

**Reforming Delivery of Urban Services  
in Developing Countries: Evidence  
from a Case Study in India**

*Kala Seetharam Sridhar*

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## **Abstract**

Given the importance of urban public services in attracting firm location, increasing employment and facilitating economic growth, in this paper, we examine the following questions: Is there a need for reforming public service delivery in Ludhiana (which is a city chosen under India's leading urban initiative), when judged against national benchmarks? Is there a relationship between the city's financial performance and its delivery of urban services? We develop several hypotheses. Next, we examine the potential bottlenecks to reform in service delivery, and finally, the triggers for reform in service delivery, if any. Several measures such as the growth of population and land area, service delivery, and its current finances, suggest a need for reforming public services in this city. We find the general decline in the service level of water supply and sewerage in the city could be attributed to a decline in its capital expenditures on these services. Further, user charges do not adequately cover the production costs of supplying water, or expenditures on sewerage. The major bottlenecks to reforming public service delivery in this city are financial and institutional, as they pertain to existing arrangements for water, sewerage and land use. Major triggers that could make the reform happen in this city pertain to changes in institutional arrangements for service delivery (privatisation) and public participation, and finances (less of a trigger). Overall, the major lessons for other cities and triggers that could make the reform happen in Ludhiana pertain to changes in institutional arrangements for service delivery, privatisation in service delivery, public participation, and finances.

**JEL Classification:** R51, R52

**Key words:** Service delivery, Public services, India, Case studies, Urban reforms

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# **Reforming Delivery of Urban Services in Developing Countries: Evidence from a Case Study in India**

## **Background**

Urban areas contribute close to half of India's GDP highlighting their importance in achieving national growth targets. Further, it is estimated that urban population in the country will increase from 28 percent in 2001 to nearly 50 percent by 2020. With increasing population and demand for urban infrastructure services, the capacities of local governments in many developing and newly industrialised countries are over-burdened. The government of the Republic of Korea estimates that infrastructure shortages result in a GDP loss of as much as 16 percent of its potential in the mid-1990s (see Singh and Ta'l, 2000). It is estimated that losses from traffic jams in Bangkok range from US \$272 million to US \$1 billion, a year. According to India's Ministry of Urban Development (MUD), 20 percent of the country's urban households are denied access to safe drinking water, 58 percent do not have safe sanitation, and more than 40 percent of garbage generated is left uncollected for want of proper waste management.<sup>1</sup> The importance, however, of public services and infrastructure in attracting firm location, increasing employment and facilitating economic growth, is well known (Sridhar, 2003; Sridhar, 2006); Mani, Pargal and Huq (1996); Sahoo (2000)).

To address some of these issues and make cities engines of growth, the Government of India (GoI), in its 2005 budget, initiated the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) to stimulate urban reform. The objectives of the JNNURM are integrated development of infrastructure services in selected cities and planned development of identified cities leading to urbanisation in a dispersed manner. Ludhiana in the north Indian state of Punjab, is one of the 63 cities identified in the country, for possible funding under the JNNURM. This case study focuses on this city's urban services and their reform, since it is representative of many growing cities in developing economies and has lessons and implications for other similar cities.

## Objective

Given the importance of urban public services in facilitating national economic growth in developing economies, in this paper, I examine the following questions: Is there a need for reform in public service delivery in Ludhiana, when judged against national benchmarks? Is there a relationship between the city's financial performance and its delivery of urban services? What are the potential bottlenecks to reform in service delivery? Finally, what are the triggers for reform in service delivery, if any?

The answers to these questions are critical for many governmental policies as they relate to urban institutions and finances. In India, the 74<sup>th</sup> *Constitutional Amendment Act (1992)* recognised urban local bodies (ULBs) as the third tier of government. Despite this, after more than 13 years of this landmark development, a majority of India's cities continue to provide quite low levels of urban services, as summarised by the MUD.

Further, city finances are in bad shape. Most of India's cities have now abolished the highly buoyant source of revenue, the octroi, which is now generally accepted to be distortionary in its effects. Further, the property tax base is at best subjective and has not yet become a buoyant source of revenue. Under these circumstances, cities in India can access the capital market (as was done by the Ahmedabad Municipal Corporation nearly a decade ago). For infrastructure needs, they will also be able to access funds under the JNNURM. But if better finances are not going to improve service delivery, then access to capital markets or the JNNURM might not make a difference to service delivery in India's cities. While finances are a critical factor underlying the delivery of any service, it is important to understand whether finances are both a necessary and sufficient condition for sustainable service delivery.

This paper is the outcome of research regarding service delivery and urban management in Ludhiana, which can be used as inputs for the JNNURM. The research can also be used as benchmarks for assessing other cities' public service delivery and for understanding what could trigger the reforms there.

This paper is organised as follows. In section 2, a brief survey of literature regarding studies of urban public service delivery is provided. Section 3 quickly describes the study hypotheses. Then

the details of the case study follow from section 4. In the case study, first, the demography and the economic base of Ludhiana, India, the focus of the case study, are described, since they have implications for consumption of various public services. Section 5 discusses the actual status of various urban services, namely water supply, sewerage and solid waste management, against certain norms and benchmarks, and assesses their adequacy. Sections 5.2-5.4 contain an analysis of whether there is a need for reforming service delivery in the city, using measures, such as population, land area, traffic *vis-à-vis* road density, and landuse that have impacts on service delivery. Next, finances and its relationship with service delivery, is discussed in section 5.5. Section 6 explores any potential bottlenecks to the reform process. Section 7 analyses possible triggers of the reform process. The final section 8 summarises the findings, implications for other cities and contains concluding remarks.

## II. Literature Review

While the literature on urban service delivery is vast, only relevant studies are summarised here.

