40	No	No	9.16	5.22
Limbdi (33)	0.80	0.80	N.A.	N.A.	N.A.	No	No	0.00	24.37	0.00	No	Yes	4.94	10.87
Rajpipla (31)	4.05	4.05	3.50	1	N.A.	No	No	Nil	131.92	114.00	No	No	4.32	15.11
Umreth	1.85	1.85	1.70	2	55,83	No	Yes	5.46	60.50	57.10	Yes	No	1.77	4.79

Table - 45-A

City Wise Water Supply Requirements

Name		Population ('000)			Water supply actual : 1983-84 (mld)	Recommended norms (lpcd)			Total qty. required (mld)		
		1991	2001	2011		1991	2001	2011	1991	2001	2011
1.		2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
Ahmedabad		2440	2910	3450	440.00	205	205	205	500.20	596.55	707.25
Surat		940	1260	1600	122.85	205	205	205	192.70	258.30	328.00
Vadodara		980	1250	1542	167.00	205	205	205	200.90	256.25	316.11
Rajkot	P	597	760	964	65.80	125	125	125	74.63	95.00	120.50
Bhavnagar	P	390	490	600	37.14	125	125	125	48.75	61.25	75.00
Jamnagar	P	370	490	620	36.00	125	125	125	46.25	61.25	77.50
Nadiad		195	250	325	14.08	145	175	175	28.28	43.75	56.88
Junagadh		141	166	195	17.00	145	145	145	20.45	24.07	28.28
Porbandar		136	148	171	12.00	145	145	145	19.72	21.46	24.80
Bharuch		138	172	225	11.60	145	145	175	20.01	24.94	39.38
Navsari		150	207	270	18.00	170	205	205	25.50	42.44	55.35
Veravalpatan		138	174	213	1.60	145	145	175	20.01	25.23	37.28
Surendranagar		117	149	189	10.00	145	145	145	16.97	21.61	27.41
Godhra		104	125	148	5.50	145	145	145	15.08	18.13	21.46
Anand		120	162	227	7.69	145	145	175	17.40	23.49	39.73
Patan		104	133	165	12.00	145	145	145	15.08	19.29	23.93
Dhoraj	P	98	118	138	4.50	90	123	123	8.82	14.51	16.97
Morvi		95	120	153	10.20	120	145	145	11.40	17.40	22.19
Kalol		93	121	150	10.35	150	170	170	13.95	20.57	25.50
Mahesana		93	121	150	9.49	120	145	145	11.16	17.55	21.75

Contd....

1.		2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
Bhuji		87	107	127	8.60	120	145	145	10.44	15.52	18.42
Khambhat		94	111	129	9.60	150	170	170	14.10	18.87	21.93
Gondal	P	76	98	100	3.00	90	90	123	6.84	8.82	12.30
Sahijpurbogha		76	100	130	6.40	150	170	170	11.40	17.00	22.10
Jetpur	P	88	119	151	7.00	150	170	170	13.20	20.23	25.67
Gandhidham		87	117	151	5.00	120	145	145	10.44	16.97	21.90
Palanpur		84	109	137	3.00	120	145	145	10.08	15.81	19.87
Amreil	P	62	78	96	2.00	90	90	90	5.58	7.02	8.64
Dohad		70	87	107	6.80	120	120	145	8.40	10.44	15.52
Valsad		69	86	105	8.29	120	120	145	8.28	10.32	15.23
Upleta	P	68	94	129	3.60	90	90	123	6.12	8.46	15.87
Mahuva		69	87	107	5.55	120	120	145	8.28	10.44	15.52
Sidhpur		61	73	87	3.10	120	120	120	7.32	8.76	10.44
Dharangadhra		64	81	99	3.60	150	150	150	9.60	12.15	14.85
Botad	P	65	85	107	2.14	90	90	123	5.85	7.65	13.16
Sawarkundla	P	62	75	91	1.50	90	90	90	5.58	6.75	8.19
Sardarnagar		65	82	104	7.00	120	120	145	7.80	9.84	15.08
Viramgaon		68	84	103	4.23	120	120	145	8.16	10.08	14.94
Petlad		54	64	74	6.88	120	120	120	6.48	7.68	8.88
Visnagar		59	71	86	4.58	120	120	120	7.08	8.52	10.32

Contd....

1.		2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
Dabhoi		64	89	120	4.50	120	120	145	7.68	10.68	17.40
Dholka		61	83	113	4.20	120	120	145	7.32	9.96	16.39
Billimora		65	88	114	2.69	150	150	170	9.75	13.20	19.38
Deesa		61	90	119	5.00	120	120	145	7.32	10.80	17.26
Wadhwan		51	65	81	3.73	120	120	120	6.12	7.80	9.72
Borsad		49	61	74	3.69	100	120	120	4.90	7.32	8.88
Unjha		44	56	72	4.05	100	120	120	4.40	6.72	8.64
Mangrol	P	45	58	71	1.80	90	90	90	4.05	5.22	6.39
Anklesvar		47	64	86	4.50	100	120	120	4.70	7.68	10.32
Kapadvanj		40	46	54	4.82	100	100	120	4.00	4.60	6.48
Kadi		38	58	74	3.50	100	120	120	3.80	6.96	8.88
Palitana		43	51	59	3.60	100	120	120	4.30	6.12	7.08
Anjar		40	47	55	4.20	100	100	120	4.00	4.70	6.60
Wankaner		36	40	43	2.20	100	100	100	3.60	4.00	4.30
Mandvi		46	59	72	2.20	100	120	120	4.60	7.08	8.64
Limbdi	P	41	52	65	0.80	90	90	90	3.69	4.68	5.85
Rajpipla		34	39	43	4.05	100	100	100	3.40	3.90	4.30
Umreth		31	35	42	1.85	100	100	100	3.10	3.50	4.20

