Improving the Fiscal Health of Indian Cities: A Pilot Study of Kolkata

Draft Report Submitted by the

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Chapter 1

Improving the Fiscal Health of Indian Cities: A Pilot Study of Kolkata

Large cities and their surrounding ring of municipal governments play an essential role in the growth and prosperity of the nation's economy. Cities, not only serve as the commercial, governmental, and cultural centers of countries, they also serve as the "engines of growth" of their economies.[1] In India, close to a half of the country's GDP originates in urban areas, highlighting their importance in achieving national growth targets. For cities to play these key roles effectively, they must be in strong fiscal health. A fiscally healthy municipal government will also be capable of delivering to all its residents, the public services for which it is responsible without levying unduly high taxes.

Basic public services and the infrastructure necessary to deliver those services, such as potable water, sanitation, roads, and electricity, are not only prerequisites for economic growth, but are essential elements to improve quality of living. The population of metropolitan areas has been growing rapidly for at least the past decade, and demographic projections indicate that by the year 2020 nearly a half of all Indians will live in urban areas. Although local and state governments are responsible for the provision of basic public services, large numbers of the inhabitants of most of India's major cities are living without one or more basic municipal services, such as water, sewage, or garbage collection.

The primary purpose of this research project is to undertake a preliminary evaluation of the fiscal condition of local governments within a sample of Indian metropolitan areas—Kolkata, Delhi, Pune, Hyderabad and Chennai. This report focuses on Kolkata. In studies of local public finance in other countries, the fiscal health of local governments has been measured by the gap between expenditure needs and fiscal capacity. We draw on the methodological advances made in measuring these fiscal variables. We attempt to measure fiscal conditions in a systematic way, and conduct preliminary analysis that will allow us to disentangle the various reasons why fiscal conditions vary among local governments, within the Kolkata metropolitan area.

Although the project is limited in scope, focusing on only a few urban areas, its goal is to provide initial answers to the question of how *fiscal institutions* in an individual local govern-

[1] For a discussion of the links between city and metropolitan area growth, see articles by Ihlanfeldt (1995) and Voith (1992).

ments and in a metropolitan area – taxing authority, public service responsibilities, intergovernmental cooperation and competition, grants-in-aid, the absence of hard budget constraints, and the lack of fiscal accountability – contribute to the fiscal health, and hence, to the ability of urban local governments in India to deliver public services.

Research Issues

The core objective of this report is to develop and implement a measure of the fiscal condition of local governments within the Kolkata metropolitan area, and to explain why the fiscal condition of local governments varies within the metropolitan area, based on the assumption that it at least partially affects service delivery. We have argued that strong fiscal health for urban local governments is an important prerequisite for economic growth and an essential element in the well-being of India's citizenry. In addition, within metropolitan areas, differences in fiscal conditions among local governments result in *fiscal disparities*. The existence of these disparities not only raises concerns about fairness (horizontal equity), but may increase the inefficiency of metropolitan area development if individuals and business firms are driven to undertake fiscally-motivated intra-jurisdictional migration (Vaillancourt and Bird, 2004), due to the inequitable nature of taxes or public service delivery.

The primary reason why it is important to measure the fiscal condition of urban area local governments in a systematic way is to help answer questions about the importance of both economic conditions and fiscal institutions in determining the ability of urban local governments to fulfill their public service delivery roles. Understanding the relationship between *fiscal institutions* and *fiscal conditions* of local governments is particularly important because many of the institutions are in effect policy levers over which governments (at the central, state, and local levels) have control. Therefore an important goal of this research project is to shed light on the role played by expenditure assignments, taxing authority, and the design and level of transfers from higher levels of government, on the fiscal health of local governments in urban areas, since it has implications for service delivery.

Policy Questions

In this pilot study, we will generate quantitative estimates of the fiscal condition of a sample of urban local governments in India. The next step will be to understand and explain the observed differences in fiscal conditions. To what extent are the differences explained by differences in the economic prosperity of different jurisdictions, to what extent are differences attributable to socio-economic and demographic differences in the residential population of each jurisdiction, and finally, what is the role played by a wide range of different fiscal institutions that help define the nature of the local government public sector? Is there an optimal mix of local governmental expenditure functions that will lead to fiscally healthy local governments?

Based on their impacts on fiscal health, we would like to investigate which services ought to be provided by local governments. If some local governments have more service responsibilities than others, and our empirical work shows them to be in weaker fiscal health, does that imply that their revenue-raising capacity should be increased by granting them more taxing authority, or increasing fiscal transfers to them, or should their service responsibilities be reduced? While this is a difficult question to answer, the general criterion for optimality should be the efficiency with which public services are delivered. All else remaining constant, local governments that are able to provide public services at lower costs are viewed as being more efficient. We will try to draw some preliminary lessons from our pilot study as to the extent that particular institutional arrangement or policies – for example privatization, or scale economies - contribute to these efficiencies.

Providing answers to these questions is an essential prerequisite for developing policy recommendations that could result in strengthening the fiscal health of urban local government in India. While it may not be possible to use rigorous econometric methods to test specific hypotheses about the reasons why fiscal conditions vary among local governments, we are confident that careful analysis of the data will allow us to draw some tentative conclusions concerning the most important factors that influence the fiscal health of local governments.

The following chapters describe the work and preliminary findings from the KMA, one of the metropolitan areas chosen for the study.

Chapter 2

Fiscal Health of Cities: Preliminary Findings from the Kolkata Metropolitan Area

Introduction

India has become the fourth-largest economy in the world in terms of purchasing power after the USA, Japan and China. Economic growth has also brought with it the pressures of urbanization. As per Census 2001 India had an urbanization rate of 28%. In 2001, India's urban population almost equaled the combined urban population of USA, UK and France. Urbanization in India in the next 20 years is expected to go up to 41% (550 million people out of an estimated 1350 million by 2021). Kolkata is the seventh largest city in the world in population and second in India, only after Mumbai.

The Kolkata Metropolitan Area (KMA), comprising of Kolkata and 40 other urban local bodies (ULBs), spread on both banks of river Hooghly, is a giant metropolis of about 15 million people. While the Kolkata Municipal Corporation (KMC) is one of the oldest municipal bodies of the country, there are two additional municipal corporations in the KMA (Howrah Municipal Corporation and Chandannagar Municipal Corporations). The three municipal corporations account for only 29 percent of KMA's total land area, but nearly 46 percent of its total population. KMC with a land area of 185 square kilometers, and a 2001 population of 4.6 million, contributes to one-fifth of the total KMA area, but accounts for 37 percent of its population.

Given the significance of the KMC, Tables 1 describes basic socio-economic data for the KMA first by including the KMC, and then without it. The KMC is the largest of the ULBs in the KMA with a 2001 population of 4.5 million.[2] It may be readily seen that the land area and population of the KMA ULBs, with or without the KMC, have increased during 1991-2001, demonstrating the need for increasing levels of various services. Further, the literacy rate in all the ULBs with or without the KMC, has increased continuously during this period. It is remarkable that the minimum literacy rate among the KMA ULBs has gone up from 49 percent in 1991 to nearly 70 percent in 2001.

[2] While KMC and Howrah Municipal Corporations have population densities higher than the average for all ULBs in the KMA, they are not the ones with the highest 2001 population density. In fact, Chandannagar Municipal Corporation's 2001 population density is less than the average for all ULBs in the KMA. The highest population density of 38,215 persons per square kilometer is surprisingly not a municipal corporation, but a municipality.

Overall, within the KMA, there are no significant differences in the literacy rate or in the economic base between KMC and other ULBs (Tables 1 and 2). Overall, more than eighty percent of KMA population is literate, with more than one-third of the metropolitan area population actively engaged in the workforce (Table 2). As of the 1991 (Census 2001 census data not yet released for employment by sector), both in the ULBs with and without the KMC, more than 40 percent of the labor force was in manufacturing, mining and construction, and roughly 45 percent of workers were in services. At the maximum, only about 15 percent of workers were in agricultural occupations. Of course there may have been a change in the economic base more recently, but these data are not yet available from the 2001 Census.

Table 1: Basic Data: KMA ULBs (with and without KMC)

	Area (Sq. Km.) 1991	**Area (Sq. Km.) 2001**	**Total Population 1991**	**Total Population 2001**	**Literacy Rate 1991 (Percent)**	**Literacy Rate 2001 (Percent)**	**Total Workers participation rate (Percent) 2001**	**Main Workers participation rate (Percent) 2001**	**Marginal worker participation rate (Percent) 2001**
					With KMC				
Average	16.94	21.90	249032.79	302178.37	76.97	83.60	36.50	33.28	3.22
Maximum	185.39	187.50	4399819	4580544	87.96	94.37	42.07	40.05	11.33
Minimum	1.68	3.25	7831	33863	48.61	69.82	30.95	26.62	1.67
Std. Dev	29.27	29.33	698485.64	704488.34	8.66	5.36	2.48	3.10	1.82
Number of observations	39	41	39	41	39	40	40	40	40
					With out KMC				
Average	12.50	17.76	139801.58	195219.23	76.96	83.67	36.38	33.14	3.24
Maximum	51.74	55.00	950435	1008704	87.96	94.37	42.07	40.05	11.33
Minimum	1.68	3.25	7831	33863	48.61	69.82	30.95	26.62	1.67
Std.Dev	9.64	12.72	152200.21	167188.69	8.77	5.41	2.40	3.01	1.84
Number of observations*	38	40	38	40	38	39	39	39	39

Source: Computed from Census of India 2001 Primary Census Abstract (PCA).

* In 2001 we have no data for Baruipur about literacy rate, total, main and marginal work participation rate. In 1991 we have no information about Rajarhat Gopalpur and Rajpur Sonarpur.

Table 2: Workforce Participation: KMA ULBs (with and without KMC)

	Work participation rate (per cent) 1991	Non-workers per 1000 workers 1991	Agricultural Labourers 1991	Manufacturing, Processing and Repairs other than 1991	Trade and Commerce 1991	Transport Storage and Communications 1991	Other Services 1991	Workers services (Percentage) 1991
With KMC								
Average	29	2522	12	41	21	12	22	45
Maximum	36	3183	15	71	30	15	43	69
Minimum	24	1779	10	16	11	10	10	0
Standard Deviation	2.63	316.60	2.032	15.63	5.41	1.31	7.61	17.00
No. of Observation	39	39	4	39	38	12	36	39
Without KMC								
Average	28	2535	12	41	21	12	22	44
Maximum	36	3183	15	71	30	15	43	69
Minimum	24	1779	10	16	11	10	10	0
Standard Deviation	2.57	310.64	2.03	15.66	5.29	1.37	7.65	16.75
No. of Observation	38	38	4	38	37	11	35	38

Source: Computed from Census of India 1991 town directory.

Fiscal Data Findings: Expenditure

For purposes of estimating expenditure functions for services such as water supply, sewerage, solid waste and municipal roads, we use revenue expenditures. We do not attempt to perform estimation of capital expenditure functions, despite the availability of such data for ULBs in the KMA. This is because capital expenditures are generally lumpy in nature, which means that they may or may not occur every year. This also means that they are not divisible by year. It would be rarely appropriate to apply an econometric approach to such expenditures (see Turvey 1976). Further, in India, the link between higher capital expenditures and service delivery is not clear, where instances of water and sewerage treatment plants that are built but do not function are commonplace. However, operations and maintenance (O&M) expenditures are continually occurring, and an econometric approach would be appropriate. Hence we only describe the capital expenditures by service and not include them in the estimation of expenditure functions.

Table 3 summarizes the total capital expenditures (in real terms with 1999-00 as the base) incurred by the KMA ULBs on all services during 1999-2004.[3] We may observe that, on average, the spending on capital projects in the KMA ULBs constantly increased upto 2001-02 after which they started declining in absolute (real) terms. Even the maximum (total) capital spending among the non-KMC ULBs was Rs.68 million in constant (1999-00) terms, as of 2001-02, and decreased since then. A part of the reason for this might be that plan funds released by the state of West Bengal to all ULBs in the state recorded a major decline from Rs.346.64 crore in 2001-02 to only Rs.161.93 crore in 2002-03 and to a further low of Rs.155.96 crore in 2003-04, while release of non-plan funds remained more or less the same during these years. This demonstrates convincingly that the ULBs, including those in the KMA, are heavily dependent upon state government transfers for their capital spending, and they cannot sustain increases in capital spending on their own.

Table 3: Total Capital Expenditure (in 1999-2000 constant prices) of KMA ULBs*

Summary statistic	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
Average	15,965,558.82	20,197,228.88	25,768,865.48	22,670,142.82	17,048,150.48
Maximum	44,791,000.00	49,719,376.41	68,846,481.90	55,529,998.73	66,676,662.37
Minimum	0	0	0	69,971.10	0
Standard Deviation	12,392,896.57	13,773,638.26	18,195,358.65	14,567,335.59	16,725,655.64
Number of observations	34	34	34	34	34

*The ULBs here do not include KMC since the KMC did not report capital and revenue expenditures separately.

Source: Institute for Local Government and Urban Studies (ILGUS), Central Statistical Organization (CSO) and Authors' Computations.

[3] We calculated the deflators based on the Gross State Domestic Product (GSDP) for West Bengal in current prices and that in constant prices for the years 1999-00 up to 2005-06 (all of which we obtained from the Bureau of Applied Economics and Statistics, Government of West Bengal). We took the ratio of the current GSDP in current prices to that in constant prices, to determine the price index. We confirmed this method to arrive at the price index from the Central Statistical Organization, Government of India. We thus applied the price indices based on the total state's GSDP (for the corresponding years), to deflate total expenditures (on all services) to real terms. For deflating expenditures on individual services, we used relevant sectoral GSDP to reflect price indices for the concerned sectors. These are explained in the sections on each service.

Table 4 summarizes in per capita real terms, the capital expenditure incurred by the KMA ULBs on all services. In per capita terms, the real (capital) expenditure of the KMA ULBs (except KMC) on all services increased from Rs.99 in 1999-00 to Rs.155 in 2001-02, but declined subsequently to Rs.96 in 2003-04, attributable to the decrease in state plan funds for all ULBs in 2002-03 and 2003-04.

Table 4: Per Capita Real Capital Expenditure (in 1999-00 prices) on All Services, KMA ULBs*

Without KMC	**1999-2000**	**2000-2001**	**2001-2002**	**2002-2003**	**2003-2004**
Average	98.94	130.08	154.55	135.98	95.83
Maximum	345.18	420.26	381.85	484.97	366.70
Minimum	0	0	0	0.32	0
Standard Deviation	66.82	93.54	79.50	83.64	78.43
Number of observations	34	34	34	34	34

Source: Institute for Local Government and Urban Studies (ILGUS), Central Statistical Organization (CSO) and Authors' Computations

*KMC not included since KMC lumps its capital and revenue expenditures together.

Taking into account the enormous population increase that has taken place during these years, the extent of increase in expenditure seems inadequate. Table 5 summarizes the population (and population density) we projected for the KMA ULBs, taking into the method recommended by the International Institute of Population Sciences. We observe continually increasing population density in all the ULBs of the KMA.

Table 5: Projected Population Density for KMA ULBs (with KMC included)

Summary Statistics	**Area (Sq. Km.)**	**2001**	**2002**	**2003**	**2004**	**2005**
Average	21.90	13434	13590	13748	13907	14069
Maximum	187.50	38215	38671	39133	39601	40074
Minimum	3.25	2393	2421	2450	2479	2509
Std. Dev	29.33	8478	8573	8669	8766	8865
Number of observations	41	41	41	41	41	41

Table 6-1 summarizes the proportion of capital expenditure spent in the various KMA ULBs (except KMC) on public services. The heads for major portions of capital expenditure by the KMA ULBs (in that order) are municipal roads, followed by "other services" such as expenditure incurred on buying land for municipal markets and for purposes of constructing houses for officials, followed by water supply, sewerage and drainage. Solid waste management and street lights constitute a small part (only about 3%) of their expenditure. On average, municipal roads constitute about 40 percent of their capital expenditure.

Table 6-1: Proportion of Capital Expenditure by Service, KMA ULBs
(in 1999-00 Constant Prices)

Service	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
Water Supply	12.8%	11.4%	11.2%	12.5%	13.5%
Sewerage & Drainage	10.7%	11.2%	15.0%	11.8%	13.6%
Solid Waste Management	1.2%	1.5%	0.4%	2.2%	3.4%
Municipal roads	45.5%	42.2%	44.3%	39.0%	41.9%
Street Lights	3.0%	3.2%	2.7%	3.1%	3.5%
Other services	26.8%	30.5%	26.4%	31.5%	24.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

We focus on capital and revenue expenditure here separately because revenue expenditures are the basis of the estimations. While capital expenditures are lumpy, they also cannot be used for econometric estimation purposes (see Turvey (1976)). Revenue expenditures are streams that occur every year continually, an econometric approach is more appropriate there.

Table 6-2 summarizes the proportion of revenue expenditure on various services in the KMA ULBs over time. The largest part of revenue expenditure (always more than 40 percent, and increasing in recent years) in all years is on “other services” which refers to maintenance of buildings for municipal markets and housing for municipal officials, followed by solid waste management and water supply. Our estimations cover water supply, sewerage & drainage, solid waste, roads, and street lights, so for most years, we cover roughly 50 percent of all revenue expenditures.

Table 6-2: Proportion of Per Capita Revenue Expenditure, KMA ULBs, by Service (KMC excluded)

Service	1999-00	2000-2001	2001-02	2002-03	2003-04
Water Supply	14.82%	13.58%	14.66%	14.54%	15.29%
Sewerage & Drainage	7.97%	7.83%	8.92%	8.41%	8.04%
Solid Waste Management	22.49%	23.48%	19.09%	18.60%	18.39%
Roads	8.06%	7.63%	5.16%	5.71%	5.70%
Street Lights	2.94%	3.50%	2.85%	3.38%	3.60%
Other Services	43.72%	43.97%	49.31%	49.37%	48.97%

Description of Capital and Revenue Expenditure on Services: Expenditure on Water Supply

Table 7-1 summarizes the per capita capital (in real terms with base as 1999-00=100) expenditure on water supply for ULBs in the KMA (except KMC).[4] On average, over time, the ULBs' per capita expenditure on water supply has been undulating and decreasing from only Rs.18 in 1999-00 to a further low of Rs.11 in 2003-04. Similarly, in real terms, the maximum per capita expenditure on water supply decreased from a high of Rs.130 in 1999-00 to only Rs.35 in 2003-04. More recent data on capital expenditures by service were not available.