In his exploration of the relationship between the gross domestic product and stock of infrastructural services in India, Sahoo (2000) finds indeed that among all the sectors, electricity, gas, water supply and communication sectors play a key role in explaining movements in the GDP.

Given the importance of water supply, we find that a majority of studies on urban public services focus on water supply since it is the most important at the local level.

A study by the University of Birmingham (1999), based on information from 35 urban centres in India, which represent 15 percent of India's urban population, finds that private sector participation is unlikely to have a significant impact on delivery of public services such as water supply in the medium term, because of too many vested interests in the existing institutional patterns. That research suggests that until there is demand for institutional development from municipalities, which is, in turn, generated by demand for better service from customers, there can be no sustainable advances in service delivery.

Expansion and improvement of public services is essential to improving the quality of life and productivity in all developing countries. Fox and Edmiston (2000) find how some African countries have been diligent in expanding the infrastructure necessary to provide public services, but unfortunately, most have not done a very good job of paying for them. Fox and Edmiston present a case study of water supply services in Egypt, where they emphasise the importance of user charges to enable expansion of coverage of water supply services.

Based on survey data from Lagos, Reedy (1986) found that many participants did not have access to public water supply because the supply authority could not afford to expand service delivery. As Fox and Edmiston (2000) point out, water charges are a sustainable way to increase affordability of the local governments to do this because taxes or intergovernmental revenues are less likely to provide a consistent funding source as competing uses can diminish available resources.

There are several studies of urban service delivery in cities of India. Sridhar, Mathur, and Nandy (2006) examine whether the solution to better public service delivery in India's cities should be to close cities to migration, or correct the under-pricing of services. In the case of essential public services such as water, it is generally accepted that it is not fair to recover capital costs. However, as Williamson (1988) points out, there is a reason why marginal, not average costs, should be the basis for pricing of water supply. A city usually develops its least expensive water sources first, but it normally becomes increasingly expensive to produce an additional unit of water as demand grows with increasing migration into the urban area. In such an instance, using the average cost of today would lead to an underestimation of the cost of water production in the future, so only marginal costs reflect the true cost of providing the service. Sridhar, Mathur, and Nandy (2006) estimate the marginal costs of providing water supply in several of India's cities and find that a few large (million-plus) cities are indeed under-pricing their water, so closing the cities to migration to firms or households might not be the solution. They find that the marginal operating cost of providing one kilolitre of water based on several of India's cities ranges from \$0.06 to \$0.11, and that several large cities are undercharging their water, based on these marginal cost estimates. Rao and Agarwal (1991) provide a methodology to estimate unit costs of public services and expenditure needs in the Indian states, based on the cost functions of five public services. They find, based on their state-level analysis, that in order to ensure even average

levels of the five services they examine – administrative services, police services, primary education, secondary education, and public health—a sizeable increase in transfers to poorer states would be required.

Zérah (2002) reports findings from a household survey in Vijayawada (a city with 2001 population of 800,000 in Andhra Pradesh, India), whose objectives were to determine the level of service provided by the (Vijayawada) Municipal Corporation, assess the existing household coping strategies, evaluate the cost of water supply and sanitation and measure the level of satisfaction of the inhabitants of the city. That survey indicated that 77 percent of the households considered water to be cheap or very cheap. In the project zone, in the case of connection and monthly charges, the study found that household willingness to pay was, in fact, more than one and a half the average, testifying for the sustainability of water charges as a means of financing investment in the area.

Raju, Praveen, and Anand (2004) make an attempt to understand the resources and management constraints in providing adequate and safe drinking water supplies in a medium sized city in the southern part of India, Kolar, in Karnataka. They find that a) though 66 percent of the city's households had piped water supply, 68 percent of them had unauthorised connections, thus depriving the exchequer of its revenue; b) the per capita supply was only one-third of the urban water supply norms; and c) the entire city supplies were based on groundwater, which was quite contaminated with high nitrate and fluoride contents, because of which the households had to depend on more expensive private water providers for drinking water. Most of the households were forced to spend \$2.26-\$11.28 [or INR (Indian Rupees) 100-500]<sup>2</sup> per month for drinking water, while the public water fee was just \$1.02 (INR 45) per house per month. The study demonstrates how local government apathy often creates not a very optimal situation for the public in the case of water.

In addition to the needs of expanding coverage, investment is also required for basic services to be environmentally sustainable. The Urban Water Council (UWC) of the United States Conference of Mayors (2000) points to recent estimates by the U.S. Environmental Protection Agency (EPA) of capital investment trends and current investment needs for sustainability. The EPA made a rough projection that if the nation's cities were to meet the requirements of the Clean Water Act, they would need to increase capital spending by 5 percent each year for the next two decades.



The literature reviewed here thus conclusively shows the need for government in overseeing the provision of basic services, and that privatisation is not a panacea. Further, existing studies confirm that user charges greatly enable the provision of sustainable level of public services such as water supply, taking into account the investment needs required in developing countries to expand coverage.

This case study adds to this literature by focusing on the issue of reforming local public services, and examines the bottlenecks and triggers of such reform, something which has not been explored much in the literature, despite the wave of decentralisation that has swept across the globe. The answers to questions—the need for reforming service delivery, relationship between finances and service delivery, bottlenecks to and triggers of reform in service delivery, have implications that can serve as input for urban initiatives such as the JNNURM, and for service delivery reform in cities in many developing countries that are reeling under the negative impact of poor public services and are similar to Ludhiana in many substantive senses.

### III. Study Hypotheses

This particular case study looks at the critical questions in reforming service delivery—its relationship with city-level finances, bottlenecks for and triggers of reform, based on an examination of a city's service delivery and finances. There are certain hypotheses that we might a *priori* test.