Table - 46

Sewerage, Drainage and Garbage : Base

Name	Drainage					Sewerage				Garbage				Per capita (Rs.)			
														Sewerage/ drainage		Garbage	
	Open	Cov-ered	Com-bined	Area served (%)	Pop. served (%)	Sepa-rate	Comb-ined system	Area served	Pop. served (%)	Plan-ned (%)	In prog-ress cover-ed	Pro-posed area	(Kpcd)*	In-come	Expen-diture	In-come	Expen-diture
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
Anmedabad	No	No	No	Nil	Nil	Yes	No	91.70	93.80	No	Yes	8.30	0.430	9.03	2.51	Nil	29.49
Surat	Yes	Yes	Yes	5.67	7.51	No	Yes	21.85	53.00	No	Yes	11.14	0.570	0.17	5.01	Nil	19.53
Vadodara	Yes	Yes	No	50.00	34.14	Yes	No	58.88	68.29	No	Yes	39.09	0.024	8.91	10.32	0.25	1.49
Rajkot	Yes	No	No	58.00	63.50	No	No	Nil	Nil	No	Yes	45.65	0.003	N.A.	GARB	0.03	0.01
Bhavnagar	No	No	Yes	Nil	Nil	No	Yes	30.01	35.70	No	Yes	14.40	0.160	3.17	7.09	0.02	1.44
Jamnagar	Yes	Yes	No	38.31	40.43	No	No	Nil	Nil	No	Yes	100.00	0.410	Nil	1.90	Nil	15.72
Nadiad	No	No	Yes	Nil	Nil	No	Yes	33.70	52.56	No	Yes	N.A.	0.068	6.21	18.08	0.15	23.29
Junagarh	Yes	Yes	No	77.80	74.60	No	No	Nil	Nil	No	No	Nil	0.053	0.06	1.40	0.15	23.29
Porbandar	Yes	Yes	No	61.70	57.40	No	No	Nil	Nil	No	Yes	N.A.	0.650	GARB	GARB	0.04	19.53
Bharuch	Yes	Yes	No	N.A.	96.08	No	No	Nil	Nil	No	Yes	N.A.	0.182	Nil	2.48	N.A.	19.77
Navsari	No	No	Yes	82.35	62.53	No	Yes	82.35	75.04	No	No	Nil	0.025	6.20	4.02	Nil	10.23
Veralpatan	Yes	No	No	57.00	59.00	No	No	Nil	Nil	No	No	Nil	0.001	Nil	Nil	0.18	3.72
Surendranagar	Yes	No	No	65.53	60.00	No	No	Nil	Nil	No	No	Nil	0.001	Nil	Nil	Nil	19.00
Godhra	Yes	No	No	N.A.	N.A.	No	No	Nil	Nil	No	No	Nil	0.103	Nil	Nil	0.16	6.97
Anand	No	Yes	Yes	Nil	Nil	No	Yes	29.53	35.16	No	Yes	15.67	0.421	2.96	4.57	Nil	1.13
Patan	Yes	No	No	100.00	100.00	No	No	Nil	Nil	No	No	Nil	0.036	0.28	N.A.	0.39	29.21
Dhoraji	Yes	No	No	59.80	60.02	No	No	N.A.	N.A.	No	Yes	100.00	0.252	N.A.	6.38	0.15	7.73
Morvi	No	No	No	Nil	Nil	No	No	Nil	Nil	No	No	Nil	0.193	N.A.	N.A.	0.26	Nil

Contd....

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
Kalol	Yes	Yes	No	23.20	47.00	No	No	Nil	Nil	No	No	Nil	0.117	4.64	7.21	Nil	16.81
Mahesana	Yes	No	No	77.70	90.00	No	No	Nil	Nil	No	Yes	30.00	0.046	Nil	1.13	Nil	6.53
Bjuj	No	No	Yes	22.50	65.00	No	Yes	22.50	65.00	No	No	Nil	0.051	3.46	2.85	Nil	19.95
Cambay																	
Khambhat	No	No	Yes	Nil	Nil	No	Yes	69.50	59.20	Yes	No	30.50	0.113	1.75	2.87	Nil	0.96
Gondal	Yes	No	Yes	68.60	45.60	No	Yes	68.60	35.60	No	No	Nil	0.284	Nil	2.28	0.19	22.53
Sahijpubogha	Yes	No	No	40.00	25.14	No	No	Nil	Nil	No	No	Nil	0.160	0.34	0.47	Nil	2.44
Jetpur	Yes	No	No	54.30	55.70	No	No	Nil	Nil	No	No	Nil	1.100	N.A.	10.98	N.A.	N.A.
Gandhidham	Yes	No	Yes	10.00	79.01	No	Yes	90.00	N.A.	No	No	Nil	0.082	0.84	1.68	0.30	16.73
Palanpur	Yes	No	No	80.00	81.87	No	No	Nil	Nil	Yes	No	N.A.	0.035	Nil	4.09	0.10	24.37
Amreli	Yes	Yes	No	30.32	31.12	No	No	Nil	Nil	No	Yes	47.50	0.015	0.02	2.24	0.31	1.54
Dohad	Yes	No	No	17.03	64.82	No	No	Nil	Nil	No	Yes	30.00	0.518	Nil	1.19	0.48	2.13
Valsad	Yes	No	No	59.90	71.65	No	No	Nil	Nil	No	No	Nil	0.859	0.36	9.60	Nil	11.21
Upleta	Yes	No	Yes	60.10	64.60	No	Yes	N.A.	15.40	No	No	Nil	0.230	N.A.	N.A.	0.63	16.13
Mahuva	No	No	Yes	Nil	Nil	No	Yes	75.88	78.04	No	No	Nil	0.025	2.72	1.06	1.91	22.57
Sidhpur	Yes	No	No	27.00	28.48	No	No	Nil	Nil	No	No	Nil	0.093	Nil	1.82	0.28	0.98
Dhrangadhra	Yes	No	No	50.00	54.20	No	No	Nil	Nil	No	No	Nil	0.580	Nil	4.57	0.74	8.07
Botad	Yes	No	No	5.00	13.50	Yes	No	40.00	64.14	No	Yes	25.00	0.016	0.20	0.39	0.09	0.40
Sawarkundla	No	Yes	Yes	75.00	64.20	No	Yes	75.00	64.20	No	Yes	25.00	1.830	Nil	3.28	0.79	1.51
Sardarnagar	No	No	Yes	Nil	Nil	No	Yes	89.92	82.95	No	No	Nil	0.001	3.26	4.93	Nil	12.67
Viramgaon	No	No	No	Nil	Nil	No	Yes	85.42	90.00	No	Yes	14.55	0.084	1.20	4.17	0.21	0.55
Petlad	No	No	No	N.A.	N.S.	No	No	Nil	Nil	No	Yes	100.00	0.013	N.A.	N.A.	Nil	6.22
Visnagar	No	Yes	No	69.15	67.92	No	No	N.A.	N.A.	No	No	Nil	0.097	1.08	2.16	Nil	9.76
Dabhoi	No	No	Yes	Nil	Nil	No	Yes	14.73	74.00	No	No	Nil	0.013	1.38	4.26	Nil	0.71
Dholka	Yes	Yes	No	51.54	63.97	No	No	Nil	Nil	No	Yes	25.77	0.062	0.03	0.93	0.01	7.07

Contd...