The situation with respect to revenue expenditure on water supply is no better. In fact, while the average revenue expenditure on water supply has been dwindling as well, overall, there is a general increase in per capita terms during 1999-2003, as may be seen from Table 7-2. The maximum per capita revenue expenditure on water supply has been continually rising in real terms with the exception of 2002.

In fact, the III working group (1995) on norms and standards for provision of basic services points out that for an urban center of Kolkata's size, the unit cost of provision of water supply is a maximum of Rs.203 at 1994-95 prices. In contrast,, per capita expenditure incurred on provision of water supply by the KMA ULBs is very low. So it is likely that the required level of the service, in terms of coverage, is not met.

[4] For purposes of deflating the expenditures on water supply, we used the GSDP for West Bengal for the sector "water supply, gas and electricity." Here, again, we followed a method similar to the one that is described earlier for deflating total expenditures (i.e., expenditures on all services). We took the ratio of the sectoral GSDP in current to that in constant prices, derived the price index and applied this to the nominal expenditures on water supply to arrive at real expenditures.

Table 7-1: Capital Expenditure on Water Supply Per Capita (1999-00 Constant prices), KMA ULBs (KMC excluded)

Summary statistic	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
Average	17.70	15.01	17.57	15.48	11.02
Maximum	130.02	58.75	70.89	39.20	35.40
Minimum	0	0	0	0	0
Standard Deviation	24.18	13.46	18.35	11.58	9.99
Number of observations	34	34	34	34	34

Table 7-2: Per Capita Revenue Expenditure on Water Supply, (1999-00 Constant prices), KMA ULBs, (KMC excluded)

Summary statistic	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
Average	33.52	31.84	42.11	39.93	41.06
Maximum	83.03	77.36	117.05	80.82	102.62
Minimum	0.41	0.39	6.89	6.40	7.45
Standard Deviation	20.49	18.18	26.49	22.01	27.33
Number of observations	37	35	21	21	21

Expenditure on Solid Waste Management

When we examine capital expenditure on solid waste (Table 8-1), on average, in real terms, the non-KMC ULBs are able to spend only about Re.1 per capita on average for capital spending on solid waste.[5] The maximum per capita spending by them (in 1999-00 constant prices) is in the range of Rs.58 (for 2002-03), whereas some ULBs have spent nothing at all.

The situation with respect to revenue spending on solid waste is better than with capital spending. On average, the per capita revenue expenditure on solid waste in real terms has remained more or less the same during the years, hovering at Rs.50. This is easily explained since revenue expenditure in the case of solid waste refers to payment of salaries and operation and maintenance of cleaning equipment. While the maximum per capita revenue expenditure has been declining, the minimum per capita revenue expenditure on the service has been continually

[5] For purposes of deflating the expenditures on solid waste management by the ULBs, we used the GSDP for West Bengal for the sector "other services." Here, again, we followed a method similar to the one that is described earlier for deflating total expenditures (i.e., expenditures on all services). We took the ratio of the sectoral GSDP in current to that in constant prices, derived the price index and applied this to the nominal expenditures on solid waste to arrive at real expenditures.

increasing over the years. This reflects either increasing recruitment of workers or officials to oversee the service, or better maintenance of cleaning equipment.

Some existing studies indicate the amount of financial resources required for effective solid waste management in cities of various sizes, to attain the status of a 'clean city.' The costs estimated by Asnani (2006) for vehicles, tools, equipment and composting for cities of various sizes are summarized in Table 9.

Table 8-1: Capital Expenditure on Solid Waste Per Capita (1999-00 Constant prices), KMA ULBs (KMC excluded)

Summary statistic	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
Average	1.42	1.94	0.45	2.83	1.88
Maximum	29.48	24.75	3.05	57.96	32.94
Minimum	0	0	0	0	0
Standard Deviation	5.15	5.28	0.73	9.92	5.97
Number of observations	34	34	34	34	34

Table 8-2: Revenue Expenditure on Solid Waste Per Capita (1999-00 Constant prices), KMA ULBs (KMC excluded)

Summary statistic	1999	2000	2001	2002	2003
Average	50.89	55.06	54.82	51.07	49.38
Maximum	131.59	128.69	122.30	132.47	124.59
Minimum	0.48	0.45	4.68	4.77	5.10
Standard Deviation	35.27	36.40	37.27	33.29	30.98
Number of observations	37	35	21	21	21

Table 9: Estimates of the Cost of Solid Waste Management by City Size

City population (in million)	Cost of vehicles, tools & equipment (in Rs.lakh)	Cost of composting (in Rs.lakh)	Total (in Rs. Lakh)	Total (in $ at $1= Rs. 46.18)
<0.1	50.97	20	70.97	$153,681.25
0.1- < 0.5	295	150	445	$963,620.61
0.5 - <1.0	511	500	1011	$2,189,259.42
>2.0	948	1000	1948	$4,218,276.31

Source: Asnani (2006)

Based on the above estimates, the total cost of solid waste management (SWM) in a million-plus city is Rs.194,800,000 and those for population between 100,000-500,000, based on Table 9, is Rs.44,500,000. We examined the population distribution of the KMA ULBs and most (18) of the ULBs are in the 2001 population range from 100,000-200,000. At the average population we projected for 2005 for all the KMA ULBs (excluding KMC) which is 195,219, per capita expenditure required turns out to be Rs.228. When compared against these cities' actual average capital spending of a little above Rs.4 for all years (except 2003-04), and revenue spending of even Rs.50 on solid waste management, spending in all ULBs (excluding the KMC), is highly inadequate.

Expenditure on Municipal Roads

When we observe trends in real per capita (capital) expenditure on roads in the KMA ULBs, the picture is better than with other services.[6] Table 10-1 summarizes per capita real capital expenditure incurred by the ULBs on municipal roads over a period of time. On average, in constant 1999-00 prices, the per capita expenditure on municipal roads in the KMA ULBs (including KMC) has been well above Rs.40 with the exception of 2003-04. In fact, the maximum per capita capital expenditure on roads is during 2001-02 (when an ULB spent Rs.252 per capita).

Table 10-2 summarizes revenue expenditure per capita on municipal roads by KMA ULBs (excluding KMC). The picture is less rosy here, given the average per capita revenue expenditure has been declining over time. Even the maximum per capita revenue expenditure on the service has declined from a high of Rs.90.67 in 1999-2000 to a low of Rs.47.23 in 2003-04. However, there are also some ULBs that have spent nothing on revenue expenditure on roads, as with capital expenditure. This means that not only that new municipal roads were not constructed, but also existing ones were not maintained, let alone adequately in many ULBs.

[6] For purposes of deflating the expenditures on municipal roads by the ULBs, we used the GSDP for West Bengal for the sector "construction." Here, again, we followed a method similar to the one that is described earlier for deflating total expenditures (i.e., expenditures on all services). We took the ratio of the sectoral GSDP in current to that in constant prices, derived the price index and applied this to the nominal expenditures on municipal roads to arrive at real expenditures.

Table 10-1: Capital Expenditure on Municipal Roads Per Capita (1999-00 Constant prices), KMA ULBs (KMC excluded)

Summary statistic	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
Average	41.49	47.82	67.36	49.57	34.96
Maximum	243.79	119.01	252.36	180.24	138.90
Minimum	0	0	0	0	0
Standard Deviation	49.78	34.61	49.55	34.58	35.23
Number of observations	34	34	34	34	34

Table 10-2: Revenue Expenditure on Municipal Roads Per Capita (1999-00 Constant prices), KMA ULBs (KMC excluded)

Summary statistic	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
Average	18.24	17.90	14.83	15.68	15.30
Maximum	90.67	69.02	43.35	53.20	47.23
Minimum	0.00	0.00	0.00	0.00	0.00
Standard Deviation	16.88	15.29	10.96	13.19	12.49
Number of observations	37	35	21	21	21

How can we assess the adequacy of this spending? We estimated per capita investment requirements for municipal roads in West Bengal, based on the India Infrastructure Report by Mohan (1996), and compared them with the actual expenditure on roads by the KMA ULBs. Table 11 summarizes the various estimates of investment requirements for municipal roads in West Bengal. The results are startling. At West Bengal's 2001 urban population (which is 18,707,601), the IIR (1996) estimates translate to a per capita expenditure of Rs.60 (Planning Commission's low estimate), Rs.90 (Planning Commission's high estimate), and Rs.50 (based on Zakaria committee's estimates). Judged against these required estimates, the capital spending alone on roads by KMA ULBs is not very much off the benchmarks. They almost meet the Zakaria committee's estimates in per capita terms and fall a little short of the Planning Commission's estimates, summarized by the Rakesh Mohan Committee (or the India Infrastructure Report 1996). The real question is the adequacy of the physical level of the service, regarding which many reports and committees are silent.

Table 11: Needs for Additional Investment in Municipal Roads for West Bengal

Source	Estimate (in Rs.million at 1994-95 prices)
Planning Commission (Low)	1120
Planning Commission (High)	1680
Zakaria Comittee	930

Source: India Infrastructure Report 1996.

Expenditure on Sewerage and Drainage Services

Table 12-1 summarizes the capital expenditure incurred by the KMA ULBs (except KMC) on sewerage and drainage services.[7] These expenditures, on average, forming only about 10 percent of the ULBs' total capital expenditure in all years, are no doubt, quite low. On average, the ULBs are able to incur only about Rs.12 per capita in real terms as capital expenditure on sewerage and drainage systems.[8] However, we have to observe that there were some ULBs during all the years which could not afford to spend anything on this. The maximum that any ULB is able to spend on sewerage and drainage for capital projects is Rs.131 (during 2003-04).

Revenue expenditure on sewerage and drainage by the KMA ULBs is even less, constituting on average only about 8% of all expenditure. In absolute terms, revenue spending on sewerage and drainage has been better than capital expenditure on this service. Table 12-2 summarizes over time the per capita revenue spending by the KMA ULBs on sewerage and drainage, which has increased from an average of Rs.18 in 1999 to Rs.21.60 in 2003-04. So even in real terms, the O&M and salary expenditures on this service have been increasing. Again the question is to judge these expenditures against some benchmarks.

[7] We were given to understand by ILGUS (Institute for Local Government and Urban Studies) which gave us the data, that some ULBs reported expenditure on sewerage only, whereas others reported incurring expenditure only on drainage. A few reported expenditure on sewerage as well as drainage. For purposes of comparison, we included any/all expenditures on sewerage and drainage under the head "sewerage and drainage."

[8] For purposes of deflating the expenditures on sewerage and drainage by the ULBs, we used the GSDP for West Bengal for the sector "construction" since capital works on sewerage and drainage would be in the nature of construction works. Here, again, we followed a method similar to the one that is described earlier for deflating total expenditures (i.e., expenditures on all services). We took the ratio of the sectoral GSDP in current to that in constant prices, derived the price index and applied this to the nominal expenditures on sewerage and drainage to arrive at real expenditures.

Table 12-1: Capital Expenditure Per Capita on Sewerage and Drainage, Non-KMC ULBs, in 1999-00 Constant Prices

Summary statistic	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
Average	9.55	13.53	19.64	14.41	11.55
Maximum	45.64	62.25	77.81	51.69	131.21
Minimum	0	0	0	0	0
Standard Deviation	10.61	14.88	18.98	12.11	23.42
Number of observations	34	34	34	34	34

Table 12-2: Revenue Expenditure Per Capita on Sewerage and Drainage, Non-KMC ULBs, in 1999-00 Constant Prices

Summary statistic	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
Average	18.03	18.36	25.63	23.08	21.60
Maximum	55.60	53.08	85.01	81.01	78.91
Minimum	0.00	0.00	0.00	0.00	0.00
Standard Deviation	16.50	16.44	22.75	20.89	19.32
Number of observations	37	35	21	21	21

Zerah (2006) summarizes the requirements of incremental investment in sewerage as being between Rs.91.2 billion corresponding to a low urban population projection, and Rs.165 billion for a high urban population projection scenario, over 2001-11, at 1995 prices. This assumes for large cities, full coverage by sewage with treatment, and for medium towns, public sewers with partial coverage by septic tanks and for small towns, low cost sanitation methods. These estimates have been summarized by Zerah (2006), based on a 1997 study by the National Institute of Urban Affairs (NIUA). Using the urban population projection of 404.17 million for 2011 for urban India (NIUA,, 2000, http://www.niua.org/newniuaorg/handbookindex.htm), this incremental investment need (for the low urban population projection) translates to a per capita requirement of nearly Rs.225 (assuming low urban population projection) and Rs.408 per capita for the high urban population projection) for the urban population’s sewerage needs during the entire period 2001-2011.

Judging by these requirements, the expenditure incurred by the KMA ULBs, summarized in Tables 12-1 and 12-2, is highly inadequate, even when the maximum spending by some ULBs is taken into account.

Expenditure on Street Lights

Capital expenditure on street lights refers to the installation of lamp posts and revenue expenditure refers to their maintenance and operation and salaries of employees. The real capital per capita expenditure by the KMA ULBs on a service like streetlights, which is a proxy for public safety has been declining over time in the KMA ULBs from Rs.6.17 in 1999-00 to a low of Rs.4.31 in 2003-04 (all in 1999-2000 constant prices) (Table 13-1). The maximum expenditure that any ULB incurred on street lights is Rs.95.60 during 1999-2000, but that also has declined to a low of Rs.35.50 in 2003-04.

Table 13-2 summarizes per capita revenue expenditure on the service. The story is not very different for this service when we look at the absolute numbers. However the picture is slightly better for revenue expenditure given the average per capita revenue expenditure on the service has been steadily increasing over time (from Rs.6.65 in 1999-2000 to Rs.9.67 per capita in 2003-04), as the maximum, which has increased from Rs.22.75 in 1999-2000 to Rs.29.36 in 2003-04.

How can we assess the adequacy of this spending? A study by PricewaterhouseCoopers (2001) updates the expenditure norms of the Zakaria committee report for Chhattisgarh for various urban services. It estimates the per capita norm for street lights in towns with population between 1 lakh-2 lakhs to be INR 49.39 per annum (at 2000-01 prices). Recall that most of the KMA ULBs (except KMC) are in this population range. That study is only for cities in the state of Chhattisgarh, and we do not have any from that state chosen in this study. But if we were to use the PWC study's estimates in the absence of better benchmarks, the average capital and revenue expenditures by the KMA ULBs on street lights is quite low, with obvious implications for public safety.

Table 13-1: Capital Expenditure Per Capita on Street Lights, Non-KMC ULBs, in 1999-00 Constant Prices

Summary statistic	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
Average	6.17	5.04	4.48	5.23	4.31
Maximum	95.60	42.62	15.66	27.22	35.50
Minimum	0	0	0	0	0
Standard Deviation	17.46	8.23	4.51	7.25	7.80
Number of observations	34	34	34	34	34

Table 13-2: Revenue Expenditure Per Capita on Street Lights, Non-KMC ULBs, in 1999-00 Constant Prices

Summary statistic	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
Average	6.65	8.21	8.19	9.27	9.67
Maximum	22.75	32.36	22.52	25.66	29.36
Minimum	0.00	0.00	0.00	0.00	0.00
Standard Deviation	5.29	7.12	6.71	7.01	8.46
Number of observations	34	28	21	21	21

Expenditure on Other Services

What is surprising is that while expenditures on basic services such as solid waste, sewerage & drainage are abysmally low in the KMA ULBs, expenditure on "other services" such as that spent to buy land for building municipal markets, housing for officials is a substantial part of their expenditures, as summarized by Tables 6-1 and 6-2, even in real terms.[9] One would have expected that "other services" would be the residual category! But more than one-fourth of their capital expenditure is on this head, and more than 40 percent of their revenue expenditure is on this head.

[9] For purposes of deflating the expenditures on other services by the ULBs, we used the GSDP for West Bengal for the sector "other services." Here, again, we followed a method similar to the one that is described earlier for deflating total expenditures (i.e., expenditures on all services). We took the ratio of the sectoral GSDP in current to that in constant prices, derived the price index and applied this to the nominal expenditures on other services, to arrive at real expenditures.

Tables 14-1 and 14-2 summarize respectively the actual capital and revenue expenditure per capita on "other services" by the KMA ULBs over time. Both tables show that this expenditure is quite substantial, when compared with expenditure on essential services such as sewerage and drainage, solid waste and water supply. The only head on which expenditure by the KMA ULBs exceeds that on other services is on municipal roads (refer to Tables 10-1 and 10-2).

This leaves one wondering if there is a need to spend a substantial portion of expenditures (see Tables 6-1 and 6-2) on buying land for municipal markets and for constructing/maintaining houses for officials, when the provision of essential services such as water supply, sewerage & drainage, and solid waste, and their quality, is questionable.

Table 14-1: Capital Expenditure Per Capita on Other Services (in 1999-00 constant prices) by KMA ULBs

Summary Statistic	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
Average	28.57	45.83	41.18	46.18	29.03
Maximum	143.21	411.14	221.51	271.63	222.82
Minimum	0	0	0	0	0
Standard Deviation	34.02	87.56	48.16	62.73	45.99
Number of observations	34	34	34	34	34

Table 14-2: Revenue Expenditure Per Capita on Other Services (in 1999-00 constant prices) by KMA ULBs

Summary Statistic	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
Average	41.44	49.61	60.47	58.83	37.13
Maximum	183.74	223.99	350.98	216.70	115.00
Minimum	3.75	5.72	10.41	4.79	2.48
Standard Deviation	41.72	52.59	73.48	65.10	31.05
Number of observations	25	26	27	28	22

Fiscal Data Findings: Revenue

The revenue of a municipality of KMA has two components, one consisting of its own sources and the other as funds from the state government. The own revenue consists of tax and non tax revenues of the municipalities whereas additional revenues come as plan and non-plan grants from the state government.