First, higher capital rather than revenue expenditures should imply better service delivery. Cities that spend relatively more on establishment, and salaries, when compared with capital expenditures (developmental work), are likely to be inefficient, hence unable to provide a desired level of the service. In theory, capital expenditures may be viewed as providing pure or impure public goods (e.g., water, street lights) whereas revenue expenditures (while indirectly facilitating the provision of public goods), most directly provide private goods such as office equipment, wages, and salaries.

Second, financial self-reliance does not imply much for service delivery. That is, a city might not be overly dependent on

state transfers and grants, but such financial independence does not imply the city is self-reliant in terms of service delivery, or is providing an adequate level of the service.

The third hypothesis follows from the literature we have reviewed (e.g., Fox and Edmiston (2000); Sridhar, Mathur, and Nandy (2006)). Cities in which user charges reflect the unit or marginal costs of providing services are able to deliver a more adequate level of the service, when compared to cities where such costs are not covered.

Finally, even if finances are important in service delivery outcomes, it is likely that other factors such as institutional arrangements are likely to impact service delivery (as both bottlenecks and triggers to reform), in the context of countries with multiple tiers of government.

An examination of these hypotheses will enable to dispel myths about service delivery and finances. If it were found that finances do not affect service delivery, further examination should enable us to focus on other aspects of service delivery. Alternatively, even if finances are important in determining service delivery outcomes, the hypotheses will enable to throw light on other factors that might be equally important in service delivery. Thus the case study makes an attempt to offer a holistic view of reforms in the delivery of important urban services, in the context of growing and emerging economies.

#### IV. Case Study of Ludhiana, India

In the case study, first the economic base and demography of the city are described since they have direct implications for the consumption and needs of various public services.

##### *4.1 Economic Base and Demography*

Ludhiana, the largest city and the only metropolis of Punjab and the youngest metropolis of India as per the 1991 census of India, is located 95 kilometre north of Chandigarh, and 300 kilometre northwest of New Delhi. Ludhiana is strategically located in the

middle of Punjab, and offers access to Amritsar from Delhi. It acts as a corridor between Punjab and the rest of the country for transport of agricultural and industrial products. The city is well known for its industrial growth and is frequently called as the Manchester of India. There is considerable industrial activity in the city consisting of cycles, machine tools including sewing machinery, auto spare parts, and hosiery units. Ludhiana produces a large number of bicycles, Hero, and Avon, being the most popular brands. In hosiery, the city is exporter to Russia, Europe, and other parts of the world.

#### 4.1.1 Demography

Ludhiana is one of the three municipal corporations in Punjab with its 2001 census population of 13,98,467, out of which 56 percent are male, the remaining being female (with this gender proportion having remained roughly constant over 1991-2001). The Ludhiana Municipal Corporation (LMC) covers a total area of 135 square kilometre yielding a 1991 density of 7,743 per square kilometre, and a 2001 population density of 8,775 per square kilometre (for an area of 159 square kilometre). The population density of the MC increased from roughly 5,519 per square kilometre in 1981 to 7,743 in 1991. The inner part of the city is, of course, more densely populated (500 persons per hectare or 50,000 per square kilometre) than the outlying areas (that has density of 80 persons per hectare or 8,000 per square kilometre) in some places.

The population density of the district for 2000-01, 804 persons per square kilometer, was also the highest of all districts in the state of Punjab, when compared to the state average of 482.3 per square kilometre. This shows the need for cautious land management in LMC to optimise city efficiencies.

The annual growth rate of Ludhiana (the city)'s population over 1991-2001 was 2.9 percent, higher than India's national average for the growth rate of urban population over this period, 2.7 percent. This somewhat supports the notion that we are looking at a relatively well-performing city, since population is usually attracted by what it perceives to be better economic opportunity in any given area.

Along with the rapid increase in its population, the city has also witnessed tremendous expansion in its area recently. In 1981, the municipal area was 110 square kilometre which increased to 134.67 square kilometre in 1991. More recently, the city has expanded in all directions mostly along its radial road corridors. The most recent extension of the MC limits took place on November 13,

1995, which now occupies an area of 159.37 square kilometre. Increases in spatial expansion, as with increases in population, have implications for stepping up provision of various services such as water supply, sewerage, and sanitation.

Literacy rate is quite high in Ludhiana, being 80 percent in 2001, well above the national average of 65 percent. The district's literacy rate, being 76.5 percent in 2000-01, was also well above the state's average of 70 percent for that year. This is despite the fact that the city is characterised by migratory labour from neighboring states who work in various industries of the city as unskilled labour and are frequently illiterate.

Data from India's 2001 census show that Ludhiana's slum population of 18.45 percent is relatively large when compared to other Indian cities that are similar in size (Bhopal, 6.27%, Patna (0.13%), and Vadodara (5.63%)).

#### 4.1.2 Economic base

Non-workers or those outside of the labour force constituted two-thirds of the population of the city in 1991, with one-third of population engaged actively in the labour market, more or less an identical trend over 1981-91. By 2001, the city's workforce participation rate had increased from one-third to 37 percent. In 1991, in fact, workers constituted 54 percent of those in the age group 15-60 years (active labour force age group), much higher than the 41 percent national work force participation rate (workers as a proportion of total population) for 2001.

There has been a decline over time in the city's proportion employed in household industry, manufacturing and processing industry. In 1991, of the one-third employed, roughly half were employed in manufacturing and processing other than household industry. Further, another 40 percent of those employed were in construction, transport, storage, communication, trade and commerce, and other services in 1991.<sup>3</sup>

There are a large number of small, medium and large firms in Ludhiana (district)<sup>4</sup> that contribute to total employment and output. *Table 1* shows this for 1996 and 2003. While the data shown in *Table 1* are cumulative, they indicate that small-scale firms in the district accounted for nearly all (99% of) the firms established during 1996 and 2003. These small units accounted for 85 percent of all employment created in 1996, and 78 percent of jobs in 2003. They

accounted, however, for a little greater than 40 percent of total investment and production in 1996, and only 22 percent of investment in 2003, consistent with the well-known fact that small-scale units are labour-intensive rather than capital-intensive.