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
Billimora	No	No	Yes	Nil	Nil	No	Yes	56.25	52.39	No	Yes	43.75	0.075	0.08	Nil	Nil	13.55
Deesa	Yes	No	No	45.71	74.33	No	No	Nil	Nil	No	No	Nil	0.003	N.A.	N.A.	0.12	19.41
Wadhwan	Yes	No	No	9.97	49.93	No	No	Nil	Nil	No	No	Nil	0.237	0.01	Nil	0.96	3.44
Borsad	No	Yes	Yes	Nil	Nil	No	Yes	3.96	47.89	No	Yes	2.97	0.718	4.30	8.51	Nil	1.30
Unjha	Yes	Yes	No	9.65	48.79	No	No	Nil	Nil	No	Yes	15.44	0.097	0.30	Nil	Nil	16.45
Mangrol	No	No	No	Nil	Nil	No	No	Nil	Nil	No	No	Nil	0.064	N.A.	N.A.	0.06	12.66
Anklesvar	No	No	No	Nil	Nil	No	No	Nil	Nil	No	No	Nil	0.039	2.31	2.45	Nil	12.91
Kapadvanj	No	No	Yes	Nil	Nil	No	Yes	23.81	61.70	No	Yes	11.98	0.004	1.18	4.44	5.11	18.64
Kadi	Yes	Yes	No	30.53	75.36	No	No	Nil	Nil	No	Yes	100.00	0.107	Nil	1.46	Nil	16.56
Palitana	No	No	No	Nil	Nil	No	No	Nil	Nil	No	Yes	100.00	0.080	Nil	19.93	1.04	0.25
Anjar	No	Yes	No	28.09	55.54	No	No	Nil	Nil	No	No	Nil	0.124	1.00	N.A.	0.12	0.94
Wankaner	Yes	No	No	44.44	40.81	No	No	Nil	Nil	No	No	Nil	0.244	N.A.	N.A.	0.16	14.64
Mandvi	No	No	No	Nil	Nil	No	No	Nil	Nil	No	No	Nil	1.523	Nil	Nil	0.23	0.49
Limbdi	Yes	No	No	85.00	85.00	No	No	Nil	Nil	No	No	Nil	0.304	0.53	8.58	0.99	3.11
Rajpipla	Yes	No	No	44.94	56.00	No	No	Nil	Nil	No	No	Nil	0.081	N.A.	N.A.	0.05	24.63
Umreth	No	No	Yes	Nil	Nil	No	Yes	81.90	11.94	No	Yes	11.49	0.302	2.39	3.70	Nil	2.36

Note : "GARB" indicates that the figures is combined with garbage.
* Kpcd: kilograms per capita per day.

Table - 47

Water Supply : Financial Resource Requirements for the Maintenance Purposes by Size Class

(Rs. in lakh)

Class	Additional requirements by the year					
	1991		2001		2011	
	Additional water supply requirement (mld)	Cost (Rs.in lakhs) Maintenance	Additional water supply requirement (mld)	Cost (Rs. in lakns) Maintenance	Additional water supply requirement (mld)	Cost (Rs. in lakhs) Maintenance
MC & towns with 200,000+ Population	194.64	1118.60	513.92	1510.87	931.22	1996.99
Class A	89.02	215.33	201.09	374.27	342.59	607.28
Class B	98.02	150.54	124.62	146.17	90.25	82.43
Class C	11.28	24.16	3.58	10.55	4.70	10.13
Total	392.95	1508.63	843.20	2041.86	1368.76	2696.83

Table - 47 A

Water Supply : Capital (Investment) Requirements by Size Class

(Rs.in lakhs)

Size Class	Investment requirements			
	1991	2001	2011	Cumulative upto 2011
MC & towns with 200,000+ population	4882.58	7485.41	9101.51	21469.50
Class A	1929.27	2289.54	3355.37	7574.18
Class B	2753.76	1456.76	736.74	4947.26
Class C	428.14	47.68	23.84	499.66
Total	9993.75	11279.39	13217.46	34490.60

Table - 48

Water Supply : Financial Resource Requirements (Cumulative) : City Wise

Name		Net Requirement (mld)			Additional Financial Requirements for the of maintenance of of water supply by the year		
		1991	2001	2011	1991	2001	2011
1.		2.	3.	4.	5.	6.	7.
Ahmedabad		60.20	156.55	267.25	48043.60	57297.90	67930.50
Surat		69.85	135.45	205.15	17465.20	23410.80	29728.00
Vadodara		33.90	89.25	149.11	15219.40	19412.50	23947.26
Rajkot	P	8.83	29.20	54.71	17253.30	21964.00	27859.60
Bhavnagar	P	11.61	24.11	37.86	8073.00	10143.00	12420.00
Jamnagar	P	10.25	25.25	41.50	5805.30	7688.10	9727.80
Nadiad		14.20	29.67	42.80	3315.00	6000.00	7800.00
Junagadh		3.45	7.07	11.28	2911.65	3427.90	4026.75
Porbandar		7.72	9.46	12.80	2064.48	2246.64	2595.78
Bharuch		8.41	13.34	27.78	1159.20	1444.80	3465.00
Navsari		7.50	24.44	37.35	2697.00	5170.86	6744.60
Veralpatan		18.41	23.63	35.68	2541.96	3205.08	5414.46
Surendranagar		06.97	11.61	17.41	1784.25	2272.25	2882.25
Godhra		9.58	12.63	15.96	2288.00	2750.00	3256.00
Anand		9.71	15.80	32.04	1624.80	2193.48	4662.58
Patan		3.08	7.29	11.93	1147.12	1466.99	1819.95
Dhoraj	P	4.32	10.01	12.47	692.86	2014.26	2355.66
Morvi		1.20	7.20	11.99	237.50	1500.00	1912.50
Kalol		3.60	10.22	15.15	985.80	2492.60	3090.00
Mahesana		1.67	8.06	12.26	364.56	2088.00	2088.00

Conta.....