The main component of taxes levied by the municipality is property tax, with other taxes like a tax on advertisement other than those published in the newspaper and toll taxes. The non-tax components include rents from market complexes and municipal properties, interest incomes from loans given to employees and other investments, development fees, license fees charged on carts and carriages and registration fees from professionals to carry on their trade in the municipal jurisdiction, duty levied on plying of heavy vehicles, a special conservancy charge on commercial and industrial establishments and collection of fines for violating municipal regulations.

Property tax

<u>Base:</u>

Annual value of the property is the base of property tax.

ARRV method

1.If the property is used by the owner himself, then "Reasonable Rental Method" is applied, i.e. from previous database and comparing with similar premises, expected rent per month, the property is capable of fetching, is determined, then it is multiplied by 12 and a 10% statutory maintenance allowance is subtracted to arrive at the Annual Valuation (round to nearest 10).

2. If the property is tenanted, then the exact monthly rent (including service charges if any) is multiplied by 12 less 10% statutory allowance to arrive at the Annual Valuation.

Capital value method

Where ARRV method is not applicable, there capital value method is used.

1.For vacant land AV= 7% of market value

2.For old building AV= cost of construction + land value – depreciation.

3. For Medical, sports and educational institutions AV= 5% of (cost of construction + land value) – 10% statutory maintenance allowance.

4. In case of Theatre/cinema halls, 7.5% of the Gross Annual receipts (excluding taxes) is fixed as Annual Valuation for the Hall.

Tax rate

1. If the Annual Valuation as fixed above, does not exceed Rs.600/-, then the rate of tax is 11% of the Annual Value. That is if A.V. is Rs,500/- then the property tax per year is Rs.55/- plus Howrah bridge tax @ 0.5% of the quarterly tax is allowed if deposited in time.
2. If the Annual Valuation as fixed above, exceeds Rs.600/- but does not exceed Rs.18000/-, then tax ration is the percentage of the A.V. worked out by dividing the A.V. of the premises by 600 and adding 10 to the quotient, the sum thus worked out being rounded off to the nearest first place of decimal.
   I.e. (AV/600 +10)% 0f AV plus Howrah bridge tax @ 0.5% of A.V. and a further rebate of 5% of the quarterly tax is allowed if deposited in time.
3. If the Annual Valuation as fixed above exceeds Rs.18000/-, then the rate of tax is 40% of the Annual Value. That is if A.V. is Rs20000/- then the property tax per year is Rs.8000/- plus Howrah Bridge tax @ 0.5% of A.V. and a further rebate of 5% of the quarterly tax is allowed, is deposited in time.
4. For Bustee, specified educational institutions, some statutory organizations the rate of tax is different.
5. For commercial/non-residentially used premises a surcharge @ not exceeding 50% of tax is levied additionally.

Tax rate minimum slab 11% and maximum slab 40%

In what follows we will analyse some data on different components of revenues of local governments in KMA to get a clear idea about the sources of these earnings. The period of analysis is for five years from 2001-02 to 2005-06. First we would like to see the composition of total own source revenues of municipalities, the proportions of tax and non-tax components in the total revenue from own sources.

Table 15.1: Proportion of Property Tax to Own Fund Revenue

Summary Statistic	2001-02	2002-03	2003-04	2004-05	2005-06
Average	51%	46%	44%	47%	45%
Maximum	97%	98%	96%	96%	97%
Minimum	18%	0%	18%	16%	20%
Standard Deviation	19%	19%	17%	20%	19%
No. of observation	40	38	40	40	40

Table 15.1 summaries the proportions of property tax to own fund revenue of KMA municipalities over a period of five years, from 2001-02 to 2005-06. The average of 51% in 01-02 declines to 46% in 02-03 and 44% in 03-04. In 04-05 it slightly rises to 47% and then decline to 45%. The calculated standard deviations for all the years are fairly low indicating not much variation amongst municipalities as far as these proportions are concerned.

Table 15.2: Proportion of Total Tax to Own Fund Revenue

Summary Statistic	2001-02	2002-03	2003-04	2004-05	2005-06
Average	60%	53%	52%	54%	50%
Maximum	99%	98%	97%	100%	98%
Minimum	18%	0%	18%	21%	21%
Standard Deviation	21%	21%	17%	20%	19%
No. of observation	40	38	40	40	40

Table 15.2 summaries the proportion of total tax to revenue from own fund in the time period mentioned above for KMA municipalities. The average of 60% in 2001-02, declines slowly year wise. 53% in 02-03, 52% in 03-04 and then slightly increased to 54% in 04-05 and then again decreased to 50% in 2005-06. The standard deviations recorded are not very high. From Tables 15.1 and 15.2, it is also seen that the average proportion of other taxes to own funds of local governments in KMA varies between 5 percent to 9 percent in differnt years.

Table 15.3: Proportion of Non Tax To Own Fund Revenue

Summary Statistic	2001-02	2002-03	2003-04	2004-05	2005-06
Average	40%	44%	48%	46%	50%
Maximum	82%	79%	82%	79%	79%
Minimum	1%	0%	3%	0%	2%
Standard Deviation	21%	20%	17%	20%	19%
No. of observation	40	38	40	40	40

Table 15.3 summaries the proportion of non tax to own fund revenue in the above mentioned time period for KMA municipalities. The average of 40% in 01-02 increased to 44% in 02-03 and then 48% in 03-04. Then in 04-05 it slightly decreased to 46% and then increased to 50%. Standard deviations for all the years are low indicating at moderate variation in theses proportions amongst ULBs. It is observed that the shares of tax and non tax components are almost equal in total own source revenues (50:50).

Next, we attempt an analysis of the composition of total revenue of KMA municipalities. In what follows, we would discuss the summary statistics of the proportions of different components of total revenue consisting of own fund sources and government transfers. We would like to see how they have changed over time. The time period is the same as the previous analysis.

Table 16.1: Proportion of Property Tax Revenue To Total Revenue

Summary Statistic	2001-02	2002-03	2003-04	2004-05	2005-06
Average	19%	21%	21%	22%	21%
Maximum	53%	68%	65%	69%	68%
Minimum	6%	0%	7%	6%	7%
Standard Deviation	11%	12%	11%	12%	13%
No. of observation	40	38	40	40	40

Table 16.1 summaries the proportions of property tax revenue to total revenues of KMA municipalities over a period of five years, 2001-02-05-06. It is seen to be more or less stable around the value of 21%. The average of 19% in 01-02 grows to 21% in 02-03, remains the same in 03-04, again rises to 22% and then declines to 21% again in 05-06. The SD recorded is considerably high showing enough variation in the data for the municipalities.

Table 16.2: Proportion of Other Tax Revenue To Total Revenue

Summary Statistic	2001-02	2002-03	2003-04	2004-05	2005-06
Average	3%	4%	4%	3%	3%
Maximum	27%	31%	27%	23%	22%
Minimum	0%	0%	0%	0%	0%
Standard Deviation	6%	7%	6%	4%	4%
No. of observation	40	38	40	40	40

Table 16.2 summaries the proportions of other tax revenues to total tax revenues. The average is more or less stable around 3% in the time period mentioned above with a slightly higher value of 4% in two consecutive years viz. 02-03 and 03-04.The variation is enormous being reflected in the SD figures which are higher than the average for all the years.

Table 16.3: Proportion of Total Tax Revenue To Total Revenue

Summary Statistic	2001-02	2002-03	2003-04	2004-05	2005-06
Average	22%	25%	25%	24%	24%
Maximum	53%	68%	66%	69%	69%
Minimum	7%	0%	9%	10%	8%
Standard Deviation	11%	13%	12%	12%	13%
No. of observation	40	38	40	40	40

Table 16.3 summaries the proportions of total tax revenues to total revenues in the time period mentioned above for KMA municipalities. The average of 22% in 01-02 rises to 25% in 02-03, remains the same in 03-04, then falls to 24% in 04-05 and does not record any change in the following year. The SDs recorded are not too high showing moderate variation across ULBs.

Table 16.4: Proportion of Total Non Tax Revenue To Total Revenue

Summary Statistic	2001-02	2002-03	2003-04	2004-05	2005-06
Average	16%	21%	23%	22%	24%
Maximum	54%	53%	56%	55%	51%
Minimum	0%	0%	2%	0%	2%
Standard Deviation	13%	14%	13%	13%	v
No. of observation	40	38	40	40	40

Table 16.4 summaries the proportions of non tax revenues to total revenues in KMA municipalities for the same time period. The average of 16% in 01-02 rises to 21% in 02-03, to 23% in 03-04, declines a little to 22% in 04-05 and again increases to 24% in 05-06. The SD figures show that there is considerable variation amongst the municipalities.

Table 16.5: Proportion of Own Fund Revenue to Total Revenue

Summary Statistic	2001-02	2002-03	2003-04	2004-05	2005-06
Average	38%	46%	48%	47%	48%
Maximum	100%	100%	100%	73%	88%
Minimum	13%	0%	15%	16%	15%
Standard Deviation	17%	17%	16%	15%	155
No. of observation	40	38	40	40	40

Table 16.5 summaries the proportions of own fund revenues to total revenues of KMA municipalities. The average of 38% in 01-02 rises to 46% in the following year, then to 48% next year and declines to 47% in 04-05 before it reaches 48% in 05-06.The low SD figures show that the extent of variation is not much amongst municipalities as far as proportions of own fund to total revenues are concerned. The SD figures show that there is a reasonable degree of variation amongst the municipalities.

Table 16.6: Proportion Total Grant to Total Revenue

Summary Statistic	2001-02	2002-03	2003-04	2004-05	2005-06
Average	62%	54%	52%	53%	52%
Maximum	87%	80%	85%	84%	85%
Minimum	0%	0%	0%	27%	12%
Standard Deviation	17%	18%	16%	15%	15%
No. of observation	40	38	40	40	40

Table 16.6 summarises the proportions of total grants to total revenues in KMA municipalities. The average of 62%in 01-02 falls to 54% in 02-03 and remains the same till 05-06 only with a slight rise to 53% in 04-05. There is not much variation amongst KMA municipalities as far as proportions of grants to total revenues are concerned as reflected by the low SD figures.

Thus it is clear that the municipalities are heavily dependent on government transfers. For each of the 5 years the shares of own funds resources in total resources of municipalities are lower than those of the government transfers.

From the above analysis is it clear that the share of property taxes in own source revenues constitutes a major part as it happens with local government finance. The shares of tax and non tax revenues in the total own source revenue in KMA municipalities are almost the same. The shares of revenues from government grants in total revenues are greater than 50% in all the years showing a greater dependence on grants than on own sources of revenues.

Now we would intend to get an idea about the per capita value of the resources generated in KMA ULBs. The absolute figures under different heads of the revenues are translated to per capita terms and then deflated to get the values at 99-00 prices. We analyse data over a time period between 2001-02-05-06. Data for Kolkata Municipal Corporation (KMC) is only available for two years, 2004-05 and 05-06.

Table 17.1: Per Capita Property Tax Revenue [99-00Constant Price]

With out KMC	**2001-02**	**2002-03**	**2003-04**	**2004-05**	**2005-06**
Average	65.56	66.13	73.47	80.76	85.05
Maximum	364.38	379.22	344.87	461.03	612.72
Minimum	8.34	0.00	9.24	11.12	13.43
Standard Deviation	71.83	71.80	72.49	88.46	103.55
No. of observation	40	40	40	39	39

We would start with property taxes. Table 17.1 summarises the data on per capita property tax revenue for the period 2001-02 to 2005-06 for 40[10] KMA ULBS. It is found that the average revenue from per capita property taxes rises from Rs. 65.56P in 01-02 to Rs. 85 .05P in 05-06[11]. The SD is higher than the average for all the years excepting 03-04 revealing high degree of dispersion in the per capita revenues in the ULBs.

[10] KMC is excluded for because data was not available for 01-02, 02-03 and 03-04. In 2004-05 and 05-06 we have no information about Haora Municipal Corporation. In 2001-02 for Baranagar, Khardah, Pujali and Rajarhat Gopalpur zero tax revenue. In 02-03 it was zero for Bidhan Nagar, South Dum Dum, Garulia and Konnagar. In 03-04 for Baidyabati, Baranagr, Mahestala and Naihati other tax revenue was zero.

[11] Including KMC in 04-05 and 05-06, the average becomes slightly higher, recorded at Rs. 96.04P and Rs.93.99 P respectively.

Table17.2: Per Capita Other Tax Revenue [99-00Constant Price]

With out KMC	2001-02	2002-03	2003-04	2004-05	2005-06
Average	8.53	9.28	12.20	9.01	9.49
Maximum	65.70	81.57	52.22	56.32	58.55
Minimum	0.00	0.00	0.00	0.00	0.00
Standard Deviation	14.03	17.56	15.33	12.62	13.63
No. of observation	40	40	40	39	39

Table 17.2 summarises the per capita other tax revenues for the time period 2001-02 to 2005-06. The average rises steadily from Rs. 8.53P in 01-02 to Rs. 9.49P in 05-06[12]. The SDs for all the years are higher than the averages in the respective years showing wide variation of other tax revenues in the KMA municipalities. Inclusion of KMC in the years 04-05 and 05-06 however does not alter the amounts considerably

Table 17.3: Per Capita Total Tax Revenue [99-00Constant Price]

With out KMC	2001-02	2002-03	2003-04	2004-05	2005-06
Average	74.06	75.41	85.68	89.82	94.54
Maximum	364.89	381.35	368.16	464.00	615.07
Minimum	10.37	0.00	10.69	12.54	14.70
Standard Deviation	71.20	77.52	77.11	88.63	103.75
No. of observation	40	40	40	39	39

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Table 17.3 summarises the per capita total tax revenue figures for the time period of 2001-02 to 2005-06 in KMA ULBs. The average steadily rises from Rs. 74.06P in 01-02 to Rs 94.54 P in 2005-06[13]. The SD s are reasonably high indicating at enough variation in the per capita total tax revenues amongst KMA ULBs.

[12] In 2001-02 for Baranagar, Khardah, Pujali and Rajarhat Gopalpur other tax revenue is zero. In 02-03 it was zero for Bidhan Nagar, South Dum Dum, Garulia and Konnagar. In 03-04 for Baidyabati, Baranagr, Mahestala and Naihati other tax revenue was zero. In 2004-05 and 05-06 we have no information about Haora Municipal And for Baidyabati, Baranagar and Baruipur other tax revenue is zero in 04-05 and in 05-06. In 04-05 it was zero for Madhyamgram also. In 05-06 other tax revenue was zero for Kanchrapara and Uluberia.

[13] In 2002-03 Total tax revenue was zero in Bidhan Nagar, Konnagar and in South Dum Dum. In 04-05 and 05-06 Haora Municipal Corporation is missing

Table 17.4: Per Capita Non Tax Revenue [99-00Constant Price]

With out KMC	2001-02	2002-03	2003-04	2004-05	2005-06
Average	47.56	56.78	74.96	75.86	81.23
Maximum	154.17	171.90	213.58	188.31	264.59
Minimum	1.26	0.00	7.45	0.00	9.71
Standard Deviation	36.83	44.09	52.47	52.73	53.64
No. of observation	40	40	40	39	39

Table 17.4 summarises the per capita revenues from non-tax component of KMA ULBs during the time period 01-02 to 05-06. The average of Rs. 47.56P in 2001-02 rises to Rs. 81.23P in 05-06.[14] The SDs reveal considerable variation over ULBs though non-of the SDs are greater than the respective averages. Inclusion of KMC in 04-05 and 05-06 raises the amounts to Rs.83.51P and Rs 89.60P respectively.

Table 17.5: Per Capita Revenue from Own Fund [99-00Constant Price]

With out KMC	2001-02	2002-03	2003-04	2004-05	2005-06
Average	121.56	132.55	160.64	165.68	175.77
Maximum	460.85	388.64	544.60	523.25	628.86
Minimum	19.36	0.00	18.14	19.58	26.36
Standard Deviation	84.65	94.07	104.00	108.35	114.81
No. of observation	40	40	40	39	39

Table 17.5 summarises the per capita revenues from own fund consisting of total tax and non tax revenues from Tables 17 and 18. The average of Rs. 121.56 P in 01-02 increases steadily to Rs175.77P in 05-06[15]. Inclusion of KMC in 04-05 and 05-06 slightly raises the figure to Rs. 188.74 P and Rs.193.29P respectively.

[14] In 03 zero non-tax revenue recorded for Bidhan Nagar, Konnagar,, South Dum Dum . In 04-05, 05-06 Haora Municipal Commission is missing and zero non-tax revenue is recorded for Champadany.

[15] In 02-03: zero per capita revenue from own fund is recorded in Bidhan Nagar, Konnagar, South Dum Dum.. In 04-05 & 05-06 data for Haora M.C. is missing.

Table 17.6: Per Capita Revenue from Govt Fund [99-00Constant Price]

With out KMC	2001-02	2002-03	2003-04	2004-05	2005-06
Average	198.15	146.32	160.52	174.44	176.84
Maximum	538.19	361.33	325.96	373.02	364.58
Minimum	73.88	0.00	63.58	50.72	13.85
Standard Deviation	93.51	76.31	54.34	64.55	68.54
No. of observation	39	39	39	39	39

Table 17.6 summarises revenues of KMA ULBs from Government funds as plan and non-plan grants. The average of Rs. 198.15P in 01-02 declines in 02-03 to Rs. 146.32P and then steadily rises to Rs.176.84P in 05-06[16]. Reasonable variation in the per capita revenues from own fund among the ULBs can be seen from the SD figures. Inclusion of KMC increases the figures to Rs.183.37P and Rs 188.34P in 04-05 and 05-06 respectively.

Table 17.7: Per Capita Total Revenue [99-00Constant Price]

With out KMC	2001-02	2002-03	2003-04	2004-05	2005-06
Average	319.62	278.10	320.80	340.11	352.62
Maximum	740.78	684.62	777.59	748.70	897.12
Minimum	138.55	0.00	123.59	124.37	119.75
Standard Deviation	148.91	152.75	135.92	141.23	157.64
No. of observation	39	39	39	39	39

Table 17.7 summarises figures on per capita total revenues including own fund and transfers of the KMA ULBs. It is found that the average of Rs 319.62P in 01-02 declines to Rs. 278.10P in 02-03 and then rises steadily to Rs. 352.52P in 05-06[17]. The SD is reasonably high for all the years showing considerable variation I per capita total revenues in the KMA ULBs.Inclusion of KMC raises the figures to Rs. 372.12P and Rs. 381.62 P in 04-05 and 05-06 respectively.