In 1996-97, sales tax collections from Ludhiana (city) amounted to \$54.06 million (INR 2,396,200,000) constituting 19 percent of the total sales tax revenue of the state of Punjab. This is one measure of its overall contribution to economic activity in the state.<sup>5</sup>

There were no marginal workers in Ludhiana in 1991. This means that there were none that were actively looking for work that did not find any. Marginal workers, according to the census of India, are those who worked for sometime in the year (less than 183 days or six months) preceding the enumeration, but did not work for a major part of the year. This corroborates the idea of the city being a labour-short area, and being able to absorb and provide jobs to a large number of in-migrants from other areas within and outside the state. However by 2001, marginal workers in Ludhiana (Municipal Corporation) constituted nearly 50 percent of total workers, implying that the supply of workers was continually increasing.

**Table 1: Industry in Ludhiana (District)**

	Small scale units*		Medium and large units	
	1996	2003	1996	2003
Number of units	26,440	42,704	88	168
Investment (million \$)	111	252	157	881
Employment	1,93,220	2,73,593	35,000	75,185
Production (million \$)	596	1,855	789	NA

**Source:** District Industries Centre, Ludhiana

\*According to the Ministry of Small Scale Industries, Government of India, a small scale industrial unit is an industrial undertaking in which investment in fixed assets in plant and machinery does not exceed Indian rupees (INR) 10 million or \$225,631.77, based on the exchange rate of \$1 = INR 44.32, prevailing when this paper was first written in October 2005).

Consistent with this, the 1991 census reports total in-migration of 250,711 (from all age groups and durations of residence less than 10 years) over 1981-91 (that accounted for 24% of the city's population in 1991) into the LMC limits.<sup>6</sup> Historically also, the census data show that migrants typically came from other states within the country mostly from poorer, high unemployment states such as Uttar Pradesh, Bihar and geographically nearer states such as Haryana. The 1991 migration data show that roughly 25 percent of the total migrants to Ludhiana did so seeking employment. Further,

the data on migration by age into the city show that roughly 40 percent of the migrants were below 30 years of age, quite conducive for the absorptive capacity of the city's labour market.

The city's economic base has implications for various civic services. While the hosiery industry is water-intensive (dyeing), it also is quite polluting. Further, basic knowledge of the inputs and processes of the bicycle, sewing machine and auto spare parts industry demonstrate the need for disposal of waste rubber and scrap metal.

## V. Need for Reform in Service Delivery

The need, if any, for reforming service delivery in Ludhiana was assessed on the basis of the actual state of service delivery for important services such as water supply, sewerage, and solid waste, followed by an examination of various outcome measures such as growth of population and land area, traffic *vis-à-vis* road density, composition of landuse that impinge on the delivery of various services, and the city's finances.

### 5.1 Service Delivery

#### 5.1.1 Water supply

The main source of water supply in the city of Ludhiana is underground water, which is drawn through shallow and deep tube wells. The institutional arrangement for providing water supply is that while the Punjab Water Supply and Sewerage Board (PWSSB), which is a parastatal agency, undertakes the planning, development and construction of *major* water and sewer networks, the operation, maintenance and the execution of *minor* developmental works is provided by the municipality (LMC).

The service level statistics for water supply in Ludhiana are summarised in *Table 2*. Hundred percent of the municipal areas have the capacity to provide water to the entire population, but, overall, only 80 percent have access to piped water supply (*Table 2*). This implies that despite the fact that there is no infrastructure constraint, the coverage with piped water supply is not complete in the city. It is likely that for the remaining 20 percent of the city, lack of affordability

of the population has prevented them from having access to piped water supply.

**Table 2: Service Level Statistics for Water Supply, Ludhiana, 2003**

<b>Description of service</b>	<b>Number or percentage covered</b>
Population as per 2001	1440000
Population in 2003	1517000
Total number of houses (2003)	316042
Average number of people per household	4.8
Population having access to piped water supply	1213600
In percentage	80
Population served by household connections	658000
Population served by stand-posts	18000
Population served by independent institutional Setup (engineering colleges, universities, Commercial and industrial establishments)	72000
Total population served	748000
Total number of private houses with Metered connection	0
Total number of houses with unmetered Connection	137071 (21% of population with household connections, 658,000)
Total number of house connections	137071
Total number of commercial connections	25663
Number of stand posts	350
Number of tubewells	347
Number of overhead reservoirs and Capacity in MLD	63 (38MLD)
Total length of distribution line (mains and sub-mains) in km.	1467

**Source:** Punjab Water Supply and Sewerage Board (PWSSB), 2003.

None of the private houses have metered water connections, which has implications for water usage. As there is no volumetric consumptive tariff regime, the customers in these locales are generally not concerned about water loss.

When the access of households to water supply in urban Punjab (the state in which Ludhiana is located) and urban India is compared with that for Ludhiana, the city has above average (state as well as national) access, called for by its higher population density. The data reported in *Table 3* for all three entities (Urban

Punjab, Urban India and LMC) is from India's census, and is presented for purposes of comparing the data obtained from local sources. The data presented for LMC in *Table 3* from the census 2001, must have been collected at least a couple of years earlier, so that is actual data of 1998 or 1999. Data from the PWSSB in *Table 2* are local, and recent, being of 2003. So while census data show 69.5 percent tap water supply access in LMC, more recent data from PWSSB show 80 percent access of population to piped water supply in LMC. The actual access of population to piped water supply in LMC is likely to be in the range of 70-75 percent.