1.		2.	3.	4.	5.	6.	7.
Bhuj		1.84	6.92	9.82	1044.00	2354.00	2794.00
Khambhat		4.50	9.27	12.33	699.36	1935.84	2249.76
Gondal	P	3.84	5.82	9.30	829.92	1070.06	2092.00
Sanijpurbhoga		5.00	10.60	15.70	793.44	2044.00	2657.20
Jetpur	P	6.20	13.23	18.67	565.84	1955.17	2480.93
Gandhidham		5.44	11.97	16.90	550.71	1910.61	2465.83
Palanpur		7.08	12.81	16.87	-432.60	528.65	664.45
Amreil	P	3.58	5.02	6.64	495.38	623.22	767.04
Dohad		1.60	3.64	8.72	236.60	294.06	1431.66
Valsad		-0.01	2.03	6.94	141.45	176.30	1265.25
Upleta	P	2.52	4.86	12.27	452.88	626.04	2149.14
Manua		2.73	4.89	9.97	715.53	902.19	2179.59
Sidhpur		4.22	5.66	7.34	448.35	536.55	639.45
Dharangadhara		6.00	8.55	11.25	451.84	571.86	698.94
Botad	P	3.71	5.51	11.02	658.45	861.05	2153.91
Sawarkundla	P	4.08	5.25	6.69	502.82	608.25	738.01
Sardarnagar		0.80	2.84	8.08	573.30	723.24	1957.28
Viramgaon		3.93	5.85	10.71	807.84	997.92	2253.64
Petlad		-0.40	0.80	2.00	476.82	565.12	653.42
Visnagar		2.50	3.94	5.74	682.63	821.47	995.02

Contd....

1.		2.	3.	4.	5.	6.	7.
Dabhoi		3.18	6.18	12.90	195.84	272.34	1567.20
Dholka		3.12	5.76	12.19	565.47	769.41	2177.51
Billimora		7.06	10.51	16.69	477.10	645.92	1976.76
Deesa		2.32	5.80	12.26	509.96	752.40	2184.84
Wadhwan		2.39	4.07	5.99	330.48	421.20	524.88
Borsad		1.21	3.63	5.19	339.08	483.12	586.08
Unjha		0.35	2.67	4.59	111.76	198.24	254.88
Mangrol	P	2.25	3.42	4.59	323.55	475.02	33.49
Anklesvar		0.20	3.18	5.82	-28.67	24.96	33.54
Kapadwanj		-0.82	-0.22	1.66	234.00	269.10	369.90
Kadi		0.30	3.46	5.38	221.54	396.14	505.42
Palitana		0.70	2.52	3.48	181.03	265.71	307.39
Anjar		-0.20	0.50	2.40	-95.20	-111.86	-75.90
Wankaner		1.40	1.80	2.10	282.96	314.40	337.98
Mandvi		2.40	4.88	6.44	84.64	167.56	204.48
Limbdi	P	2.89	3.88	5.05	248.46	367.12	458.90
Rajpipla		-0.65	-0.15	0.25	227.12	260.52	287.24
Umreth		1.25	1.65	2.35	286.13	323.05	387.66

Table - 48 A

Water Supply : Investment Requirements : City Wise

Name		Gap in water supply (mld)			Investment requirements* (Rs.in 000')		
		1991	2001	2011	1991	2001	2011
1.		2.	3.	4.	5.	6.	7.
Ahmedabad		60.20	96.35	110.70	130453	208790	239887
Surat		69.85	65.60	69.70	151365	142155	151040
Vadodara		33.90	55.35	59.86	73461	119943	129717
Rajkot	P	8.83	20.37	25.50	38260	88263	110492
Bhavnagar	P	11.61	12.50	13.75	50306	54163	59579
Jamnagar	P	10.25	15.00	16.25	44413	64995	70411
Nadiad		14.20	15.47	13.13	30771	33523	28453
Junagadh		3.45	3.62	4.21	7476	7845	9123
Porbandar		7.72	1.74	3.34	16729	3771	7238
Bharuch		8.41	4.93	14.44	18224	10683	31292
Navsari		7.50	16.94	12.91	16253	36709	27976
Veralpatan		18.41	5.22	12.05	39894	11312	26112
Surendranagar		06.97	4.64	5.80	15104	10055	12569
Godhra		9.58	3.05	3.33	20760	6609	7216
Anand		9.71	6.09	16.24	21042	13197	35192
Patan		3.08	4.21	4.64	6674	9123	10055
Dhoraj	P	4.32	5.69	2.46	18719	24655	10660
Morvi		1.20	6.00	4.79	2600	13002	10380
Kalol		3.60	6.62	4.93	78012	14346	10683
Mahesana		1.67	6.39	4.20	3619	13847	9101
Bhuji		1.84	5.08	2.90	3987	11008	6284
Khambhat		4.50	4.77	3.06	9752	10337	6631
Gondal	P	3.84	1.98	3.48	16639	8579	15079
Sahijpurbogha		5.00	5.60	5.10	10835	12135	11052
Jetpur	P	6.20	7.03	5.44	26865	30461	23572
Gandhidham		5.44	6.53	4.93	11788	14151	10683
Palanpur		7.08	5.73	4.06	15342	12417	8798
Amreil	P	3.58	1.44	1.62	15512	6240	7019
Dohad		1.60	2.04	5.08	3467	4421	11008
Valsad		0.01	2.02	4.91	22	4377	10640
Upleta	P	2.52	2.34	7.41	10979	10139	32108
Mahuva		2.73	2.16	5.08	5916	4681	11008
Sidhpur		4.22	1.44	1.68	9145	3120	3641
Dhrangadhra		6.00	2.55	2.70	13002	5526	5851
Botad	P	3.71	1.80	5.51	16075	7799	23875

Contd....

1.		2.	3.	4.	5.	6.	7.
Sawarkundla	P	4.08	1.17	1.44	17679	50670	6240
Sardarnagar		0.80	2.04	5.24	1734	4421	11355
Viramgaon		3.93	1.92	4.86	8516	4161	10532
Petlad		0.40	0.40	1.20	867	867	2600
Visnagar		2.50	1.44	1.80	5418	3120	3901
Dabhoi		3.18	3.00	6.72	6891	6501	14562
Dholka		3.12	2.64	6.43	6761	5721	13934
Billimora		7.06	3.45	6.18	15299	7476	13392
Deesa		2.32	3.48	6.46	5027	7541	13999
Wadhwan		2.39	1.68	1.92	5179	3641	4161
Borsad		1.21	2.42	1.56	2622	5244	3381
Unjha		0.35	2.32	1.92	758	5027	4161
Mangrol	P	2.25	1.17	1.17	9749	5070	5070
Anklesvar		0.20	2.98	2.64	433	6478	5721
Kapadvanj		-0.82	-0.60	1.44	1777	1300	3120
Kadi		0.30	3.16	1.92	650	6848	4160
Palitana		0.70	1.82	0.96	1517	3944	2080
Anjar		-0.20	0.30	1.90	433	650	4117
Wankaner		1.40	0.40	0.30	3034	867	650
Mandvi		2.40	2.48	1.56	5201	5374	3381
Limbdi	P	2.89	0.99	1.17	12522	4290	5070
Rajpipla		-0.65	-0.50	0.10	1409	1084	217
Umreth		1.25	0.40	0.70	2709	867	1517