The main findings of the analysis of data on per capita revenues from different sources suggest that per capita total tax revenues are slightly higher than the per capita non-tax revenues.

[16] 02-03 records zero per capita revenue from own fund in Bidhan Nagar, Konnagar, South Dum Dum. For 04-05 & 05-06 data on Haora M.C is missing.
[17] Haora MC data is missing for all the years

The figures for per capita revenues from own fund and those from the transfers on an average have been very close to each other over the years. Thus we can infer that the shares of own fund and the transfers to total per capita revenues of KMA municipalities have almost equal shares on an average.

Physical Levels of Services

In this section we will give an overview of the physical levels of services provided by the KMA municipalities. We will concentrate on five major services *viz*. water supply, sewerage, solid waste management, street lights and municipal roads. However ULB wise data on each service characteristics are not available which constrains our analysis.

Water Supply

The KMA municipalities get water from two main sources, surface water from river Hugli and ground water source. A very few municipalities have access to surface water sources. Majority of the municipalities have access to ground water sources. Most of the ULBs do not have data on per capita supply of water. However it is available for KMC. As per records KMC has supplied 201 lpcd in the most recent year[18]. This indicates that KMC supply is higher than the physical norm set at 150 lpcd for mega cities in India. However for other ULBS the norm stands at 135 lpcd.

Table 18.1 summarises the current water demand in KMA municipalities. The total is estimated to be 437 MGD the average being 10.66 MGD with an SD as high as 31.01 indicating a high variation in water demand amongst ULBs..

Table 18.1: Water Demand (in million gallons per day) in KMA

Total	437.14
Average	10.66
Maximum	201.54
Minimum	1.01
Standard Deviation	31.01
No. of Observation	41

Source: *Master Plan for Water Supply within KMA*. City Development Plan for Kolkata Metropolitan Area, 2006.

[18] CPHEEO estimates on water supply of different urban agglomerations in India, 2006-07.

The total number of water supply connections in KMA according to current figures stands at 7,35,684. The average proportion of domestic connections in KMA ULBs stands at 80 per cent. The commercial and industrial connections clubbed together accounts on an average for 3 per cent of the total connections. Other categories of connections (given in Table 18.2) account, on an average, for the residual 17 per cent.

Table 18.2: Descriptive Statistics of Proportions of different categories of connections for water supply

Statistics	Proportion of domestic connection	Proportion of industrial & commercial connection	Proportion of Other Connections (stand post, Street Hydrants, hand tubewell and others)
Average	80%	3%	17%
Maximum	95%	41%	60%
Minmum	40%	0%	1%
Standard Deviation	15%	9%	16%
No. of municipalities	22	19	22

Sewerage

Based on the recommendation of the sewerage proposals of previous master plan (1966-01) existing and proposed water supply facilities, topography of the area, location advantages for present and future land use patterns and available facilities of water bodies for discharge of treated effluents on the entire metropolitan area of KMA have been divided into twenty sewerage zones of which fourteen are situated in the east bank and six in the west bank of Hugli.

Table 18.3 gives the coverage of area and households by the sewerage system and the type of sewerage system in 39 KMA municipalities. It is found that most of ULBs do not have formal sewerage system. The descriptive statistics summarized in Table 18.4 shows that the average area covered under sewerage system on the basis of a small sample of 10 observations stands at 43% with a maximum of 96% in Kalyani and a minimum 2.% of in Gayespur

Table 18.3: Percentage of Area/ Household under formal Sewerage/Drainage system in ULBs

Name of ULB	Percentage of Area/ House-hold covered under Formal Sewerage System	Types of Sewerage/Combined/ Separate
North DumDum	Nil	Only Storm Water
Dum Dum	Nil	Only Storm Water
Baranagar	4%	Combined
Barrackpore	13.8% (by 2007)	Combined system
Budge Budge	Nil	Only Storm Water
South DumDum	5% (area)	Combined system
Khardah	Nil	Only Storm Water
Madhyamgram	Nil	Only Storm Water
Howrah MC	15%	Combined
Chandannagar MC	22%	Separate
Barasat	Nil	Only Storm Water
Kamarhati	0.50%	Separate
Hugli-Chinsurah	Nil	Combined
Serampore	60%	Combined
Bally	75%	Combined
Rishra	Nil	Combined
Baruipur	Nil	Only Storm Water
Uluberia	Nil	Only Storm Water
Mahestala	Nil	Only Storm Water
Pujali	Nil	Only Storm Water
Gayespur	Nil	Only Storm Water
North Barrackpore	Nil	Only Storm Water
Rajpur-Sonarpur	Nil	Only Storm Water
New Barrackpore	nil	Only Storm Water
Bansberia	nil	Only Storm Water
Baidyabati	Upcoming-Ganga Action Plan	Separate
Halisahar	nil	Only Storm Water
Bhadreswar	nil	Combined
Titagarah	60%	Combined
Uttarpara - Kortung	nil	Combined
Panihati	nil	Only Storm Water
Bidhannagar	92%	Separate
Konnagar	nil	Combined
Naihati	nil	Separate
Champadani	nil	Combined
Garulia	nil	Combined
Bhatpara	25%	Separate
Kalyani	65%	Separate
Kanchrapara	nil	Combined

Source: City Development Plan for Kolkata Metropolitan Area, 2006.

Table 18.4: Descriptive Statistics of proportions of area covered by sewer system

1999-2000	Proportion of area covered by sewer system
Average	42.90%
Maximum	96.09%
Minimum	2.17%
Standard Deviation	0.32
No. of Observation	10

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Solid Waste

The Municipal Solid Waste can be categorized as:-

Domestic Waste

The Solid Waste generated from single & multistoried residential complexes in the households are the domestic wastes.

Commercial Waste:

The SW originated from the offices, wholesale & retail stores, hotels & restaurants, ware houses etc. are considered as commercial wastes.

Municipal Wastes:

The SW generated from municipal activities and services like street waste (i.e. wastes from street, walkways, alley roads, parks and vacant lots), dead animals, market waste, abandoned vehicles, and sewage by products from STPs are known as Municipal waste.

Institutional Wastes:

The SW which are arising from the institutions like schools, colleges, Universities, hospitals, & research organizations are known as institutional wastes.

Bulky Wastes:

The SW which are categorized as Bulky wastes are the wastes developed in household complexes, refrigeration & other electronic workshop, big hotels & restaurants. These wastes are mostly metallic wastes, rubber & wood product wastes, tree wastes.

Garbage, Rubbish & Ashes:

The SW Garbage, Rubbish & Ashes have a relation within items. The garbages are resulting from the handling storage, sale preparation, cooking & servicing of food. Rubbish is originated from domestic, commercial & institutional solid wastes simultaneously. The ashes are the residue from burning of wood, coal, charcoal, coke & other combustable materials.

Construction & Demolition Wastes:

The SW generated by the construction, renovation repair & demolition of houses, commercial buildings & other multistoried structures are known as construction & demolition wastes. The solid wastes are the combination of earths, stones, concretes, bricks, lumbs, roffing materials, heating equipments & electrical wires.

Industrial Wastes:

The SW generated from industrial processes, the treatment of liquid effluents is emissions are known as industrials wastes. The toxic, non-toxic and the ashes are known as Industrial wastes.

. Table 18.5 gives estimates of solid waste generation of Indian cities according to size class of population. Since of the KMA municipalities have population in the range of 1-5 lakhs average amount of solid wastes generated can be assumed to be 0.21 KG per capita per day.

Table 18.5: NEERI Waste Generation Estimates

Population (millions)	Kilograms per capita per day
<0.1	0.21
0.1-0.5	0.21
0.5-1.0	0.25
1.0-2.0	0.27
2.0-5.0	0.35
>5.0	0.5

Source: City Development Plan for Kolkata Metropolitan Area, 2006.

Basic Collection Systems of Solid Wastes

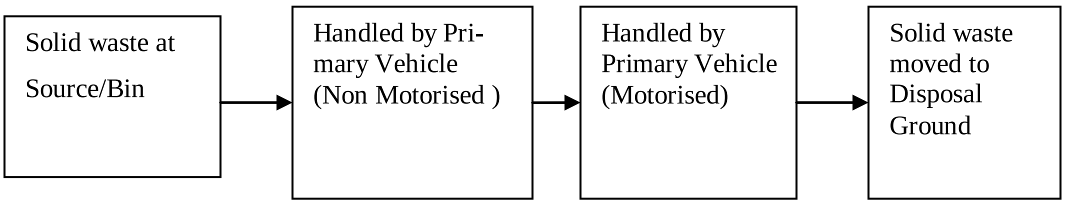
There are three steps involved in solid waste management practiced in KMA viz on site storage, collection and disposal. There are methods of collection of solid wastes which vary in the degree of participation by the households and the authority. Four common methods are:

1. Communal storage collection which may require delivery of wastes by the householder/ occupiers over a considerable distance.
2. Block collection, where the householders / occupiers deliver the wastes to the vehicle at the time of collection.

3. Door-to-door collection, where the collector enters the premises and the householder /occupier is not involved in the collection process.
4. Kerb side collection, where householder/ occupier put out and later retrieves the bin.

<u>Basic Transportation System of Solid Wastes</u>

The method of transferring system from primary collection vehicles to secondary collection vehicles to secondary collection vehicle is a stage transportation system.



<u>Disposal System of Solid Waste:</u>

Disposal is carried on to one of the five available alternatives:

1. Open dumping grounds
2. To covered trenching grounds
3. To ordinary sanitary landfill sites
4. To mechanized sanitary landfill sites
5. To ordinary/ mechanized sanitary landfill sites.

There are three basic modes of treatment of disposed solid wastes viz. sanitary landfill, composting and incineration. The Solid waste management system has been divided into three components *viz.* Municipal Solid Waste Management, Bio-medical Waste Management and Hazardous Waste Management.

The collection efficiency, defined as the ratio of amount collected to amount generated in solid waste management, can be assessed from the summary statistics tabulated in Table 18.6. The average collection efficiency has slightly declined over a period of four years. In 1999-2000, 100% collection efficiency was in KMC, Bhadreswar, Garulia, Kalyani. In 2003-2004, 100% collection efficiency was in Bhadreswar.

Roads

There are as many as 40 arterial roads in the KMA connecting the urban agglomeration to the National Highways and other routes going outside the metropolitan area. However

Table 18.6: Solid Waste Collection Efficiency

Summary Statistic	1999-2000	2003-04
Average	74.47%	73%
Maximum	100%	100%
Minimum	2.5%	40%
Standard Deviation	0.20	0.17
No. of observation	34	21

average percentage of municipal roads area to ULB area is as low as 8% (Table 18.8). The maximum of 15% is recorded at South Dum Dum and Bidhannagar and a minimum of 2% is recorded at Baruipur. Table 18.7 shows that on an average 69% of the municipal roads in KMA municipalities are surfaced 31% being unsurfaced. There are municipalities where 100% of the roads are surfaced. On the other hand there are municipalities where 75% of the total road length is unsurfaced., Proportions of cement concrete roads to surfaced roads stands at 14% whereas around 47% of the unsurfaced roads are found to be motorable.

Table 18.7: Descriptive Statistics on Some Quality Indicators of Municipal Roads[19]

As on 31st March, 2000	Proportion of Surfaced to Total	Unsurfaced to Total	Proportion of Cement Concrete to Surfaced road	Proportion of Motorable to Unsurfaced road
Average	68.67%	31.32%	13.58%	46.55%
Maximum	100%	75.71%	52.40%	100%
Minimum	24.29%	0%	0%	0%
Standard Deviation	21%	21%	17%	30%
No. of observation	40	40	40	39

[19] Missing: Bidhannagar
Maximum for surface road & minimum for unsurface road: Bansberia;
Minimum for surface road and maximum for unsurface road: Rajarhat-Gopalpur.
Maximum for cement concrete road: Mahestola;
Minimum (zero) for cement concrete road: Bally, Baidyabati, Uluberia, Uttarpara-Kotrung, New Barrackpore, Rajarhat-Gopalpur;
Maximum for Motorable unsurfaced road: Madhyamgram & South DumDum.
Minimum for Motorable unsurfaced road: Haora MC, Barrackpore, Titagarh, Kalyani

Table 18.8: Descriptive Statistics of Some Vital Proportions of Roads and Street Lights

Statistics	Percentage of road area to total ULB area	Percentage of roads covered by proper street lighting	Percentage of Total population coverage with street lights
Average	8%	67%	64%
Maximum	15%	100%	96%
Minimum	2%	4%	10%
Standard Deviation	4%	24%	34%
No. of observation	19	19	11

Street Lights

Data on street lights of KMA municipalities are scanty for a complete analysis. However we can get an idea about the average percentage of roads covered by street lighting from Table 18.8. It is recorded that on an average 67 percent of the roads are covered by street lights. A maximum of full coverage of roads by street-lighting has been recorded at Bidhannagar and a minimum of 4 percent at Uluberia. We can also get an idea about the population coverage statistics by street lights from the same table. It has been found that on an average 64 percent of the population in KMA municipalities are covered by street light network. The maximum of 96% has been recorded at Panihati and the minimum of 10 percent is recorded at Rajarhat-Gopalpur.

It is clear that the levels of services provided in the KMA municipalities are not adequate to ensure a desirable standard of living to the inhabitants. Also, disparities are high amongst ULBs in terms of service provision. The quality of the services is also subject to some clarification. However, we are not in a position to compare the service delivery levels with the physical norms on those services due to data inadequacy. It is difficult to give definitive answers as to why the existing situation is like this. One of the major reasons would be the financial handicap of municipalities. The other could be the administrative inefficiencies. Also the awareness of the mass regarding the levels and quality of these services must have played an important role.

Chapter 3

Fiscal Health of Cities: Methodology and Estimations for Kolkata Metropolitan Area

Introduction

The main objective of the study is to identify the disparities in fiscal health of the municipalities in Kolkata Metropolitan Area (KMA) by measuring the fiscal conditions of 41 local governments within the metropolitan area, using a conceptually sound measure of fiscal health.

The appropriate way to measure the fiscal conditions of local governments is to compare the fiscal needs of each government to the average capacity to raise revenue and their actual receipt of intergovernmental grants. However the data requirement to fully implement this approach is difficult to be fulfilled. The general methodology in the literature on metropolitan fiscal disparities deals with a set of correlates of fiscal health.

We define the structural fiscal condition of any given local government as the gap between its expenditure need and revenue raising capacity. Expenditure need is a measure of the amount of money needed to provide the services for which the local government is responsible. Revenue raising capacity is the amount of tax and non tax revenue each jurisdiction can raise at a particular rate plus the amount of revenue the government receives as intergovernmental grants. This gap is generally referred to as a need-capacity or fiscal gap.

In what follows we will give the steps followed in the methodology for estimating the fiscal gaps of municipalities in KMA for the present study. The methodology for estimating expenditure need will be elaborated first followed by the sections on data and estimation results. There will be a separate section on the methodology for revenue capacity estimation followed by a section on estimation results. The final step would be to calculate the need-capacity gap of KMA municipalities and assess the state of fiscal health in the urban agglomeration.

Expenditure Need

It is a methodological challenge to arrive at correct figures for expenditure needs from the data on actual expenditures on different heads of services provided by the local government. Expenditures actually incurred at the local government level do not necessarily match with these needs.

A common way to do this is to estimate a cost function for various public services. The cost of providing an average or any other normative standard of a given public service can be defined as the expenditure need for the service. The expenditure needs added for all servi ces is the aggregate expenditure need.

Expenditures of a local government would depend on a vector of public services it has to provide and a set of factors determining the cost of service provision. We have non-economic location factors like topography, nearness to water-bodies etc and purely economic factors like scale, demand and supply parameters, as also social and demographic factors. The step from estimated expenditure function to expenditure need for a local government is crucial because splitting up the actual spending data into parts attributable to the cost of service provision, local preferences or policies about levels of service provision and inefficiencies is tricky[20].

An index, constructed properly from the estimated expenditure functions, summarizing all the information about the costs of public services can serve the purpose. The first step in the calculation is to predict what each local government would have spent if it had average resource and demand variables, but retained its own values for the cost variables. Substituting the average values for the non-cost variables and the actual values of the cost variables in the estimated expenditure regression equation we can arrive at these predicted expenditure figures[21]. The observed variation in the resulting predicted expenditures will reflect variation in the cost factors alone. The final step involves translating these predicted expenditures into a cost index. This is accomplished by dividing predicted expenditures for each local government obtained from the earlier step by the average of the predicted expenditures of all the local governments[22].

Once an index is constructed for each service for all the local governments, the expenditure need can be calculated for its provision according to the prescribed norm for the service concerned. The product of the index for each service and the financial norm (in terms of operations and maintenance cost for the provision of the physical level of service prescribed by a standard norm[23]) for that service for each municipality will give the expenditure need of that

[20] For the present study we do not deal with inefficiencies due to data constraints.

[21] Separating the demand and resource variables and the cost variables however is subject to some limitations as these models typically have the elements of simultaneity.

[22] The cost index was normalized for every ULB within the KMA by taking the ratio of its own predicted value (arrived at as described above) as a proportion of the average predicted value index (for all ULBs). Hence a ULB with a normalized cost index of less than 1 is faced with a favorable (or low) cost index when compared with another ULB whose (normalized) cost index is greater than 1.

[23] For instance for water supply for megacities in India the norm is 150 litres per capita per day

municipality. We will elaborate on the estimated norms used for different services in the estimation sections on respective services[24].

The final step in calculating the total expenditure needs of each urban government is to sum across expenditure needs for all categories of public services for which the municipality in question is responsible.