**Table 3:** Access of Households to Water Supply and Toilet Facilities in Ludhiana, State of Punjab and India, 2001

	Access to safe drinking water	Access to water within premises	Access to tap water supply	Access to tap water within premises	Access to toilet facility	Access to toilet within house hold
Ludhiana M.Corp	98.52	92.43	69.50	65.81	94.88	83.27
Punjab (Urban)	98.88	91.70	66.81	63.44	86.52	82.76
India (Urban)	90.01	60.84	68.66	49.68	73.72	57.38

**Source:** Census of India, 2001.

While being above average when compared to the state and that for the country as a whole (*Table 3*), it is debatable whether the level of water supply is adequate in LMC, when compared against benchmarks. The city's population density has also been above average so far (see *Figure 1* in *section 5.2*). If we take into account the projections we have made for its population density, making various assumptions (see *Figure 2*, *section 5.2*), there is no room for complacency.

*Table 4* shows the compilation of facts as they pertain to water supply. According to the PWSSB, actual average daily production of water in LMC is 284 MLD (million litre daily), out of which only 140.5 MLD is charged. Only 137 MLD is consumed through house connections in the city. The 137 MLD accounts for a mere 98 LPCD (litre per capita daily), which implies water supply of only about 8-10 hours (*Table 4*) a day. The lack of continuous supply is due to the fact that ground water has to be pumped up through tubewells and power is a constraint for this. Further, there could be seasonal variations in the supply, about which data were not available from the PWSSB.



**Table 4:** Statistics for Water Supply, Ludhiana, 2003.

Description of service	Level
Actual average daily production of water (MLD)	284
Total average daily water discharge capacity (MLD)	454
Daily water consumption through house connections (MLD)	137
Daily water consumption through handposts (MLD)	3.5
Total average daily water charged (MLD)	140.5
Percent of water unaccounted for	50.5
Daily water supply duration (hrs.)	8-10

**Source:** Punjab Water Supply and Sewerage Board, 2003.

The ideal norms for water supply vary greatly across cities and are based on considerations of industrial use, public use, fire demand, and losses in transmission, according to the oldest committee on urban services, the Zakaria Committee (1963). This committee, examining various norms for urban infrastructure services, specifies certain considerations to be taken into account in the development of norms for water supply, as with other services. It recommends a service level target of 150 LPCD for piped water supply with sewerage (70 LPCD without sewerage), which includes roughly 20 percent wastage of water.

While the average daily production of water (284 MLD) in Ludhiana accounts for 203 LPCD of water, the actual supply consumed in the city being 98 LPCD, is highly inadequate taking into account the national ideal supply standard of 135 LPCD or 175 LPCD, taking into account distribution losses, recommended by India's National Commission on Urbanisation, or the 150 LPCD recommended by the Zakaria Committee for cities with piped water supply systems with sewerage.

#### 5.1.2 Sewerage

While the Zakaria Committee recommends that for large urban centres (such as LMC), the service level target should be *full* coverage by sewerage with treatment, a formal sewerage system exists in only half the city's area. Sewage treatment plants are non-existent in the city, with the collected sewage being discharged into the local stream. In the rest of the city, sewage is conveyed in rudimentary open shallow drains and ditches, which are close to the living quarters of the residents, being discharged into the ground or the nearest water body. This leads to contamination of the water supply network and also pollutes the aquifer, which serves as a source of the city's water.

As a norm, 70 percent of water provided for domestic purposes (284 MLD, *Table 4*) finds its way into the environment as wastewater. This means that a total of 200 MLD is generated as wastewater. Of this, about 150 MLD of sewage is discharged into the city's environment from domestic sources and about 50 MLD, from industries and other sources. This is likely to increase as the water supply increases with the commissioning of the water supply augmentation project.

*Table 5* summarises the level of service for sewerage. It may be noted that only 55 percent of the city's population have access to sewerage connection, much less than the coverage for water supply. At present only 10 percent of the city is covered by storm water drainage facilities, primarily because it is expensive. Given that the Zakaria Committee recommends 100 percent city area to be covered by sewerage system with treatment facilities in large urban centres, the extent of sewerage access in LMC is highly inadequate.

**Table 5:** Service Level Statistics for Sewerage System, Ludhiana, 2003

<b>Description of service</b>	<b>Proportion/ Number covered</b>
Population access to sewerage in numbers	834350
In percentage	55
Population served through sewer house connection in (numbers)	585928
Population served through soakage pits/ septic tanks (in numbers)	849072
Population served by independent institutional sewage (own systems in universities, colleges and so forth) (in numbers)	72000
Population served through conservancy system (in numbers)	10000
Actual number of sewer connections	121985
Number of institutions having independent sewerage system	22
Total average daily sewage flow in MLD	292
Length of outfall sewer (in kilometre)	8
Length of intercepting sewer (in kilometre)	96
Length of lateral/branch sewer (in kilometre)	964
Total length of sewer (in kilometre)	1098

**Source:** Punjab Water Supply and Sewerage Board, 2003.

### 5.1.3 Solid waste management

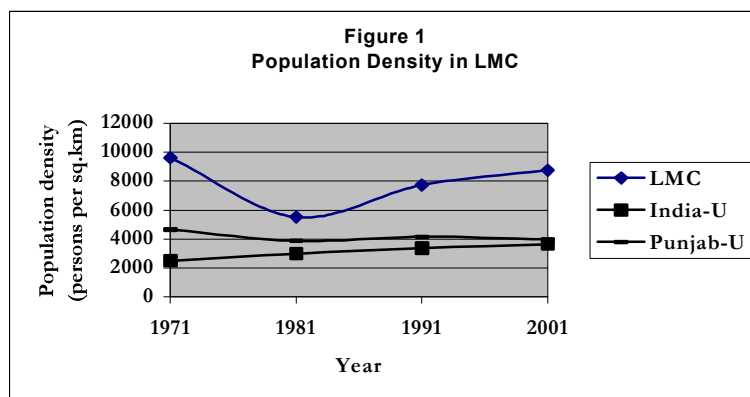
Ludhiana produces a high volume of solid waste. While most Indian cities generate garbage in the range of 200 to 500 grams per capita per day, in the year 2000-01, LMC's generation of waste was about 420 gram per capita per day. About 70 percent of garbage and

waste is collected and disposed off every day. The total area of the LMC is 159.37 square kilometre. Out of this, the older part of the city covering approximately 40 percent of the area and comprising 50 percent of the population is being served by scavenging and sanitation facilities. Fifty percent of the population living in the outer areas is deprived of these facilities.