Table - 49

Sewerage, Drainage and Garbage : Financial Resources Requirement by Size Class

(Rs. in lakhs)

Size Class	Additional requirements					
	1991		2001		2011	
	Capital	Maintenance	Capital	Maintenance	Capital	Maintenance
MC & towns with 200,000+ population	3759.20	2115.29	6490.00	2818.29	8011.20	3713.32
Class A	1215.00	429.76	5005.60	759.04	394.00	1155.84
Class B	1032.60	358.53	1522.48	343.23	595.20	220.32
Class C	269.60	96.12	170.00	37.26	72.00	23.04
Total	6276.40	2999.70	13188.08	3957.82	9072.40	5112.52

Table 49(A)

Sewerage, Drainage and Garbage: Financial Resources Requirement City wise

Name	Percent population coverage			Additional financial resources requirements (Rs. in '000)								
				1991			2001			2001		
				Capital	Maintenance		Capital	Maintenance		Capital	Maintenance	
					Sewerage/ drainage	Garbage		Sewerage/ drainage	Garbage		Sewerage/ drainage	Garbage
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
Ahmedabad	82	82	82	25920	46360	43920	154160	55290	52380	177200	65550	62100
Surat	75	75	75	117200	17860	16920	96000	23940	22680	102000	30400	28800
Vadodara	88	88	88	144400	18620	17640	95040	23750	22500	104000	29298	27756
Rajkot	Nil	50	90	-	11343	10746	152000	14440	13680	195200	18316	17352
Bhavnagar	70	75	85	72800	74100	7020	38000	9310	8820	57200	11400	10800
Jamnagar	50	75	75	15600	7030	6660	73000	9310	8820	39000	11780	11160
Nadiad	80	85	85	32400	3510	2730	22600	4750	4500	25600	6175	5850
Junagarh	Nil	75	90	-	2538	1974	49800	2988	2324	20400	3510	2730
Porbandar	50	90	90	26000	2448	1904	26080	2684	2072	8320	3078	2394
Bharuch	Nil	75	90	-	2484	1932	51600	3096	2408	29400	4275	4050
Navsari	80	80	80	16000	2700	2100	18200	3933	3726	20200	5130	4860
Veralpatnam	Nil	50	75	-	2484	1932	3480	3132	2436	29200	4047	3834
Surendernagar	75	75	75	35100	2106	1638	9600	2682	2086	12000	3402	2646
Godhra	Nil	50	75	-	1872	1456	25000	2250	1750	19400	2664	2072
Anand	50	85	85	12000	2160	1680	31080	2916	2268	22120	4313	4086
Patan	Nil	75	75	-	1872	1456	39900	2394	1862	9600	2970	2310
Dhoraji	Nil	75	80	-	588	1078	35400	2124	1652	8800	2484	1932
Morvi	Nil	75	90	-	570	1045	36000	2610	1680	19080	2754	2145

Contd....

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
Kalol	50	75	90	18600	558	1023	17400	2178	1694	18000	2700	2100
Mahsena	Nil	75	75	-	558	1023	36300	2178	1694	8500	2700	2100
Bhuj	65	75	75	4400	522	957	9600	1926	1498	6000	2286	1778
Cambay	60	75	75	6000	564	1034	10800	1998	1554	5600	2322	1806
Gondal	50	75	85	5800	456	836	14200	588	1078	4600	1800	1400
Sahijpur Bogha	Nil	75	90	-	456	836	30000	1800	1400	16800	2340	1820
Jetpur	Nil	50	85	-	528	968	23800	2142	1666	27200	2718	2114
Gandhidham	75	80	85	14000	522	957	11600	2106	1638	13600	2718	2114
Palanpur	Nil	50	75	-	504	924	21800	1962	1526	19400	2466	1918
Amreli	Nil	Nil	Nil	-	310	682	-	390	858	-	480	1056
Dohald	Nil	Nil	75	-	420	770	-	522	957	32000	1926	1498
Valsad	Nil	Nil	75	-	408	748	-	516	946	31500	1890	1470
Upleta	15	50	80	800	414	759	14800	564	1034	22400	2322	1806
Mahuva	75	75	75	4000	414	759	5400	522	957	6000	1926	1498
Siddpur	Nil	Nil	Nil	-	305	671	-	365	803	-	435	955
Dharangadhra	Nil	50	85	-	384	704	16200	486	891	17600	594	1089
Botad	64	80	85	4000	390	715	10400	510	935	9200	1926	1498
Savarkundla	64	70	75	3400	372	682	5128	450	825	6200	546	1001
Sardarnagar	75	75	75	3000	390	715	5100	492	902	6600	1872	1456
Viramgaon	75	75	75	3200	408	748	4800	504	924	5600	1854	1442
Petlad	60	80	85	12800	324	594	7600	384	704	4800	444	814
Visnagar	50	75	80	12000	354	649	9500	426	781	6400	516	946
Dabhoi	50 *	75	80	-	384	704	14000	534	979	11600	2160	1680
Dholka	Nil	50	75	-	366	671	16600	498	913	17400	2034	153

Contd....

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
Billimora	80	80	80	11260	390	715	7200	528	968	8400	2052	1596
Deesa	Nil	Nil	75	-	366	671	-	540	990	35600	2142	1666
Wadhwan	Nil	Nil	Nil	-	255	561	-	325	715	-	405	891
Borsad	Nil	50	75	-	490	392	12200	366	671	10000	444	814
Unjha	Nil	Nil	Nil	-	308	352	-	280	616	-	360	792
Mangrol	Nil	Nil	Nil	-	315	360	-	290	638	-	355	781
Ankleshwar	Nil	Nil	Nil	-	329	376	-	320	704	-	430	946
Kapadwanj	50 *	50	75	-	400	320	1200	460	368	7000	324	594
Kadi	80	80	80	12000	380	304	6560	348	638	5040	444	814
Pelitane	80	80	80	13760	430	344	2560	306	561	2480	354	649
Anjar	Nil	Nil	Nil	-	400	320	-	470	376	-	330	605
Wankaner	Nil	Nil	Nil	-	360	288	-	400	320	-	430	344
Mandvi	Nil	Nil	Nil	-	460	368	-	354	649	-	432	792
Limbadi	Nil	Nil	Nil	-	410	328	-	312	572	-	390	715
Rajpipla	Nil	50	75	-	340	272	7800	390	312	5000	430	344
Umreth	20	75	75	1200	310	248	8000	350	280	2200	420	336

* In Dhaboi and Kapadwanj, the percentage shown is already covered by the existing sewerage system, and therefore no capital works.