Data

Kolkata Metropolitan Area consists of 41 ULBs. Data for the period of 99-00-03-04 for all these ULBs are collected from the administrative reports of the municipalities and various other sources during field visits. However missing data for a number of municipalities restrict us to use anything more rigorous than Ordinary Least Squares. We intend to do service wise estimations for five major services viz. water supply, sewerage, solid waste management, street lights and roads and then come up with a cost index for each service. The methodology for arriving at the expenditure needs numbers for the municipalities for all the services will be the same as described in the section on methodology. Data source for each of the variables used for estimations is mostly the annual reports of the municipalities and the Urban West Bengal published by Institute of Local Government and Urban Studies, Kolkata.

Estimations

We have attempted parametric estimations of expenditure functions using Reduced Form Equations for each of the five services mentioned above using Ordinary Least Squares[25]. The functional form chosen is linear with a constant term in it. While the set of independent variables is somewhat different from one service to the other depending on the nature of the service[26], the dependent variable is the per capita revenue expenditure per annum[27] on a service for estimations of all the services. All the financial variables are expressed in 1999-2000 prices.

[24] Norms on each service are expected to differ across municipalities even within a metropolitan area due to differences in service conditions. But due to unavailability of records at the municipality level on these norms our analysis will be subject to some limitations.
[25] Though we get a balanced panel with 41 municipalities for 5 years, with some missing observations, the size and the content of the data do not give the scope for using Time Series/Panel Data Estimation Techniques.
[26] The issue of identification of equations is also taken care of.
[27] Capital expenditures are not considered for two reasons; firstly, they are lumpy in nature so converting them to yearly figures would be erroneous, secondly data for all the years were available for a very few municipalities.

In what follows we will give the details of the estimation procedures for each of the services separately. We would like to provide the rationale for choosing the independent variables, state and give some valid justification of the significance of the model and identify a set of resource and demand variables and a set of cost variables to construct the cost index for each service. We would also state the norm used to arrive at the expenditure needs figures for each service and finally analyse the estimated figures for expenditure need on each service.

The list of variables used in the regressions and their descriptive statistics are given in Table A1 and A2 of the Appendix.

Water Supply

For water supply the revenue expenditure per capita[28] of a municipality is assumed to be a linear function of population, population density, property tax revenue per capita, grants (received by the local governments) per capita, literacy rate, household size and price index for water supply[29]. Population as an independent variable intends to capture the scale effect; population density is included to reflect the relation between water supply expenditure and the coverage in terms of land area[30], property tax and grants constitute the resources of the municipality which are important determinants of expenditure, household size and literacy rate are variables indicative of the standard of living which would definitely affect expenditure, price index is also included as it has an effect on the expenditure. We have also added an error term $e_{iws.}$ in the equation.

The expenditure function for water supply for ULB i can be written as follows:

Revenue expenditure on water supply per capita$_i$ = a_{0ws} + a_{1iws} population + a_{2iws} population density + a_{3iws} per capita property tax revenue + a_{4iws} per capita grants + a_{5iws} literacy rate + a_{6iws} household size + a_{7iws} water supply price index + $e_{iws.}$

[28] Revenue expenditure in absolute terms is another alternative which is ruled out as scrutiny of the data reveals that results on the basis of the model fitted with this dependent variable will be unreliable in terms of comparability.
[29] Central Statistical Organisation publishes price indices sectorwise in which price index for water supply gas and electricity is used to estimate the expenditure equation for water supply. For roads the price index for construction and for all other services the price index for other services are used.

The results are tabulated below in Table 19.1.

Table 19.1: Regression Results for Water Supply

Dependent Variable: Per Capita Revenue Expenditure On Water Supply				
Independent Variables	**Coeff.**	**Std.Err.**	**t-ratio**	**P-value**
Constant	-313.9440	73.31950	-4.2819	0.0001
Population	-0.0001	0.00002	-3.3904	0.0014
Population density	0.0002	0.00026	0.8663	0.3904
Proper tax revenue	-0.0254	0.05785	-0.4391	0.6624
Per capita grant real	0.1869	0.02757	6.7785	0.0000
Literacy rate	281.5010	52.29060	5.3834	0.0000
House hold size	17.1114	7.90942	2.1634	0.0352
Water supply price index	20.1426	16.82350	1.1973	0.2367
Number of Observations = 59	**R^2 =0.74**	**Adjusted R^2 =0.70**		**F(7,51)=21.07**

Apart from property tax revenue per capita and population density, all the independent variables are significant household size is significant at 5% level, water supply price index is significant at 10% level, and all the others are significant at 1% level). The explanatory power of the model, with R^2 (0.74) and adjusted R^2 (0.70) and the value of F statistic (21.07), is also reasonably high. We find a low but significant negative impact of a rise in population on per capita revenue expenditure indicating mild economies of scale in water supply in KMA area.

All the other variables which are significant have a positive sign which is expected. The effect of literacy rate is the most pronounced, with a very high value of the coefficient and the t-statistic; household size and price index are also important determinants; the coefficient for per capita grants, however, is positive but the magnitude is not that high. Thus we can infer that literacy in KMA municipality population is one of the most important determinants of water supply expenditures in the area, higher literacy rates can make the government spend more on this service. With respect to the increase in household size and price index we can expect that a rise in these variables can cause the levels of water supply expenditure considerably. The levels of wa-

[30] Inclusion of population and population density in the same regression equation might create confusion but as data on no physical variable like land area coverage of the water supply system is available, population density is taken.

ter supply expenditures do depend on per capita grants but the effect is not that strong that is to say a rise in grants can cause a nominal rise in water supply expenditures. Proprty tax revenues and population density however does not effect these expenditures.

On the basis of the estimated expenditure equation for water supply, we have to construct a cost index for water supply for each municipality. Such an index indicates how much each ULB, given average characteristics for demand and fiscal factors, is different in terms of costs for providing water supply, depending on its population, population density and the price index. The first step is to get the predicted values of the expenditures of municipalities with average values of the demand and resource variables and actual values of the cost variables. So we substitute in the expenditure equation the average values of per capita grants, property tax revenues (resource variables), household size, literacy rate (demand variables) and actual values for population, population density, water supply price index (cost variables). Then we divide these expenditures by the average of the series of predicted values obtained from the earlier step.

It is surprising that the average cost index for water supply is 1 with a SD of 0.17, with a minimum of 0.517 in Bhatpara for 2001 and a maximum of 1.28 for Titagarh in 2003. Scrutiny of the data shows that both population density and price index, the important cost determining factors, are highest for Titagarh among the KMA municipalities.

Once the cost index is constructed for each municipality the next task is to arrive at figures for expenditure need on water supply of each of the municipalities. For this we have used engineering estimates to implement the physical norm on water supply in KMA. From the available estimates on O&M cost for the provision of water supply in Kolkata Municipal Corporation (KMC) and taking expert opinion we found that to supply 150 lpcd in the municipalities of KMA area on an average the O&M cost is Rs.257.40P per capita per annum at 2005-06 prices[31]. Deflating this financial norm by the deflator applicable for gas electricity and water supply sector, at 2000-01 prices it amounts to Rs.256.37P. Multiplying the cost index by this amount we get the expenditure need figures for water supply of each municipality.[32]

We find that corresponding to the mean of 1 for cost index for water supply, the mean expenditure need is that prescribed by the norm itself ie Rs.256.37 P, with a SD of 43.16. The

[31] No data on the average O&M cost for supplying the quantity of water specified by the norm are available at the municipality level. Only for KMC some estimates were available and on the basis of that we have derived the estimates for other municipalities taking the physical norm of 135 lpcd.

maximum expenditure need has been recorded in Titagarh for 2003 amounting to Rs.328.99P, whereas the minimum has been recorded for Bhatpara for 2001 amounting to Rs. 132.59P.

Sewerage

For estimating the expenditure function on sewerage we take the revenue expenditure per capita on sewerage as a linear function of, population density, property tax revenue in per capita terms, per capita grants, literacy rate, number of households and price index for other services. We have taken number of households instead of household size because sewerage connections directly depend on the number of units of establishment, rather than the number of users of the facility. We have also added an error term $e_{isg.}$ in the equation.

The expenditure function for sewerage for ULB i can be written as follows

Revenue expenditure on sewerage per capita$_i$ = a_{0sg} +a_{1isg} population density + a_{2isg} property tax revenue + a_{3isg} per capita grant real + a_{4isg} literacy rate + a_{5isg} no. of household + a_{6isg} other services price index + $e_{isg.}$

The results are tabulated below in Table 19.2.

Table 19.2: Regression Results for Sewerage

Dependent Variable: Per Capita Revenue Expenditure On Sewerage				
Independent Variables	**Coeff.**	**Std.ErSG.**	**t-ratio**	**P-value**
Constant	-41.1945	86.2457	-0.4776	0.6349
Population density	0.0020	0.0003	7.3088	0.0000
Property tax revenue	-0.0667	0.0609	-1.0960	0.2781
Per capita grant real	0.0498	0.0297	1.6807	0.0988
Literacy rate 01	74.9459	45.4527	1.6489	0.1052
House hold	0.0002	0.0001	1.5378	0.1302
Other services price index	-32.6986	69.9827	-0.4672	0.6423
Number of Observations = 59	**R^2 =0.55**	**Adjusted R^2 =0.50**		**F(6,52)= 10.77**

The model for sewerage is a moderately good fit with population density (1 % level), literacy rate (10% level) and per capita grants (5% level) having statistically significant positive

[32] For two major municipalities, Kolkata and Howrah Municipal Corporation the estimates could not be obtained due to non-availability of data.

coefficients. Literacy has a strong effect with a coefficient as high as 75, per capita grants also has a positive impact on expenditure on sewerage. The positive sign of population density as a determinant of expenditure requires explanation as the general observation is that per capita costs would decrease with increased density requiring narrower sewerage network. One possible explanation is that in majority of the municipalities of KMA over the years of the study period, with an increase in population density the sewage generation has reached a level for which the existing system needs to be expanded considerably. Hence more expenditure is incurred on account of operating and maintaining the expanded system for disposal of the increased volume of sewage, which is caused by an increase in population density.

On the basis of the estimated expenditure equation for sewerage we have to construct a cost index for sewerage for each municipality. We substitute in the estimated expenditure equation the average values of per capita grants, property tax revenue (resource variables) and literacy rate(demand variable) and actual values for population density, no. of households, and other services price index. (cost variables) and divide these expenditures by the average of the series of predicted values obtained from the earlier step.

The average value of cost index for sewerage is recorded at 0.95 with SD as high as 1.1 indicating at wide dispersion of the values of the index. The highest value (2.33) of the cost index is observed in Titagarh for 2000 which has the highest population density and price index for other services.

On the basis of the cost index the expenditure needs figures for sewerage of each of the municipalities are calculated. For this we have used updated Zakaria Committee estimates (Rs./capita/annum) on O&M cost for sewerage[33]. The expenditure norms estimated in 94-95 have been brought upto 2000-01 prices assuming an annual inflation of 7.74%[34]. Though the estimates were updated for Chattisgarh, the calculations are done according to population size of cities. We have used the financial norm for sewerage and storm water drainage stated as

[33] The Zakaria committee norms were originally framed in 1960-61 recommending full coverage by sewerage with proper treatment facilities as a physical norm for medium and large cities. The financial estimates conforming to these norms were reassessed in 1994-95 according to 94-95 prices. The reassessment has been done assuming an annual inflation of about 7.74%.

[34] Infrastructure Development Action Plan for Chhattisgarh – Final Report by Pricewaterhouse Coopers Ltd

Rs.183.72P[35] for cities with 1-5 lakhs population. Multiplying the cost index by this norm we get the expenditure need figures for sewerage of each municipality.

The mean expenditure need for sewerage is recorded at Rs.138.61P per capita per annum with a SD of 106.25. The highest expenditure need (Rs.428.39) is observed for Titagarh in 2000.

Solid Waste Management

The computation of expenditure need for solid waste, as for the other services was done in a few steps. First, we estimated the per capita (revenue) expenditures as a function of various cost and household demand factors. An equation of the following form was used for estimating expenditure on solid waste by ULB i:

Revenue expenditure on solid waste per capita$_{isw}$ = a_{0sw} + a_{1isw} population + a_{2isw} population density + a_{3isw} per capita property tax revenue + a_{4isw} per capita grants + a_{5isw} literacy rate + a_{6isw} household size + a_{7isw} commercial connections + a_{8isw} other services price index + $e_{isw.}$

Population, population density and the relevant price index are included as cost factors. For public services characterized by large "fixed costs" and relatively low operating costs, per capita costs generally decline dramatically as the scale of operation rises. In the case of solid waste, fixed costs are cleaning equipment (trucks and so forth), and operating costs would be salaries of workers. Specifically, population has been included to test for the effect of scale economies in the provision of the service.

The provision of solid waste, as with other services, will be more costly in communities where the development patterns are dense. Hence population density has been included. A more literate population is likely to be more aware of the need for a cleaner environment; greater commercial activity means greater need for solid waste management. Further, all solid waste management initiatives are at the level of the household. Hence literacy rate, household size and the number of business establishments (measured here by the number of commercial connections

[35] Infrastructure Development Action Plan for Chhattisgarh – Final Report by Pricewaterhouse Coopers Ltd (*Annexure IV.3* 1)

for water supply (per 1,000 population)) are demand factors that determine expenditure on solid waste. Per capita property tax revenue and per capita grants are fiscal determinants of the extent of actual spending. e_{isw} is the error term.

Regression results for solid waste management are tabulated in Table 19.3

Table 19.3: Regression results for Solid waste expenditures per capita

Dependent Variable: Per Capita Revenue Expenditure On Solid Waste Management			
Independent Variables	**Coeff.**	**Std.Err.**	**t-ratio**
Constant	-524.4190***	162.0350	-3.2365
Population	-0.0001	0.0000	-1.8480
Pop Density	0.0007	0.0004	1.6987
Per capita property tax revenue	0.2416	0.1455	1.6601
Per capita grants (real)	0.2066***	0.0460	4.4958
Literacy rate 2001	379.6490***	86.1455	4.4071
HH size	42.9292***	13.0309	3.2944
Commercial connections per 1,000 population	-16.3670	9.1976	-1.7795
Price index (other serv.)	17.3153	106.9620	0.1619
Number of Observations=59 Adjusted R^2 = 0.56 F (8,50) = 10.27			

***Statistically significant at the 1% level.

The estimation of expenditure for solid waste shows that per capita grants, household size, and literacy rate are the most important determinants of revenue expenditures on solid waste. Specifically, the per capita grant in real terms has a positive and significant impact on solid waste expenditures. This implies that ULBs tend to depend on state grants for their solid waste management expenditures (such as salaries of sanitation workers and equipment), rather than on property tax revenues.

The larger the household size, the higher is the expenditures on solid waste. This makes sense because larger households generate more waste and given solid waste management happens at the household level, it also costs more to collect, treat and dispose them. Finally, the literacy rate has a positive and significant impact on the expenditures on solid waste. It is possible to believe that higher literacy rate generates a stronger demand and preference for cleaner cities and so the ULBs also tend to spend more per capita on solid waste, when the literacy rate is higher.

After estimating the regressions, in the second step, we substituted for average values of demand and fiscal factors in the equation for solid waste, and actual values of cost factors, to come up with a cost index for solid waste. Such an index indicates how much each ULB, given average characteristics for demand and fiscal factors, has a different index for providing solid waste services, depending on its population, population density and the price index. These factors determine its cost of providing solid waste services, as described in the section on methodology.

The cost index was normalized for every ULB within the KMA by taking the ratio of its own predicted value (arrived at as described above) as a proportion of the average predicted value index (for all ULBs). Hence a ULB with a normalized cost index of less than 1 is faced with a favorable (or low) cost index when compared with another ULB whose (normalized) cost index is greater than 1.

Based on the 200 observations (time series data on the 41 ULBs) for solid waste, we find the average (normalized) cost index is 1, with a maximum of 1.43 (for a ULB named Titlagarh, for 2003). No doubt, this is an area with the highest population density, and also was faced with the highest price index for other services for that year. Areas such as this would suffer from many cost disabilities in the provision of this service.

We arrived at expenditure need for solid waste (and all other services) by benchmarking a given level of the service and examining past estimates of how much it costs to arrive at that physical level of the norm. Based on Asnani's (2006) estimates in India Infrastructure Report (2006), (for cities of population between 100,000-500,000, he estimates the total cost of solid waste management is Rs.44,500,000), we computed the per capita cost to be Rs.228 in 2005 prices (applicable for the KMA ULBs since most of them are in the above said population range). We converted this to 1999-00 prices using the GDP deflator for other services, to be consistent with our regressions and other computations. When we do this, the per capita expenditure norm turns out to be Rs.188. We multiplied the cost index by this desired norm to arrive at the actual expenditure need of every ULB for solid waste.

Based on the distribution of expenditure needs for solid waste we generated for all ULBs, the average is Rs.188.10, consistent with an average cost index of 1. The maximum expenditure need (per capita) we came up for solid waste is Rs.269.36 (for a ULB named Titlagarh for 2003 which has the maximum population density and a price index for other services greater than 1). Similarly, we came up with per capita expenditure needs for all services for all ULBs.

Municipal Roads

The computation of expenditure need for municipal roads, as for solid waste and other services was done in the same set of steps. First, we estimated the per capita (revenue) expenditures as a function of various cost and household demand factors. An equation of the following form was used for ULB i for estimating expenditure on city roads:

Revenue expenditure on municipal roads per capita$_{ird}$ = a_{0rd} + a_{1ird} population + a_{2ird} population density + a_{3ird} per capita property tax revenue + a_{4ird} per capita grants + a_{5ird} literacy rate + a_{6ird} household size + a_{7ird} commercial connections + a_{8ird} price index for construction + e_{ird}

In the case of city-wide roads, fixed costs refer to costs of construction, and operating costs refer to salaries of workers and any maintenance material. Specifically hence, population has been included to test for the effect of scale economies in the provision of city roads.

The provision of city roads, as with other services, will be more costly in communities where the development patterns are dense. Hence population density has been included. Further, the price index for construction directly impacts the prices of inputs. Hence in the equation for roads, population, population density and the price index for construction are included as cost factors. Population and population density directly determine usage of roads, whereas the construction price index influences the cost and the actual expenditure on municipal roads.