Various committees (including the Zakaria Committee) have laid down the minimum physical standard of services to be 100 percent collection and disposal of solid wastes. Further, Mohan (1996) finds that on average, the solid waste efficiency was 83 percent for class 1 cities in India.<sup>7</sup> Given this, the question arises as to why the collection efficiency is only 70 percent in LMC. This shows the need for increasing the solid waste collection efficiencies and its management in the city.

## 5.2 Growth of Population Density and Projections

Given the actual state of various essential services, consider the growth of population that most critically determines the demand for these services in the near future. The population density of LMC has been consistently higher than that for the state and national urban population and has been continually increasing post-1981. *Figure 1* shows this. This represents the need for increasing levels of all urban services.



**Source:** Census of India

Next, we projected population density for LMC, assuming its own growth rate (historical growth rate and recent trends), the state's urban growth rate, and the national (urban) growth rate. *Figure 2* shows the actual and projected population density. In *Figure 2*, the

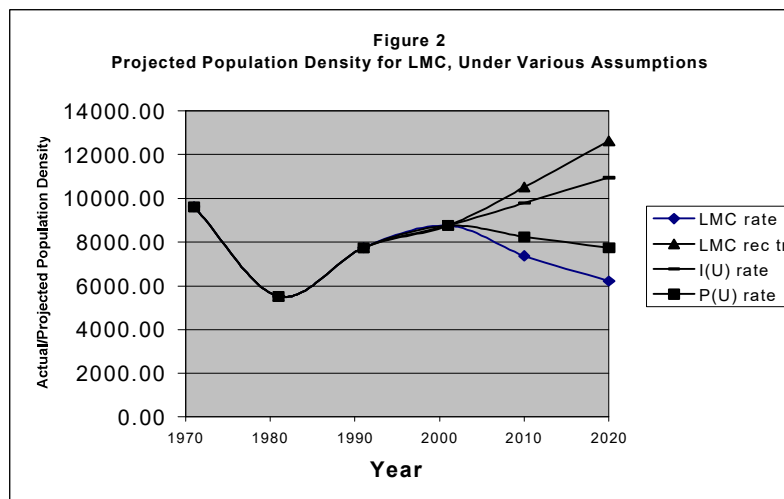
trend shown over 1970-2000 is actual LMC population density. We projected population density for 2010 and 2020, making four different assumptions. In case LMC's future population density follows its own historical rate, or Punjab's urban growth rate of population density (both of which are declining), there is no imminent threat regarding service levels. However, if it follows its own recent trends (i.e., average growth of LMC's population density in the past two decades, 1981-91 and 1991-2001), or the country's average growth rate for urban areas, there is an imminent need to increase levels of all urban services such as water supply, sanitation, sewerage, urban roads, to meet the increasing burden imposed by rising population density.

### *5.3 Traffic vis-à-vis Road Density*

An examination of road and traffic densities displays the need for changing patterns of land use in this city, which promises to be the biggest problem in India's cities, for many years to come. When juxtaposed with population density, the density of roads in Ludhiana district (not available for the city) was 1.08 per square kilometre in 1999-00, (decreasing from 1.58 per square kilometre during 1996-97), compared to only 0.87 per square kilometre for the state in 1999-00. While being above the state average, the inadequate road network in relation to population density and unbalanced spatial distribution of urban activities in the district pose special problems of accessibility. The low percentage of land to roads indicates narrow right of ways resulting in low levels of the service. Most of the "through" traffic passes through the city centre owing to lack of peripheral or ring roads.

The vehicle density in the district is also very high, being 162 per square kilometre for 1999-00, compared with only 54 per square kilometre for the state for that year.

Part of the reason for this is that the district has the highest number of motor vehicles registered, 608,780 as of 1999-00, of all districts in the state. This indicates the inadequacy of the road infrastructure relative to vehicles in the district more generally.



**Source:** Census of India, and Author's Projections

*Table 6* shows the number of different types of motor vehicles on the road in Ludhiana (district) during 1993-94. Based on this data, the total number of vehicles per capita for the district turns out to be 0.26, compared to 0.10 for the state of Punjab for 1991, again reinforcing the need for vehicle space.

Based on the above problems, the city needs to enforce plan more carefully for landuse in its comprehensive traffic and transportation plan. The next section contains details of the city's current landuse patterns.

**Table 6: Vehicles on Road in Ludhiana**

Type of vehicle	Number on the Road
Buses	537
Cars and station wagons	21,102
Jeeps	1,214
Taxis	851
Three-wheelers (passenger)	2,494
Two-wheelers	2,40,793
Four-wheelers, trucks and lorries	10,090
Three-wheelers (goods)	2,902
Tractors	30,939
Others	12
Total	310,934

**Source:** Statistical Abstract of Punjab, 1997

## 5.4 Landuse

*Table 7* compares the disaggregated landuse of Ludhiana for 2000 and 2003. A quick comparison shows that the area zoned for residential use, although declining, forms the bulk of landuse in the city. Further, there is a perceptible increase in land devoted for traffic and transportation, reflecting the city's response to the growth of traffic and congestion problems.