Table 50

Roads: Financial Resources Requirement by Size Class

(Road length in km., Rs. in lakhs)

Size Class	Existing roads		Additional requirement							
			1991				2001			
			Roads		Cost		Roads		Cost	
	Kuchha	Pucca	Kuchha	Pucca	Capital	Maintenance	Kuchha	Pucca	Capital	Maintenance
MC & towns with 200,000 population	597.50	2426.98	175.69	703.52	5346.67	1878.30	450.81	1803.20	13704.32	3045.41
Class A	353.81	460.19	82.42	192.37	994.81	261.02	159.70	372.65	1927.12	459.48
Class B	522.36	721.53	153.07	284.27	1188.55	301.72	163.97	329.58	1383.91	323.55
Class C	172.83	294.12	49.26	74.09	241.97	73.64	27.00	40.50	132.00	36.53
Total	1646.50	3902.82	460.44	1254.25	7772.00	2514.68	801.48	2545.93	17147.35	3864.97

Table 50(A)

Roads: Financial Resources Requirement, City wise

(Roads in km., Rs. in '000)

Name	Existing roads		Additional requirements									
			1991					2001				
			Roads		Cost			Roads		Cost		
					Capital		Maintenance			Capital		Maintenance
	Kuchha	Pucca	Kuchha	Pucca	Kuchha	Pucca		Kucnha	Pucca	Kuchha	Pucca	
1.	2.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14
Ahmedabad	122.69	878.50	36.96	147.84	1478.4	110880	61580.4	162.80	651.20	6512.0	488400	100652.4
Surat	48.62	453.65	39.54	158.18	1581.6	118635	36709.8	100.00	400.00	4000.0	300000	60709.8
Vadodara	124.30	497.57	41.60	166.50	1664.0	124875	39844.2	45.80	183.20	1832.0	137400	50836.2
Rajkot	210.00	357.00	38.60	154.40	1544.0	115800	30684.0	48.00	192.00	1920.0	144000	42204.0
Bhavnagar	69.44	160.57	12.40	49.60	496.0	37200	12610.2	15.00	60.00	600.0	45000	16210.2
Jamnagar	22.45	79.69	6.59	27.00	263.6	20250	6401.4	3.20	12.80	128.0	9600	7169.4
Nadiad	37.90	53.54	10.06	23.50	402.4	11750	3081.6	20.00	80.00	800.0	60000	7881.6
Junagarh	1.29	64.00	7.41	17.30	286.4	8650	3252.0	17.40	40.60	696.0	20300	4876.0
Porbandar	27.60	54.68	4.41	10.30	176.4	5150	2599.2	2.70	6.30	108.0	3150	2851.2
Bharuch	14.83	45.95	8.76	20.45	350.4	10225	2656.0	32.10	74.90	1284.0	37450	2851.2
Navsari	84.00	66.00	30.00	70.00	1200.0	35000	5440.0	56.00	224.00	2240.0	168000	18880.0
Veravalpatan	11.23	21.90	3.11	7.25	124.4	3625	1166.0	3.45	8.05	138.0	4025	1488.0
Surendranagar	35.74	67.08	9.35	21.82	374.0	10900	3555.8	10.80	25.20	432.0	12600	4563.8
Godhra	12.11	16.37	4.65	10.86	186.0	5430	1089.2	5.10	11.90	204.0	5950	1565.2

Contd...

1.	2.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14
Anand	117.50	33.07	-	-	-	-	1322.8	-	-	-	-	1322.8
Patan	11.61	37.60	4.67	10.89	186.8	5445	1939.6	5.40	12.60	216.0	6300	2443.6
Dhoraji	37.14	6.43	4.20	7.80	168.0	3120	426.9	3.37	7.88	134.8	3940	724.1
Morvi	38.71	33.32	7.59	14.10	303.6	5640	1422.6	7.20	16.80	288.0	8400	2094.6
Kalol	27.70	13.40	4.76	8.84	190.4	3535	667.2	4.98	11.48	196.8	5740	1126.2
Mahesana	-	37.27	14.08	26.14	563.2	10456	1902.2	19.26	44.94	770.4	22470	3699.8
Bhuj	10.49	38.86	7.57	14.07	302.8	5628	1587.9	10.20	23.80	408.0	11900	2539.8
Canmay Khambhat	37.04	38.69	9.55	17.72	382.0	7088	1692.3	5.70	13.30	228.0	6650	2224.3
Gondal	37.20	29.76	3.51	6.52	140.4	2608	1088.4	7.70	14.60	308.0	5720	1517.4
Sahijpur												
Bogha	9.50	7.50	1.05	1.95	42.0	780	283.5	2.10	4.90	84.0	2450	479.5
Jetpur	-	55.29	7.60	14.11	304.0	5644	5082.0	8.10	18.90	324.0	9450	2838.0
Gandhidham	66.08	45.96	16.80	31.20	672.0	12480	2314.9	16.50	38.50	660.0	19250	3854.9
Palanpur	19.62	26.57	5.25	9.75	210.0	3800	1089.5	5.40	12.60	216.0	6300	1593.5
Amreli	16.56	34.51	1.75	3.25	70.0	1300	1132.5	5.25	9.75	210.0	3900	1425.0
Dohad	0.92	29.98	3.15	5.85	126.0	2340	1074.9	5.25	9.75	210.0	3900	1367.4
Valsad	-	25.76	4.98	9.25	199.2	3700	1050.3	8.22	21.17	328.8	8468	1508.0
Upleta	-	19.20	1.75	3.25	70.0	1300	673.5	2.10	3.90	84.0	1560	790.5
Mahuva	-	59.89	3.50	6.50	140.0	2600	1991.7	-	-	-	-	1991.7
Sidhpur	6.60	15.68	1.40	2.60	56.0	10040	548.4	1.75	3.25	70.0	1300	2637.6
Dhrangadhra	33.90	10.00	7.35	13.65	294.0	5460	709.5	8.75	21.25	350.0	8500	1197.0
Botad	34.36	11.40	5.25	9.75	210.0	3880	634.5	12.00	22.00	480.0	8800	1294.5
Sawarkundla	0.55	16.77	1.75	3.25	70.0	1300	598.5	3.85	7.15	154.0	2860	813.0
Sardarnagar	-	5.50	1.75	3.25	70.0	1300	262.5	3.50	6.50	140.0	2600	457.5
Viramgaon	7.00	17.00	3.85	7.15	154.0	2860	724.5	3.50	6.50	140.0	2600	919.5
Petlad	-	19.00	1.75	3.25	70.0	1300	667.5	1.40	2.60	56.0	1040	745.5
Visnagar	9.00	30.00	5.25	9.75	210.0	3900	1192.5	9.45	17.55	378.0	7020	1719.0
Dabhoi	21.88	14.18	5.95	11.05	238.0	4420	756.9	7.35	19.65	294.0	7860	1166.4

Contd...