A more literate population is likely to be more aware of the need for better roads; greater commercial activity means greater need for transport. A city with a higher household size is also likely to experience more demand for better roads than a city with a smaller household size on average. Hence the remaining variables – literacy rate, household size and the number of business establishments (measured here by the number of commercial connections for water supply) are demand factors. Per capita property tax revenue and per capita grants are fiscal determinants of the extent of actual spending on roads, as with other services. e_{ird} is the error term.

Results from Regression are tabulated in Table 19.4

Table 19.4: Regression results for Municipal road expenditures per capita

Dependent Variable: Per Capita Revenue Expenditure On Municipal Roads			
Independent Variables	**Coeff.**	**Std.Err.**	**t-ratio**
Constant	35.7770	55.9682	0.6392
Population	0.0000	0.0000	-1.6828
Pop Density	-0.0002	0.0002	-0.9978
Per capita property tax rev.	0.1504**	0.0605	2.4867
Per capita grants (real)	-0.0142	0.0191	-0.7459
Literacy rate 2001	-0.3014	35.8252	-0.0084
HH size	-3.7034	5.4186	-0.6835
Commercial connections per 1,000 population	1.5506	3.8247	0.4054
Price index for construction	-2.8321	24.7658	-0.1144
Number of Observations=59 Adjusted R^2 = 0.39 F(8,50) = 5.68			

The regression on roads is interesting given that property tax revenues are the only significant and positive determinant of spending on municipal roads, when controlled for the effect of other fiscal factors, demand and cost factors. Specifically, for every extra rupee of higher property tax revenue per capita, the revenue expenditure on municipal roads is higher by Rs.0.15. This implies that ULBs spend for municipal roads out of their property tax kitty. None of the other variables have a significant impact on the spending on municipal roads.

In the second step, as with solid waste, we substituted for average values of demand and fiscal factors in the regression equation for municipal roads, and actual values of cost factors, to come up with a cost index for roads. Such an index indicates how much each ULB, given average characteristics for demand and fiscal factors, has a different index for providing roads, depending on its population, population density and the price index for construction, which obviously impact a ULB's expenditure on roads.

As was done in the case of solid waste, the cost index was normalized for every ULB within the KMA by taking the ratio of its own predicted value index as a proportion of the average predicted value index (for all ULBs). Hence a ULB with a normalized cost index of less than 1 is faced with a favorable (or low) cost index when compared with another whose (normalized) cost index is greater than 1 due to its own cost disadvantages.

Based on the 184 observations (time series data on the 41 ULBs) for roads, the average (normalized) cost index is 1, with a maximum of 1.34 (for a ULB named Pujali, for 1999). No doubt, this is an area with the lowest population in absolute terms, for that year, hence the per capita cost is higher. The lowest cost index for roads (0.48) is found in South Dum Dum for 2003. This is a ULB with above average population and population density that year, even though it was faced with a construction index of above 1. Thus the cost index is a function of the factors that determine the costs.

In the final step, in order to arrive at expenditure needs of cities for spending on municipal roads, we converted the cost index into a number. To do this, we looked up a norm for spending on municipal roads. The only norm that we were able to identify is from a Pricewaterhouse-Coopers (PWC) (2001) study, which updates the Zakaria committee's expenditure norms to that in 2000-01 prices. This study develops and updates norms for many municipal services for towns in the state of Chhattisgarh, including those for city roads. Most of the ULBs in the KMA area are within the 2001 population range from 100,000-200,000. We used the PWC norm for per capita O&M expenditure on municipal roads for towns in the population range from 1-5 lakh, which is Rs.26.67 in 2000-01 prices.

Given that Rs.26.67 is the ideal expenditure norm for towns in the relevant population range to maintain a satisfactory level of the quality of city roads, we multiplied the cost index for every ULB by this norm. This gave us an actual expenditure need for spending on municipal roads for every ULB, taking into account their cost disabilities and the generally accepted norm for spending on this service.

Given the average cost index is 1, the average expenditure need is Rs.26.67, consistent with the norm we have used. However the maximum expenditure need for per capita spending on municipal roads is Rs.35.80 (being a function of the various cost factors discussed above), for the ULB that had the highest cost index as well. The minimum per capita expenditure need is at Rs.12.74 for a ULB with 2001 population of 406,373 (South Dum Dum).

Streetlights

The computation of expenditure need for streetlights was done in a similar manner as for other services. First, we estimated the per capita (revenue) expenditures on streetlights as a function of various cost and household demand factors. An equation of the following form was used for ULB i:

Revenue expenditure on streetlights per capita$_{istl}$ **=** a_{0stl} **+** a_{1istl} **population +** a_{2istl} **population density +** a_{3istl} **per capita property tax revenue +** a_{4istl} **per capita grants +** a_{5istl} **literacy rate +** a_{7istl} **commercial connections +** a_{8istl} **price index for other services +** a_{9istl} **land area +** e_{istl}.

Specifically, population has been included to test for the effect of scale economies in the provision of streetlights. The provision of streetlights, as with other services, will be more costly in communities where the development patterns are dense, since more lamp posts and their maintenance would be needed. Hence population density has been included. Further, the relevant price index directly impacts the prices of inputs. Hence population, population density and the price index for other services are included as cost factors. Population and population density directly determine need for streetlights, whereas the price index influences the cost and the actual expenditure on streetlights. One may have imagined that the only cost factor that might in principle be expected to be important would be density with a negative sign. This is because the per capita spending on streetlights should be less if there are more people relative to the length of streets that need to be lighted.

However, land area directly influences the cost since street lighting should be a function of street miles. For instance, all else equal, the Kolkata Municpal Corporation would have many more streetlights to install and operate/maintain compared with the other ULBs. We controlled for land area to take into account this effect. The remaining variables – literacy rate, and the number of business establishments (measured here by the number of commercial connections for water supply) are demand factors. A more literate population is likely to demand better levels of public safety, and better street lighting. Further, the existence of businesses is likely to require work in shifts, hence there would be need and demand for more streetlights by both employees and employers alike.

Per capita property tax revenue and per capita grants are fiscal determinants of the extent of actual spending on roads, as with other services. As always, $e_{istl.}$ is the error term.

Table 19.5: Regression results for Street light expenditures per capita

Dependent Variable: Per Capita Revenue Expenditure On Street Lights			
Independent Variables	**Coeff.**	**Std.Err.**	**t-ratio**
Constant	-32.2429	32.1039	-1.0043
Population	0.0000	0.0000	-1.2419
Pop Density	-0.0002	0.0002	-1.0076
Per capita property tax rev.	0.0768*	0.0381	2.0157
Per capita grants (real)	0.0064	0.0109	0.5866
Literacy rate 2001	9.6528	16.0816	0.6002
Price index (other serv.)	25.2997	25.2904	1.0004
Commercial connections per 1,000 pop	1.6428	2.5891	0.6345
Land area	0.2097	0.1259	1.6663
Number of Observations=59	**Adjusted R^2 = 0.44**	**F(8,50) = 6.7**	

The actual regression of streetlights is interesting given that property tax revenues are the only significant and positive determinant of spending on streetlights as with municipal roads, when controlled for the effect of other fiscal factors, demand and cost factors. Specifically, for every extra rupee of higher per capita property tax revenue, the revenue expenditure on street lighting is higher by Rs.0.08. This implies that ULBs' spending on streetlights is certainly financed at least partly out of their property tax kitty. None of the other variables have a significant impact on the spending on streetlights.

In the second step, as with the other services, we substituted for average values of demand and fiscal factors in the equation for streetlights shown above, and actual values of cost factors, to come up with a cost index for streetlights. Such an index indicates how much each ULB, given average characteristics for demand and fiscal factors, has a different cost disability index for providing streetlights, depending on its population, population density, land area and the price index it is faced with.

As was done in the case of the other services, the cost index was normalized for every ULB within the KMA by taking the ratio of its own predicted value index as a proportion of the average predicted value index (for all ULBs). Hence a ULB with a normalized cost index of less than 1 is faced with a favorable (or low) cost index when compared with another whose (normalized) cost index is greater than 1, for provision of a said service.

Based on the 200 observations (time series data on the 41 ULBs) for streetlights, the average (normalized) cost index is 1, with a maximum of 2.03 (for a ULB named Rajpur-Sonarpur, for 2003). No doubt, this is an area with above average population, and also was faced with a price index of greater than 1 for other services for that year. So its cost index is also higher. Similar cost indices were computed for all ULBs.

At the final step, in order to arrive at expenditure needs of cities for spending on streetlights, we converted the cost index into a number. To do this, we looked up a norm for spending on streetlights, as we did for the other services. The only norm that we were able to identify is from a PricewaterhouseCoopers (PWC) (2001) study, which updates the Zakaria committee's expenditure norms to that in 2000-01 prices. This study develops and updates norms for many municipal services for towns in the state of Chhattisgarh, including those for street lighting. Given that the population in most of the ULBs in the KMA area are within the 2001 population range from 100,000-200,000, we used the PWC norm for per capita O&M expenditure on streetlights for towns in the population range from 1-5 lakh, which is Rs.49.39 in 2000-01 prices. This must be the expenditure norm that corresponds to the international norms of one streetlight for every 30 metres (also mentioned by Mohan (1996)).

Assuming that Rs.49.39 is the ideal expenditure norm for towns in the relevant population range, we multiplied the cost index for every ULB by this norm. This gave us an actual expenditure need for spending on streetlights for every ULB, taking into account their cost disabilities and the generally accepted norm for spending on this streetlights.

Given the average cost index is 1, the average expenditure need is Rs.49.39, consistent with the norm we have used. The maximum expenditure need for per capita spending on streetlights is Rs.100.20, for the ULB (Rajpur Sonarpur, with 2001 population of 348,591) that had the highest cost index as well. The minimum per capita expenditure need is only Rs.1.99 for a ULB with relatively less land area. Even this translates to a total expenditure need of Rs.498,723 (in 2000 prices) for streetlights for this ULB. Similar per capita expenditure needs were calculated for all ULBs in KMA for this service, as with others.

Total Expenditure Needs

After we estimate the figures for expenditure needs we add up the expenditure needs for all the services in a particular ULB. This way we arrive at figures for total expenditure need of each ULB. This indicates the expenditure per capita a ULB has to incur to provide these five survices at a level satisfying the existing norm for each service. It is found that the average expenditure need Rs. 664.39P with a maximum of Rs..1064.63P. recorded in Titagarh for 2003 and a minimum of Rs.508.04P recorded in Maheshtala for 2001. The charts in the Appendix gives a clearer idea of the expenditure needs in KMA ULBs in each of the years considered for the study.

Revenue Capacity

'Revenue-raising capacity' of a local government differs from the actual revenues raised by a local government. The revenue-raising capacity refers to the maximum amount of revenue a government can raise at a standard (often average) tax rate, or set of tax rates when there is more than one tax instrument. Often, the revenue raising capacity of a local government is not fully realized as a result of which the revenues actually raised are far below those measured by the capacity. Throughout the world it has been found that cities are underperforming in terms of realizing their maximum revenue potential. Indian cities are no exception, as a result of which we find that most of the local governments are heavily dependent on the transfers in the form of plan and non-plan grants from higher levels of governments.

Maximum revenue capacity as a function of the economic activities in a jurisdiction can be expressed as[36] :

Maximum revenue capacity= $$GCP\sum_{i=1}^{N} D_i \times t_i^{\max} \times share_i\left(\frac{B_i(t_1,t_2,\ldots,t_n)}{GCP}\right)$$

In the above equation, GCP is Gross City Product, a measure of total output produced in the city; D_i equals one if a jurisdiction is allowed to use tax of type I and zero if it is not allowed; t_i^{max} is the maximum tax rate allowed for tax of type I; *share*$_i$ is the proportion of the tax base

36 GCP for instance is not collected for any Indian city. However, we do have some estimates of GCP for the KMA, estimated by the Kolkata Metropolitan Development Authority (KMDA). First the per capita SDP by sector for the state of West Bengal (WB) is computed. This is obtained by dividing SDP for WB in a sector, into workers in that sector in WB. This per capita SDP for the state is assumed to be valid for Kolkata as well, and the per capita SDP is multiplied by workers in that sector in the KMA. The data on workers in KMA are taken from the Census.

(B_i) that a local government is allowed to tax; and $t = \{t_i,...,t_n\}$ is the vector of N tax rates imposed by a local government (some of these may be zero).

Maximum revenue capacity is a normative measure. So it is very difficult to quantify this measure in terms of numbers which can be claimed to be accurate. Identifying a comprehensive urban tax base and also arriving at correct numbers for different tax rates, simultaneously, that can result in realizing the maximum potential for revenues of a local government is not an easy task as the variables involved share a complex relationship with each other. Also, the maximum amount of revenue extractable from the urban base is a function of the administrative efficiencies of local governments. So, econometric or statistical methods of estimations have limited scope for revenue capacity estimations[37].

One widely used approach in the literature for measuring revenue capacity is to estimate the 'representative tax capacity'. It involves calculating the amount of revenues a jurisdiction would be able to raise if it imposed 'standard' tax rates on a 'standard' set of tax bases. This is known as the representative tax system (RTS) approach. The standard tax bases include all of the taxes used by any of the jurisdictions within a metropolitan area or a state. The "standard" tax rates are generally taken to be the average rates utilized by the jurisdictions in the reference group. Fiscal (revenue) capacity is thus the weighted sum of *N* potential tax bases in a jurisdiction, where the weight for each base is the average tax rate, τ_i for tax *i*. Ignoring any intergovernmental sources of revenue, the revenue-raising capacity of local government j can be written as:

$$R_j = \sum_i \tau_i BASE_{ij}$$

where R_j is the local government revenue-raising capacity of local governments in any given state and $BASE_{ij}$ refers to local government j's tax base for revenue source i.[38]

Estimations: Revenue Capacity

In the present analysis we would attempt to identify some standard rates and bases for KMA municipalities that can roughly be considered as a representative system for urban revenue generation and collection. We have replaced the word 'taxes' by 'urban revenues' as we take

[37] Regression approach is used to estimate revenue capacity but for the present analysis adequate data is not available to carry out such procedures.

both tax and non tax components of revenues for the revenue capacity estimations. We find that own revenue sources of KMA municipalities are composed of almost equal shares of tax and non tax revenues. So non-tax revenues are also included. However, the modified methodology is subject to certain limitations due to non availability of data at the urban level.

The first step would be to identify the urban base through which revenues can be generated. Due to non-availability of data on GCP for municipalities in KMA or any other reliable data on variables which can act as proxies for urban tax bases, we have followed a simple straightforward method for estimating the domestic products of KMA municipalities. We have used the yearly data on Gross District Domestic Products[39] for the six districts in which the KMA municipalities are situated[40] . We estimate the per capita Gross District Domestic Product by dividing the Gross District Domestic Product for each district by the population[41] of the respective districts. The per capita Gross District Domestic Product of a district is multiplied by the population of each of the ULBs situated in that district to get a proxy for the GCP of the local government. [42].

Once we have identified a base on the basis of which the revenue capacity would be estimated the next task would be to choose an appropriate rate which can be applied to the base specified. Now choosing a 'standard' rate that maximizes the revenue is very difficult.because ULBs collect tax and non tax revenues which encompasses a lot of categories. One alternative is to build up scenarios and do some simulations on the basis of a set of standard rates. The results of these simulations give us an idea about the revenue capacities corresponding to the 'standard' rates chosen. After converting to per capita terms on dividing the revenue capacities by the population of the respective municipalities, we can actually compare the averages of these series of per capita revenue capacities generated in different scenarios with the data on per capita revenues collected by the municipalities and attempt to identify which standard rate specified by the exer-

38 In fact, we can make a further distinction here to define what is administratively feasible to be collected as revenues can be defined as feasible revenue capacity. This may be defined as Σ t.α.B, where all other terms are as defined before, and α refers to the efficiency with which the taxes are collected.

[39] Published by Central Statistical Organisation

[40] These districts are Kolkata, Hugli, Haora, Nadia, North 24 Parganas and South 24 Parganas

[41] Apart from the census year (00-01) the other population figures are projected on the basis of 91 or 01 Census using standard methodology by International Institute of Population Research, Mumbai.

42This implies that the per capita domestic product across municipalities of a district is constant, but with the data constraint as of now this is the only way to construct a proxy for GCP at the municipality level .We have thought of constructing a proxy for GCP as the non-agricultural component of rhe District Domestic products but as of now we only have data on the non-agricultural component of GDP at the state level and not at the district level. The rationale for using the non-agricultural component is that agricultural activities are carried out in the urban areas is minimal.

cise comes closest to the actual practices i.e., corresponding to which standard rate the average of the per capita revenue capacities generated by the simulations is closest to the average per capita revenue collected in the KMA municipalities. If we can identify such a rate, given the underperformance of the cities, we can propose a reasonable increase in the rate to be specified as the 'standard' rate for the representative system of urban revenue collection. But for that we need to have a reference point as to which rate to start with.

One way to go about it is to choose this rate after a scrutiny of the available data on urban revenues as a proportion to the non-agricultural component of GDP[43] at the state level. Table 19.6 below shows the year wise variation in the ratios of total urban revenue to non agricultural component of the GSDP, total urban revenue from own sources[44] to non agricultural component of the GSDP and total urban tax revenue to non agricultural component of the GSDP in West Bengal. If we ignore grants for the moment then revenue capacity of a local government will depend on the own source revenues. We would rationalize our choice of the rate to be applied to the GCP proxy constructed on the basis of the ratio of urban own source revenue to the non-agricultural component of GSDP. We find that in West Bengal, this ratio varies between 0.4% to 0.5% between 99-00 to 03-04.

Table 19.6: Urban Revenues and its Components as Proportions of Non-agricultural GSDP: West Bengal

Proportions	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**2003-04**
Proportion of urban revenue to non-agricultural GSDP	1.26%	1.04%	1.12%	0.96%	0.96%
Proportion of urban own source revenue to non-agricultural GSDP	0.39%	0.37%	0.43%	0.50%	0.50%
Proportion of urban tax revenue to non-agricultural GSDP	0.20%	0.20%	0.26%	0.29%	0.29%

Keeping the issue of under performance of local governments in mind it would not be wrong to assume the 'standard' rate applicable to KMA municipalities to be higher than the proportion of urban own source revenue to non-agricultural component of GSDP which is calculated

[43] Sectorwise GDP data at the state level is available from CSO. We have subtracted the GSDP of the primary sector in West Bengal from the total GSDP of West Bengal to get the non-agricultural component of the state.
[44] Data on different components of urban revenue are taken from Twelfth Finance Commission Report.

at 0.5% for West Bengal . We would like to estimate the revenue capacities of the local bodies at a rate higher than 0.5%, but not too high to be considered infeasible.