**Table 7:** Landuse Pattern, Ludhiana, 2000 and 2003

Landuse	2000		2003	
	Area (acres)	%	Area (acres)	%
Residential	14540	49.20	12570	42.3
Commercial	2086	7.06	1867	6.30
Industrial	5353	18.12	5560	18.73
Recreational	120	0.41	538	1.80
Traffic and Transportation	4724	16.00	6046	20.35
Utilities	60	0.20	65	0.22
Government	610	2.06	650	2.20
Public and Semi Public	2055	6.95	2406	8.10
Total built-up area	29548	100	29702	100

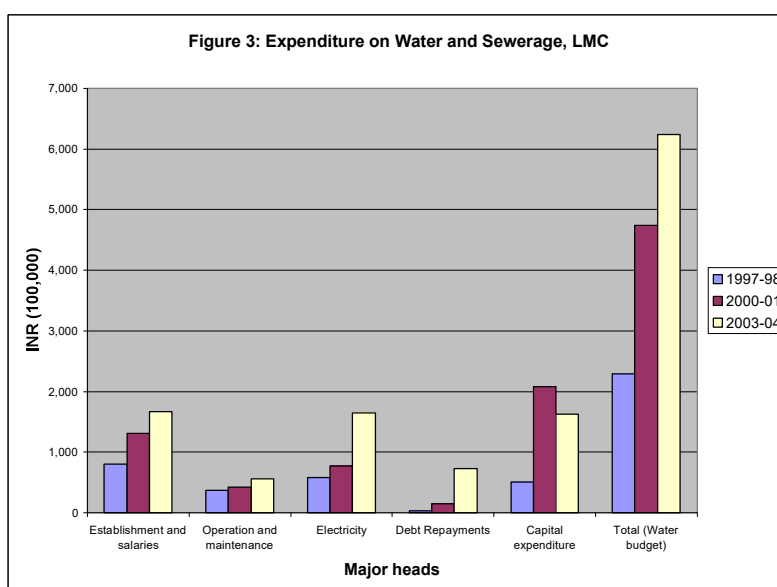
**Source:** Draft Master Plan, Ludhiana 2000-2021

## 5.5 Finances

While the state of the various services emphasises the need for reform, we test the various hypotheses raised at the beginning of the case study, based on a study of Ludhiana's finances.

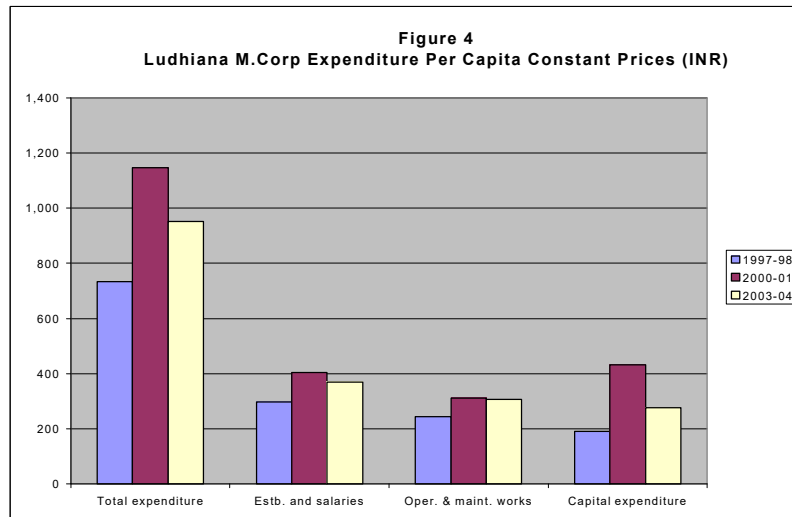
First, take the hypothesis that higher capital rather than revenue expenditures imply better service delivery. The bulk of LMC's total expenditure (75 percent of it) on water supply and sewerage, indeed, constitutes revenue expenditure. This refers to establishment (office furniture, administration, equipment, and so forth) and operation and maintenance (O&M) expenses that respectively constituted 27 and 47 percent of total expenditure in 2003-04. In revenue expenditure, O&M expenses have overtaken expenditure on salaries since 2001-02. Therefore, only a small part of the total expenditure on water and sewer (roughly 20 to 22 percent) is being spent on developmental works and investment in assets (e.g., installation of hand pump). The exceptions were 1999 and 2000 when 45 percent of total expenditure was on developmental work. Capital expenditure accounted for 26 percent of total expenditure in 1997-98, and increased to only 29 percent of total expenditure in 2003-04.

*Figure 3* shows over time the expenditure on water and sewerage by category. The figure shows that although total expenditure on water and sewerage showed a continual increase since 1997-98, capital expenditure declined since 2000-01, whereas establishment and salary expenditures continually increased. O&M expenses remained more or less constant. The only exception was expenditure on electricity for operating tubewells that registered an increase since 2000-01. Debt repayments increased since 2000-01, reflecting repayments towards a loan (discussed in the section on debt).



**Source:** LMC

*Figure 4* shows a comparison of trends in the LMC's total expenditure on all services including water and sewerage (in per capita constant prices) over time. This picture shows that total expenditure on all services has fallen since 2000-01, consistent with its income trends (*Figure 6*). Further, expenditure on establishment and salaries, operation and maintenance works have remained the same over 2000-01 to 2003-04, whereas capital expenditure has declined significantly over the period. In general, capital expenditure on services has not kept pace with the rapid population growth summarised in *Figure 1*.