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
Dholka	7.12	14.30	4.752	8.82	190.0	3528	693.6	6.49	12.05	260.0	4820	1055.0
Billimora	36.90	33.37	3.50	6.50	140.+0	2600	1196.0	11.55	21.45	462.0	8580	1839.5
Deesa	4.20	24.01	4.47	8.31	178.8	3325	969.3	6.65	12.35	266.0	4940	1339.8
Wadhwan	59.89	8.00	8.96	16.64	358.4	6656	739.2	9.97	26.52	399.0	10608	1294.8
Borsad	-	72.06	7.20	10.80	288.0	3240	1657.0	7.74	14.75	317.0	5900	2099.5
Unjha	27.00	11.00	2.40	3.60	96.0	1080	292.0	4.20	7.80	168.0	3100	526.0
Mangrol	-	15.89	3.36	5.04	134.4	1512	418.6	5.50	10.20	220.0	4080	724.6
Anklesvar	12.50	4.00	6.00	9.00	240.0	2700	260.0	7.88	14.62	315.0	5848	698.6
Kapadvanj	4.26	26.13	1.84	2.76	73.6	828	577.8	1.60	2.40	64.0	720	625.8
Kadi	19.85	7.10	0.82	1.23	33.0	369	166.6	5.60	10.40	224.0	4160	478.6
Palitana	18.31	21.53	4.06	6.09	162.4	1827	552.4	3.50	6.50	140.0	2600	747.4
Anjar	20.63	20.84	2.53	4.00	101.2	1200	496.8	3.60	5.40	144.0	1620	604.8
Wankaner	11.44	18.01	1.24	2.13	56.8	639	402.8	1.60	2.40	64.0	720	450.8
Mandvi	43.87	24.13	12.00	18.00	480.0	5400	842.6	9.37	17.87	374.8	7148	1378.6
Limbdi	10.50	12.20	2.92	4.38	116.8	1314	331.6	5.25	9.75	210.0	3900	624.0
Rajpipla	1.25	31.23	3.20	4.80	128.0	1440	720.6	18.40	27.60	736.0	8250	1272.6
Umreth	3.22	30.00	1.51	2.26	60.4	678	645.2	1.80	2.70	72.0	810	699.0

Table 51

Education: Financial Resources Requirement by Class Size

(Rs.in lakh)

Size class	Existing no. of		Additional requirements							
			1991				2001			
	Class rooms	Teachers	Class rooms	Teachers	Capital cost	Estt. cost	Class rooms	Teachers	Capital cost	Estt. cost
MC & towns with 200,000+ population	10867	14518	5143	7265	2571.5	2663.63	740	1480	370.0	3018.06
Class A	1524	2920	1307	2314	653.5	584.92	238	476	119.0	879.41
Class B	4511	5271	1506	2070	753.0	634.04	251	486	125.5	506.64
Class C	2023	1639	357	349	178.5	207.82	-	-	-	68.52

Table 51(A)

Education: Financial Resources Requirement City Wise

(Rs. in '000)

Name	Additional requirement									
	1991						2001			
	Existing class rooms shifts)	Additional class rooms (both)	Existing teachers	Additional teachers	Capital cost	Estab-lishment cost	Class rooms (both shifts)	Teachers	Capital cost	Establisn-ment cost
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
Ahmedabad	4163	2433	7403	1625	121650	113753	61	122	3050	115254
Surat	1832	823	2112	1366	41150	43843	236	472	11800	49896
Vadodara	2782	422	2718	908	21100	45612	147	294	7350	49508
Rajkot	955	627	1585	1254	31350	27720	87	174	4350	30240
Bhavnagar	540	451	55	1388	22550	18182	47	94	2350	19404
Jamnagar	595	387	645	724	19350	17249	84	168	4200	19404
Nadiad	1336	193	349	372	9650	8496	31	62	1550	9903
Junagadh	235	143	379	287	7150	6136	-	-	-	6136
Porbandar	184	160	304	319	8000	5900	-	-	-	5087
Bharuch	384	63	407	104	3150	6018	14	28	700	6372
Navsari	233	161	271	284	8050	6549	47	94	2350	8197
Veravalpatan	152	180	254	257	9000	6018	18	36	900	6454
Surendranagar	187	123	271	162	6150	5097	17	34	850	5522
Godhra	267	59	299	86	2950	4543	4	8	200	4720

Contd...

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
Anand	136	154	138	306	7700	5192	32	64	1600	6018
Patan	243	71	248	137	3550	4543	16	32	800	4956
Dhoraji	136	113	189	174	5650	3118	4	8	200	4366
Morvi	214	69	193	158	3450	3022	12	24	600	4451
Kalol	133	105	179	165	5250	2967	18	36	900	4488
Mahesana	227	58	388	-	2900	2967	18	36	900	4484
Bhuj	95	113	175	150	5650	2752	7	14	350	4012
Khambhat	239	54	236	112	2700	2993	-	-	-	4012
Gondal	138	72	189	92	3600	2408	13	26	650	2649
Sahijpur Bogha	202	40	249	32	2000	2408	16	32	800	3705
Jetpur	100	113	204	122	5650	2759	24	48	1200	4413
Gandhidham	119	101	168	154	5050	2752	22	44	1100	4137
Palanpur	139	86	242	69	4300	2673	16	32	800	4012
Amreli	196	17	211	18	850	1976	8	16	400	2107
Dohad	264	-	282	-	-	2236	7	14	350	2351
Valsad	201	27	226	29	1350	2193	7	14	350	2322
Upleta	195	28	117	135	1400	2150	22	44	1100	2537
Mahuva	133	61	161	94	3050	2193	9	18	450	2351
Sidhpur	114	56	155	71	2800	1935	2	4	100	1978
Dhrangadhra	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Botad	133	54	139	101	2700	2064	13	26	650	2296
Sawarkundla	110	60	155	74	3000	1978	3	6	150	2026
Sardarnagar	263	11	313	-	550	2064	8	-	400	2236
Viramgaon	67	92	94	158	4600	2150	6	12	300	2270
Patlad	152	24	144	56	1200	1720	1	2	50	1720
Visnagar	191	14	184	34	700	1892	2	4	100	1892
Dabhoi	223	7	170	67	350	2064	21	42	1050	2408

Conta...