We propose to build up scenarios starting with the ideal rate equal to 1%. After multiplying the GCP estimates by 1% we get the revenue capacities of each municipality. To convert to per capita terms we divide each by the population of the respective municipality .We find that the average of per capita revenue capacities Rs. 105.72P applying this rate to the proxy of GCP is lesser than what we have got from the actual data on per capita revenues from own sources[45] of KMA municipalities. This implies that roughly the agglomeration is already generating 1% of the approximate urban base. That means at the city level we can take the ‘standard’ rate to be higher than 1%[46].

Fixing the rate at 1.5% we get that the average per capita revenue as Rs.158.58P which is the closest to the figures available for per capita own source revenue of KMA municipalities.

So, we propose to take the ‘standard’ rate at 2% and get the average per capita revenue capacity from our estimation as Rs 211.45P, with a maximum recorded at Rs 300.95 P in Uluberia for 2003 and the minimum of Rs.174.47 P in Barrackpore for 2000. The figures for per capita revenue capacity records a rather low SD of 31.99 indicating low variation amongst ULBs across time. The results of the simulations are summarized in Table 19.7 below:

Table 19.7: Descriptive Statistics of Per Capita Revenue Capacity and Fiscal Gaps in Alternative Scenarios

Scenarios	Variables (Rs 99-00 prices)	N	Minimum	Maximum	Mean	Std. Deviation
Scenario 1 (Rate=1%)	Per Capita Revenue Capacity	195	87.23	150.47	105.72	15.99
	Need-Capacity Gap	195	-960.98	-403.58	-558.66	105.27
Scenario 2 (Rate=1.5%)	Per Capita Revenue Capacity	195	130.85	225.71	158.58	23.99
	Need-Capacity Gap	195	-909.16	-349.04	-505.80	106.80
Scenario 3 (Rate=2%)	Per Capita Revenue Capacity	195	174.47	300.95	211.45	31.99
	Need-Capacity Gap	195	-857.34	-277.95	-452.93	108.90
Scenario 4 (Rate=4%)	Per Capita Revenue Capacity	195	348.94	601.90	422.90	63.98
	Need-Capacity Gap	195	-679.27	14.69	-241.48	122.26
Scenario 5 (Rate=5%)	Per Capita Revenue Capacity	195	436.17	752.37	528.63	79.97
	Need-Capacity Gap	195	-592.03	165.16	-135.76	131.38

Need Capacity Gap and Implications

[45] See Table 17.5

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Need capacity gap of a local government is the difference between its maximum revenue capacity and the expenditure needs. This gap is a measure of fiscal health of a municipality. We can add a step further to our previous analysis of expenditure needs and revenue capacity estimations to take the difference between the per capita revenue capacity and total per capita expenditure need on the five services viz. water supply, sewerage, solid waste management, roads and street lights taken together. This gives us the per capita need capacity figures for each KMA municipality.

We have considered five scenarios to get a clear idea about the need-capacity gaps in the municipalities. The results are summarized in Table 19.7.

Details of the descriptive statistics of need capacity gap for the scenario 3, which is our representative revenues scenario, with a rate of 2% reveal that all the municipalities have deficits to cover there expenditure needs. Corresponding to this rate an average value of the need capacity gap in per capita terms is recorded at Rs. 452.93P with the maximum of Rs 857.34P recorded at Titagarh for 2003 and a minimum of Rs 277.95 P being recorded in Uluberia for 2002. The SD recorded is fairly low compared to the average indicating at a low variation of these gaps amongst municipalities across years.

We find from Table 19.7 that in scenarios 1, 2 and 3 all the municipalities record deficits to cover their expenditure needs which means they have to rely on transfers from the upper levels of governments. In scenario 4 though the average need capacity gap turns out to be negative and as high as Rs241.48 P we have low surpluses of Rs 8.26 P and Rs 14.69 P for one ULB[47] for 2002 and 03. Thus 2 out of 195 observations have recorded positive need capacity gaps. So it would not be very wrong to say that beyond a standard rate of 4% some of the KMA municipalities can cover their expenditure needs from their own sources. Thus there is lesser dependence on inter governmental transfers.

Within the limited scope of the analysis it would be interesting to know corresponding to which 'standard' rate the average value of the need capacity gap is the closest to the average per capita grants of the KMA municipalities. This 'standard' rate if identified for KMA can enable on an average a revenue capacity for KMA municipalities that can roughly make them sustain with the existing levels of per capita grants. In order to find out a rate that corresponds to the

[47] Uluberia in Haora district

average need capacity gap in the KMA area to be closest to the average per capita grants[48] we have generated the figures for need capacity gaps with 5% as the 'standard' rate. We find that at 5% the average need capacity gap is a deficit of Rs. 135.76P which is still a bit lower than the average per capita revenue from government fund which means if the KMA municipalities can be made to pay a proportion higher than 5% of their urban bases they can sustain with the present levels of government transfers[49]. It is to be noted that in this scenario also only 18 out of 195 observations have recorded positive need-capacity gaps, with eight[50] municipalities in some of their fiscal years recording positive surpluses.

We have also attempted a district level analysis based on the KMA municipalities data. As already mentioned, these municipalities are dispersed among six[51] districts of West Bengal. The objective is to get an idea about the performances of the ULBs across districts. On the basis of the performances of the ULBs we have ranked the districts in terms of per capita revenue generation and need capacity gap. Table 19.8 gives the detailed the descriptive statistics of the records generated at the 'standard' rate of 2%.

We find that two districts viz. 24 Parganas North and 24 Parganas South record an average per capita revenue capacity lower than the average per capita revenue capacity of all KMA municipalities. The other three viz.Haora, Hugli, Nadia record higher averages than the KMA average. As far as need capacity gaps are concerned only 24 Parganas North record a higher average deficit than the KMA level average in per capita terms, all the others record lower averages. If we rank in terms of revenue capacities, Haora is the best and 24 Parganas North is the worst. As far as fiscal health is concerned Nadia performs the best whereas 24 Parganas North performs the worst. The ranking of districts is given in Table 19.9.

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[48] See Table 17.6

[49] Country case studies providing records on local government revenues (Source: IMF Government Finances) are consulted to get an idea about what proportion of the urban level GDP of a country (Source: WDI online) accounts for the local government revenue. It has been found that the local government revenues as proportion of urban GDP, for five countries (US, Canada, Australia, Kenya and China) varies from 1% in Kenya to a maximum of 9% in Canada.

[50] Baidyabati (2003), Bansberia (2003), Chinsura (2001,02,03), Serampore (03) and Uttarpara (2001,02,03) in Hugli district, Maheshtala (2001,02,03) and Rajpur- Sonarpur (2002,03) in South 24 Parganas district and Uluberia (2000,01,02,03) in Haora district

[51] We will be dealing with five districts as Kolkata is excluded because non-availability of data.

Table 19.8: District wise Descriptive Statistics of Per Capita Revenue Capacities and Fiscal Gaps of KMA Municipalities (Rs in 99-00 Prices)

Descriptive Statistics :Nadia					
Scenario 3 (rate =2%)	**N**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Per Capita Revenue Capacity	10	200.39	230.84	216.33	12.76
Need Capacity Gap	10	-391.01	-356.60	-373.95	12.21
Descriptive Statistics :Hugli					
Scenario 3 (rate =2%)	**N**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Per Capita Revenue Capacity	45	231.54	282.52	251.89	18.04
Need Capacity Gap	45	-505.38	-342.54	-427.74	50.21
Descriptive Statistics Haora					
Scenario 3 (rate =2%)	**N**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Per Capita Revenue Capacity	10	219.78	300.95	264.65	29.50
Need Capacity Gap	10	-503.05	-277.95	-385.76	89.44
Descriptive Statistics 24 pgns South					
Scenario 3 (rate =2%)	**N**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Per Capita Revenue Capacity	30	177.49	226.67	205.26	17.32
Need Capacity Gap	30	-463.30	-294.49	-380.49	49.85
Descriptive Statistics 24 pgns North					
Scenario 3 (rate =2%)	**N**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Per Capita Revenue Capacity	100	174.47	207.30	189.30	11.82
Need Capacity Gap	100	-857.34	-325.07	-500.62	124.05

Table 19.9: Ranking of Districts on the basis of Revenue Capacities and Fiscal Gaps in KMA Municipalities

Districts	Ranks on the basis of Average Per Capita Revenue Capacity (Averages in parantheses)	Ranks on the basis of Average Need Capacity Gaps (Averages in parantheses)
Nadia	3 (216)	1(373)
Hugli	2 (251)	4 (427)
Haora	1 (264)	3 (385)
24 parganas South	4 (205)	2(380)
24 Parganas North	5 (189)	5(500)
KMA overall	(211)	(452)

It is to be noted that the above analysis gives rough estimates because both the base involved in the calculation of revenue capacity and the standard tax rate applied are based on certain assumptions which might not hold good for all the municipalities. However, throughout the analysis the rationale and the intuitive logic behind each assumption have been made clear.

Conclusions

The main objective of the present study is to assess the fiscal health of 41 municipalities in KMA. Fiscal health is defined as the difference between the revenue capacity and the total expenditure need of a ULB. So in order to estimate the fiscal gap we have to estimate both the expenditure needs and the revenue capacities of municipalities. In order to estimate the expenditure needs we have identified five major services, viz, water supply, sewerage, solid waste management, roads and street lights, which are to be provided by the municipalities of KMA. After estimating the need for each service, the expenditure needs for all the services are summed up to get the total expenditure needs of the municipalities. It is to be noted that the expenditure need for each service is calculated for satisfying a physical norm given for that particular service. However, due to data limitations we cannot apply physical norms directly but physical norms translated to financial norms expressed in terms of O&M costs to provide up to the level specified by the norm.

We follow a standard methodology for estimating the expenditure needs. First a set of identifiable econometric equations are set up and estimated as expenditure functions for each service. Then a cost index for each municipality for each service is computed by substituting the average values of demand and resource variables and actuals for the cost variables in the respective expenditure functions of the a service, normalized by the average predicted value across all the municipalities for that service. This way we are able to relate expenditure functions to cost parameters alone. We get the expenditure needs figures for each service on multiplying the financial norm by the cost index of the service. When we add up expenditure needs across services for a particular municipality to get the total expenditure need of the municipality. All calculations are done in per capita terms.

The main finding suggest that for three (water supply, sewerage, solid waste management) out of five services taken, the local government expenditures are more dependent on intergovernmental transfers than on own sources of revenues. It is only in the cases of municipal roads and street lights where amount of expenditure incurred are lower, there is a dependence on own sources of revenues rather than grants. As far as the demand variables are concerned, literacy seems to be a dominant determining factor for public service provision. Scale economies vary in degree amongst services.

Certain data caveats and limitations of the expenditure needs analysis need to be mentioned. First, due to inadequacy of data on physical levels of services, the expenditure functions cannot be calculated using physical levels of services as the explanatory variables. As a result we have to take reduced form equations. Though we have made best of our efforts to choose the explanatory variables in such a manner that identification problems are taken care of, some elements of simultaneity cannot be ruled out in these models. Also, often we have to use estimates like projected population, etc as variables which possibly reduces the explanatory powers of the models on the basis of which expenditure needs numbers are calculated.

Second, taking revenue expenditure per capita instead of absolute revenue expenditures is a debatable issue. Since per capita figures are more useful in terms of comparability and since we are working with a sample with a lot of variation, the model is estimated taking revenue expenditure in per capita terms.

Third, physical norms for the ULBs are not available for most of the services. So, we have to use financial engineering estimates for implementing these physical norms, either from different studies or on the basis of expert opinion.

Fourth, though we take the sum of the expenditure needs for the five services as the total expenditure need for each ULB, municipality records show that the share of expenditures on other services like building and maintaining markets, malls, etc are quite high in KMA area. Our model does not include these expenditures.

For revenue capacity estimations we closely follow what has been coined as the Representative Tax System approach in the literature. In our case we have attempted to estimate the urban revenue base as a proxy for GCP on the basis of District Domestic Products of the six districts in which the KMA ULBs are dispersed, by taking the per capita District Domestic Product as the per capita GCP. To identify the 'standard' rate at which the ULBs can generate revenues, we have done a series of simulations and found that it would not be quite infeasible to generate revenues at the rate of 2% in the foreseeable future. We have also done some analysis of the need capacity gaps for KMA municipalities and found that there is a huge dependence on inter governmental transfers.

Our methodology of revenue capacity estimation cannot be claimed to be absolutely sound. There is some degree of arbitrariness involved in the estimation of GCP as well as the standard rate at which municipalities are to generate revenues. However we can only claim that the system envisaged as the representative urban revenue system in our analysis is a rough approximation of situations which can possibly generate revenues close to the maximum revenue capacity amounts.

Our analysis of need capacity gaps directly follows from the expenditure needs and revenue capacity estimations. Overall our findings suggest that there is a considerable disparity in the fiscal health scenarios of KMA municipalities. The charts [52](as well as the descriptive statistics on expenditure needs and revenue capacities) in the Appendix show clearly that they are caused by the differences in expenditure needs rather than revenue capacities. This is partly because the base for revenue capacity calculation does not have enough variation as they are based on District Domestic Products are not actual city level figures. However it would not be incorrect to observe how these gaps behave in different scenarios and in which direction they change from one scenario to the other.

[52] Charts 1-5, Appendix

Appendix

Table A 1: List of Variables used in Regressions

Abbreviations	Variables
REXPWSPC	Per capita revenue expenditure on water supply (in Rs. with 99-00 constant prices)
REXPSGPC	Per capita revenue expenditure on Sewerage and Drainage (in Rs. With 99-00 constant prices)
REXPSWPC	Per capita revenue expenditure on solid waste management (in Rs. With 99-00 constant prices)
REXPRDPC	Per capita revenue expenditure on municipal roads (in Rs. With 99-00 constant prices)
RXPSTLPC	Per capita revenue expenditure on street lights (in Rs. With 99-00 constant prices)
DPCICON	Per Capita District Domestic Product of West Bengal at Constant Prices
POP	Population
HH	Number of household
HHSZ01	Household size in 2001
LITRAT01	Literacy rate in 2001
PCGREAL	Per capita grant deflated by 99-00 constant prices
PTAXREV	Per capita property tax in Rs. Deflated by 99-00 constant prices
CONN000	Commercial connection of water supply per thousand populations
POPDEN	Population density per sq. km.
WSPIND	Price index for water supply, electricity (99-00 constant prices)
CONSTRPI	Price index for construction (99-00 constant price)
OTHSRVPI	Price index for other services (99-00 constant price)
LANDAREA	Total area of the ULB in Sq. Km.

Table A2: Descriptive Statistics of Variables used in Regression

	Mean	Std.Dev.	Skewness	Kurtosis	Minimum	Maximum	Cases
REXPWSPC	40.9762	31.9526	2.29173	11.9991	0.385225	226.129	141
REXPSGPC	21.8842	20.6049	1.14969	4.13209	0	93.3917	141
REXPSWPC	55.5677	41.4491	1.08459	4.66844	0.45083	225.275	141
REXPRDPC	19.3897	19.779	2.62468	12.2297	0	131.697	141
RXPSTLPC	8.21	6.81	0.93	0.78	0.00	32.36	125
DPCICON	9811.52	2340.07	3.11379	16.5183	7892	23563	123
POP	326050	761657	5.20599	29.2786	33463.2	4.65E+06	206
POPDEN	13646.4	8508.66	1.16033	3.90138	2364.28	39600.8	206
WSPIND	1.04471	0.08527	1.03381	2.6055	0.958919	1.20259	206
CONSTRPI	1.11237	0.078918	0.134971	2.01872	1	1.31274	206
OTHSRVPI	1.05017	0.048749	0.188884	1.63026	0.993903	1.16413	206
LANDAREA	22.70	31.18	4.32	22.89	3.25	187.5	206
HHSZ01	4.78669	0.403275	1.26816	4.87896	4.21792	6.1642	201
HH	69576	159700	5.13558	28.5191	6693.04	965747	201
LITRAT01	0.835261	0.051067	-0.60045	3.31959	0.6982	0.943684	201
PCGREAL	174.575	77.4647	1.32086	6.96419	0	538.193	115
PTAXREV	67.8384	70.9515	2.66547	10.0813	0	374.746	120
CONN000	0.457212	1.32485	4.78331	27.1407	0	8.09571	206

Table A3: Expenditure Norms

	>20 lakhs	5-20 lakhs	1-5 lakhs	0.5-1 lakh	0.2-05 lakh
Heads			(Rs/capita/annum)-2000-01 prices		
Water Supply	213.34	201.49	193.59	170.67	149.34
Sewerage & storm water drainage	241.00	235.07	183.72	171.86	161.99
City roads	43.45	35.55	26.67	23.71	21.73
Street lighting	59.26	56.29	49.39	45.44	42.47

Source: Infrastructure Development Action Plan for Chhattisgarh – Final Report by Pricewaterhouse Coopers Ltd.