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
Dholka	163	31	205	21	1550	1935	17	34	850	2236
Billimora	136	52	139	101	1600	204	17	34	850	2408
Deesa	129	48	208	18	2400	1935	28	56	1400	2408
Wadhwan	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Borsad	129	26	158	2	1300	1900	5	10	250	1720
Unjha	129	17	143	20	850	1689	6	12	300	1548
Mangrol	61	53	103	63	2650	1757	8	16	400	1565
Anklesvar	102	36	176	-	1800	1837	13	26	650	1728
Kapadvanj	174	-	159	-	-	1563	-	-	-	1520
Kadi	100	20	129	11	1000	1478	21	42	1050	1565
Palitana	69	45	126	33	2250	1690	-	-	-	1376
Anjar	59	44	107	41	220	1563	-	-	-	1558
Wankaner	94	20	121	12	1000	1393	-	-	-	1320
Mandvi	69	51	87	83	2550	1795	8	16	400	1591
Limbdi	89	31	111	41	1550	1584	6	12	300	1376
Rajpipla	110	8	116	10	400	1330	-	-	-	1292
Umreth	104	6	103	12	300	1203	-	-	-	1162

ANNEXURE - 1

National Institute of
Urban Affairs
New Delhi regarding entrusting
a study of _____

GOVERNMENT OF GUJARAT
URBAN DEVELOPMENT & URBAN HOUSING DEPTT.,
RESOLUTION NO: MFB-1083-1545-F,
DATED: 12-1-84

Read:- Letter No. Chairman/CCD-2-4120,dt. 28-10-83 from the Chairman, Gujarat Municipal Finance Board.

R E S O L U T I O N
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The Government is pleased to accord the sanction to the Chief Executive Officer, Gujarat Municipal Finance Board, to entrust to the National Institute of Urban Affairs, New Delhi, a study to determine the expected level of Services (Water Supply and Drainage System, Road and Primary Education), in the Municipalities of the State by classifying the Municipalities in suitable categories or otherwise, and to work out, on scientific basis, their financial requirement for upgrading the level of services to the said expected levels after taking into consideration the present levels of these services in the Municipalities and to pay Rs. 2.25 lakhs to the National Institute of Urban Affairs, New Delhi towards this.

The expenditure should be met from the interest income from the investment in Banks of the entertainment tax grant with the Gujarat Municipal Finance Board.

This issues with the concurrence of the Financial Advisor, vide his note dated 13-12-83 on this department file of even number.

By order and in the name of Governor of Gujarat,

Sd/-
(GIRISH MEHTA)
UNDER SECRETARY TO THE GOVERNMENT OF GUJARAT
URBAN DEVELOPMENT & URBAN HOUSING DEPTT.,

To,

1. Chairman, Gujarat Municipal Finance Board, 119, Swastik Society, Navrangpura, Ahmedabad.
2. Chief Executive Officer, Gujarat Municipal Finance Board, Ahmedabad.
3. Accountant General - I, Gujarat, Ahmedabad.
4. Accountant General - II, Gujarat, Rajkot.
5. Director, Accounts and Treasuires, Ahmedabad.
6. Pay and Accounts Officer, Ahmedabad.
7. Treasury Officer, Ahmedabad.
8. Financial Advisor, Urban Development & Urban Housing Department, Sachivalaya, Gandhinagar.
9. Director of Bureau of Public Enterprises, Finance Department, Sachivalaya, Gandhinagar.
10. Select File.

ANNEXURE - 2

METHODOLOGY USED FOR WORKING OUT WATER SUPPLY GAP

In accordance with the study objectives the water supply requirements are worked out for augmenting the existing capacities in urban Gujarat in order to meet the requirements in a long range i.e. 2011 A.D. The following norms have been determined for projecting the water-supply requirements in different size class of towns in consultation with GMFB and taking into account the various norms prescribed by different commettees and agencies.

Water Supply : Recommended norms

Size (Population)	Overall	Pre-dominantly Industrial Town	Problem Town
MC + Towns with 200,000 + population	135-210 (175)	200-210 (205)	125
100,000-200,000	115-170 (145)	170	120-125 (123)
50,000-100,000	80-150 (120)	150	-
20,000-50,000	75-125 (100)	-	-

() Figures within the brackets indicate the average value.

Total quantity required is calculated on the basis of recommended norms-average value incase of a range. However, the net requirement is derived by subscribing the actual supply from the total requirements on the assumption that the present supply (1982-83) represents the optimum capacity utilization. Thus, the basis for arriving at net requirement (NR) is :

NR = TR - AS

Where as

TR = Projected Population x recommended norm (Table-45A)

AS = Actual Supply (Table-45A)

Investment Requirements (IR)

Investment reqirements for augmenting the present system in each city are worked out on the basis of capital cost @ Rs. 300-500 for 150 lpcd approximately for all sizes of towns except the problem towns. In case of problem towns the capital cost is taken as Rs. 600-650 per 150 lpcd approximately (Table-49A). Thus the Investment requirement which are non-recurring in nature are worked out as

IR = NR x Cc

Where as

NR = Net requirement

Cc = Capital Cost (Average value has been taken in case of a range).

Additional Maintenance Requirements (AMR)

The main idea behind this perspective planning is to augment the system at a level upto the terminal year 2011 A.D. However capacity utilization during this period will vary in a gradual way depending upon the increase in population. Owing to the fact that the existing user-charges and other cost recovery mechanisms lead to a negative income-expenditure differential at a high degree, the maintenance gap in water supply service is worked out on following basis : AMR = Pp x AE - IWS x Pp

Or AE - IWS x Pp

Where as

AE = Per capita ordinary expenditure on water supply [(Arithmetic mean of respective size class : (Table - 33)].

IWS= Per capita income from water supply through user charges and water tax in each town in 1982-83 (Table-45).

Pp = Projected population.

The years 1991, 2001 and 2011 are taken as reference year for the purpose of working out operating cost and subsequent gap by subscribing the per capita income from water supply sources assuming that the cost-recovery mechanisms will remain same. In other words the maintenance gap, thus, worked out does not include the inflationary trends and its possible implications.