Chart 1: Expenditure need & Revenue Capacity of KMA municipalities: 1999

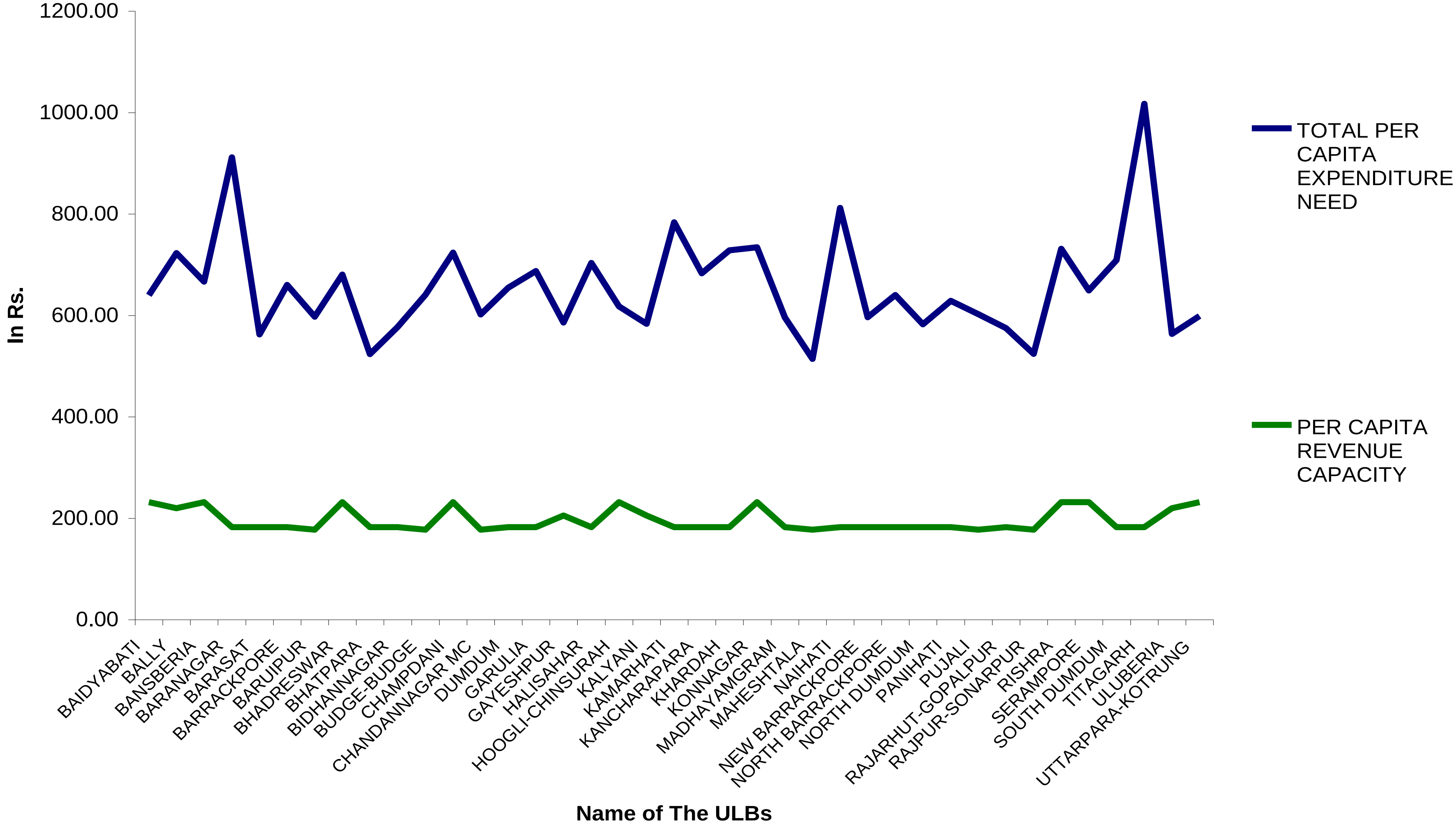


Chart 2: Expenditure Need & Revenue Capacity of KMA Municipalities in 2000

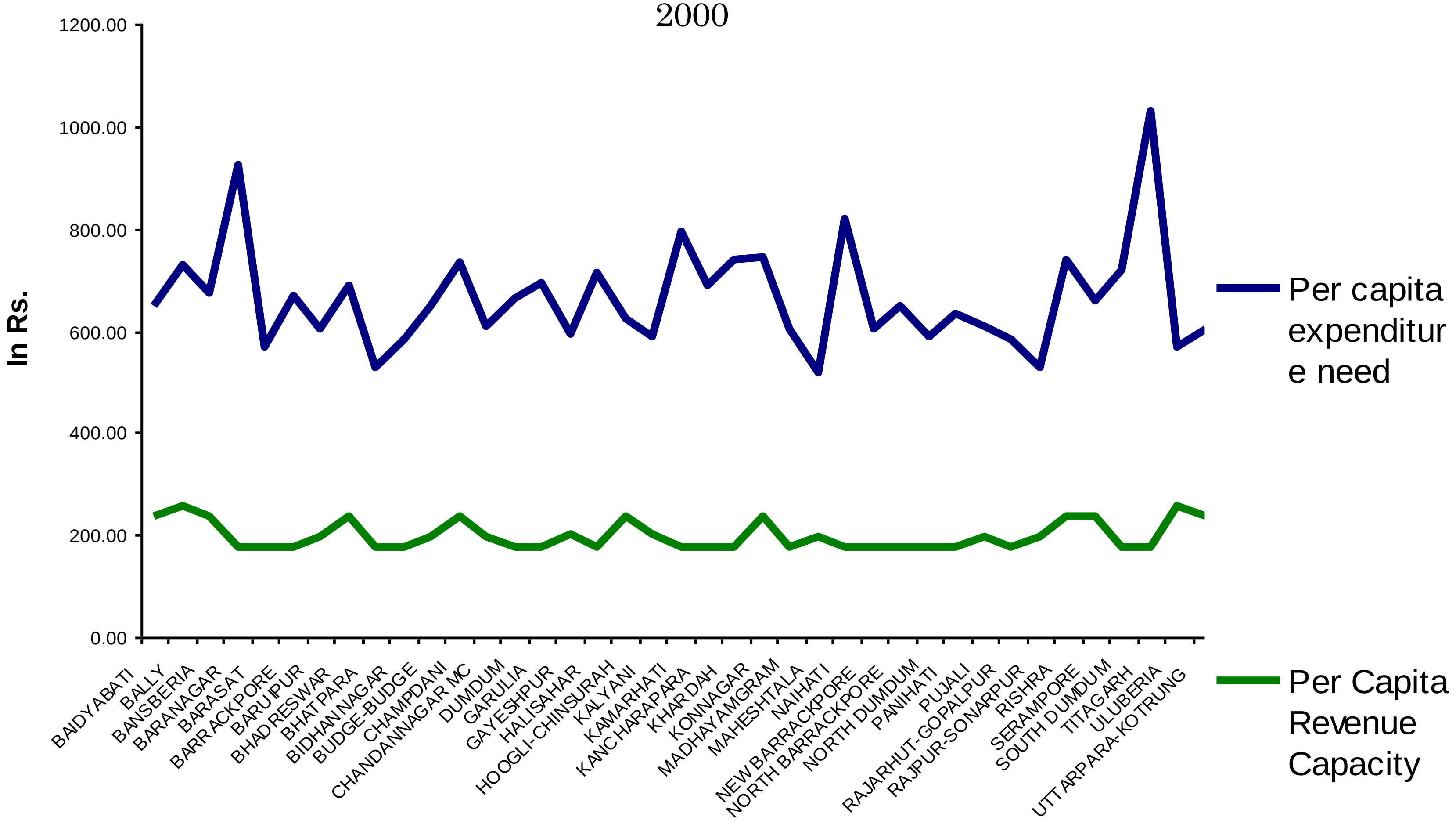


Chart 3: Expenditure need & Revenue Capacity of KMA municipalities : 2001

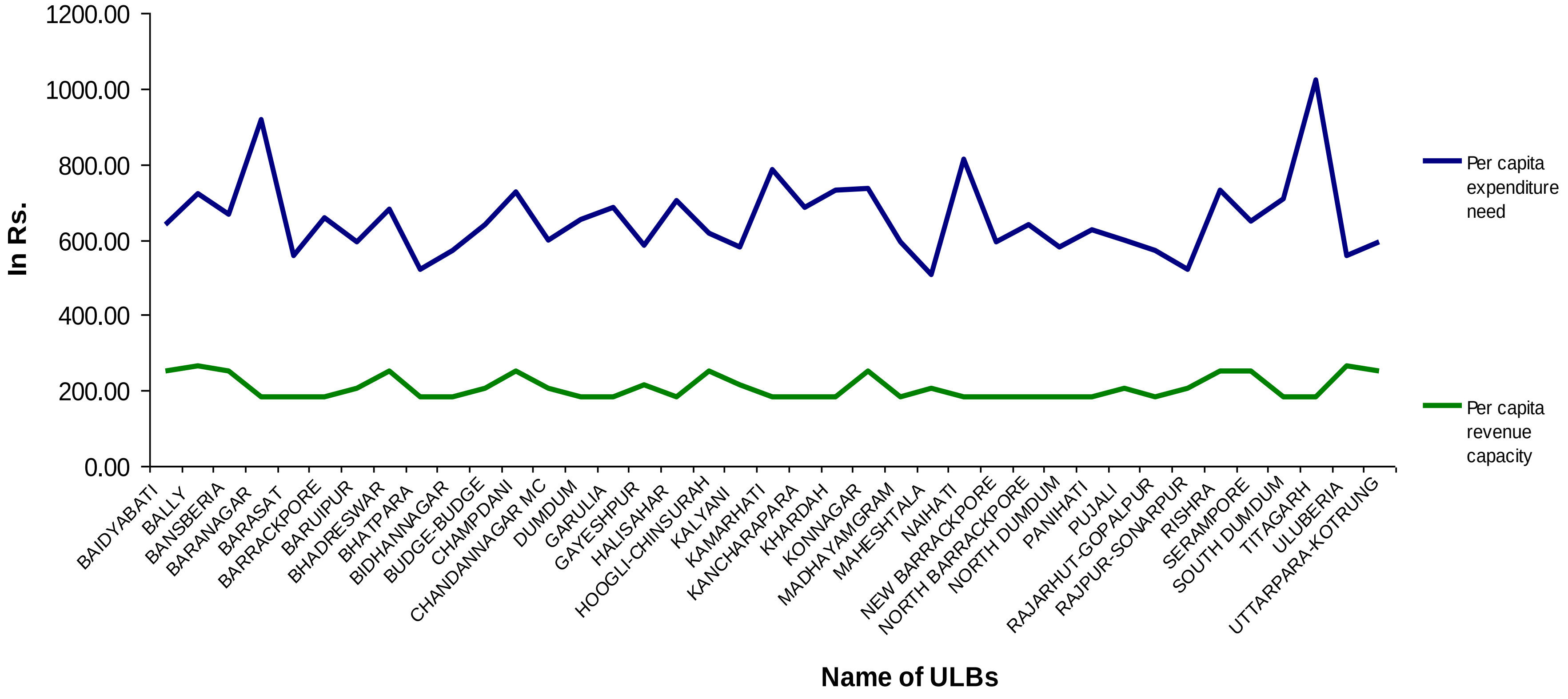


Chart 4: Expenditure Need & Revenue Capacity of KMA municipalities: 2002

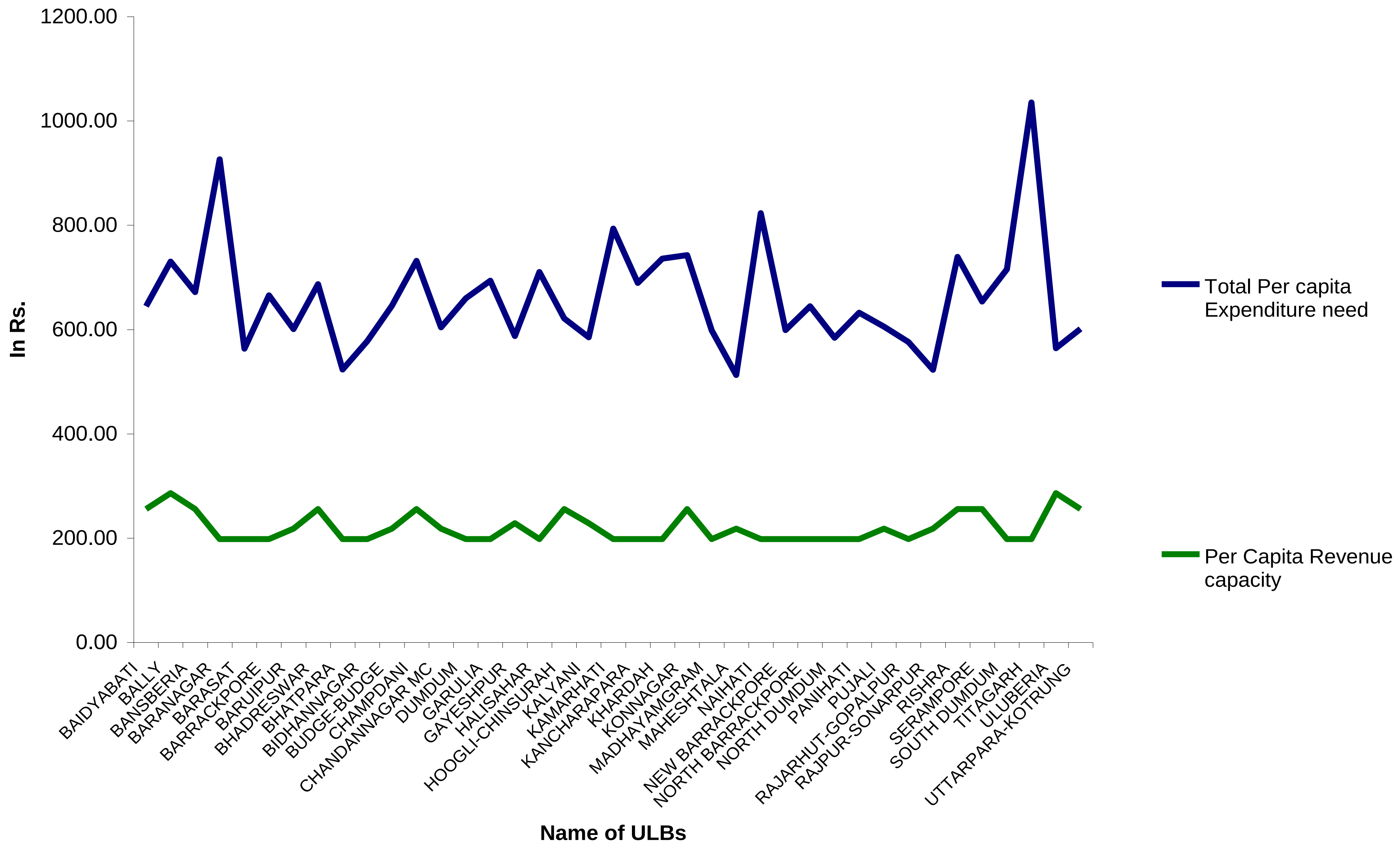
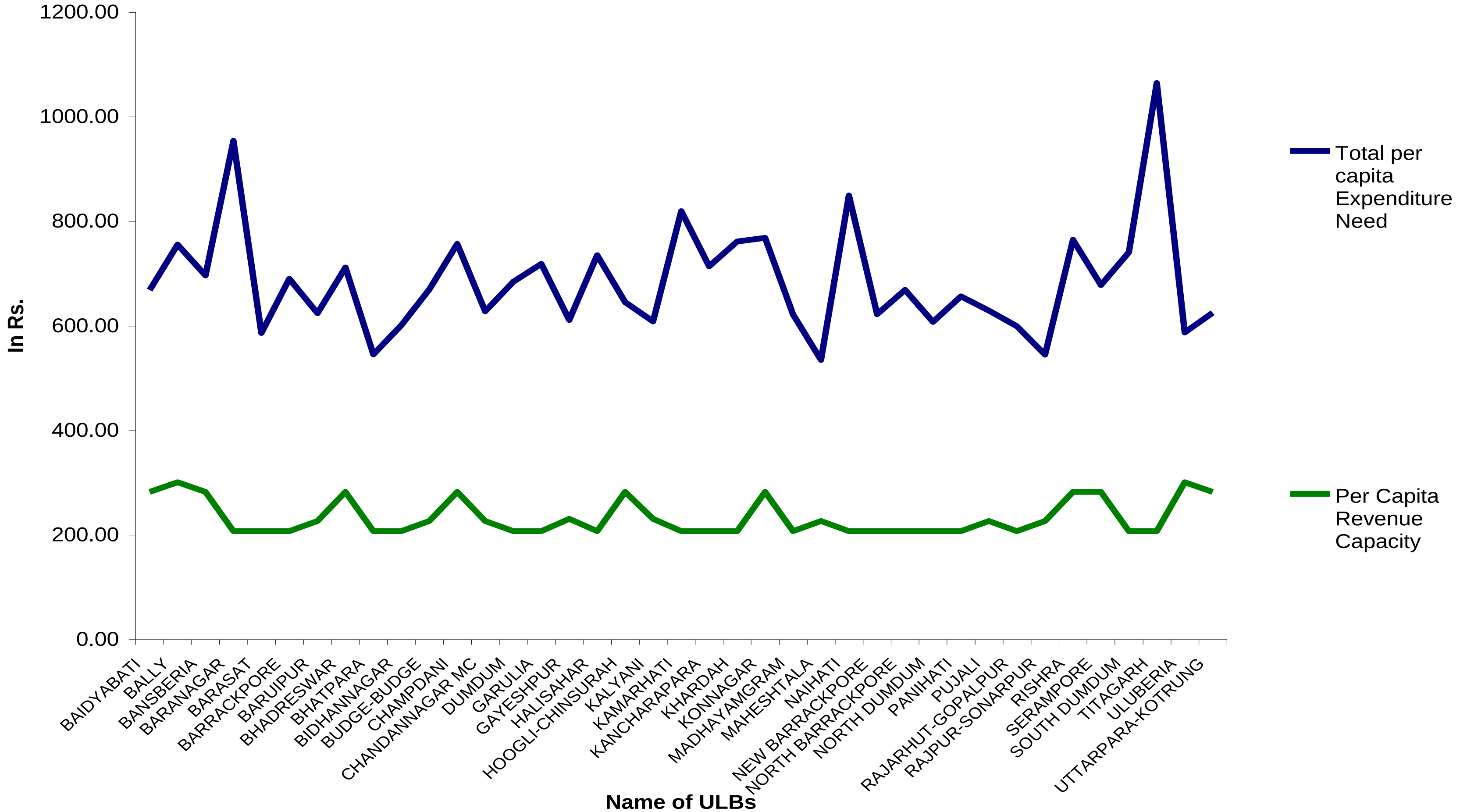


Chart 5: Expenditure Need & Revenue capacity of KMA ULBs :2003



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