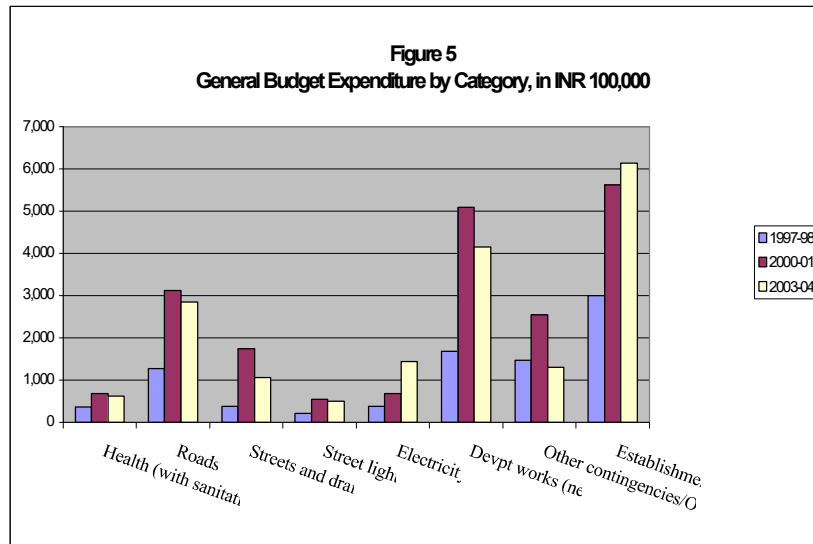
**Source:** LMC

We find that revenue expenditure is the primary component that drives total expenditure, the primary drivers being salaries followed by O&M (*Figure 4*). Wages and salaries increased in absolute terms over this period because they are indexed to inflation. They declined as proportion of total expenditure, which is likely due to various outsourcing attempts made for the provision of various services during 1998-2001. As is well known, government recruitment is costly (higher wages and compensation for workers of lower levels of skills), when compared to the market.

A similar trend holds good for general expenditure apart from water and sewer. A majority of the general budget of LMC has traditionally been spent on revenue items such as administration, salaries, and O&M.

*Figure 5* shows the general budget's expenditure on various services (apart from water and sewer) over time. It demonstrates a decline in expenditure on all important civic services – including health, sanitation, roads, streets, and drains, street lights, new developmental works, and O&M over the period 2000-01 to 2003-04. The only exception is electricity for street lighting that showed a continual increase in expenditure over the period 1997-98 to 2003-04, and establishment expenditure.





**Source:** LMC

Overall, capital expenditure and expenditure on developmental works continue to constitute less than 30 percent of total expenditure, a case of capital expenditure not growing fast enough to keep pace with population growth.

What do these expenditures mean for service levels? *Table 8* summarises the trends in the service levels of various aspects of water supply over 1996-2003. Consistent with the expenditure trends, there has been a constant increase in the percentage of unaccounted for water, and decrease in the average daily water charged, since 2000-01, when the capital expenditures also started declining. Further, since 2000-01, there has been a decrease in the daily water supply duration from 12 to 10 hours. The daily water consumption through house connections has also registered a decline since 2000-01, as summarised in *Table 8*. All these findings lend support to the hypothesis that the general decline in the service level could be attributed to a decline in capital expenditures, post 2000-01.

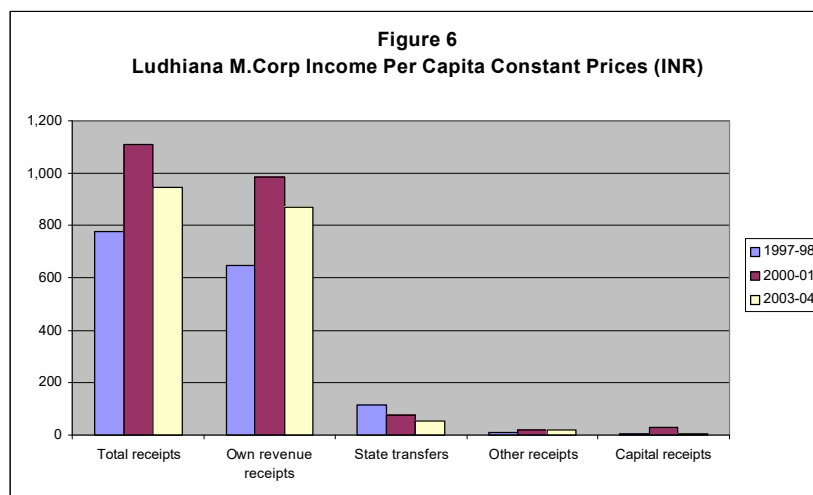
**Table 8:** Trends in Water Supply, Ludhiana Municipal Corporation

Description	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03
Actual average daily production of water (MLD)	193.05	210.1	234	245	247	258	284
Total average daily water discharge capacity (MLD)	360	360	390	452	484	508	454
Daily water consumption through house connections (MLD)	122.39	133.2	172	184	185	131	137
Daily water consumption through handposts (MLD)	12.79	12.75	6.5	6	3	3.5	3.5
Total average daily water charged (MLD)	135.14	145.95	178.5	178	182	135	140.5
Percentage of water unaccounted for	30	30.50	24	25	25	47	50.50
Daily water supply duration (in hours)	12	13	12	13	12	10	10

**Source:** Punjab Water Supply and Sewerage Board.

Now, consider the other two hypotheses posed, both pertaining to receipts (income)—one that financial self-reliance does not mean adequacy in service delivery; and that, those cities in which user charges reflect the cost of providing the service are in a position to provide better services, judged against certain benchmarks.

*Figure 6* shows a comparison, across time periods, of LMC's revenues (in per capita constant 1997-98 prices). The figure demonstrates some interesting aspects; there is a clear decline in the total per capita revenues of the LMC in 2003-04, when compared to 2000-01. State transfers to LMC have continuously fallen since 1997-98 and the LMC has been self-reliant, dependent heavily on octroi receipts, with octroi accounting for roughly two-thirds of total own revenues over time.<sup>8</sup>



**Source:** LMC

However, own-revenue receipts in per capita terms have also decreased in 2003-04, relative to their level in 2000-01. Income from capital and other receipts has been negligible.

*Table 9* shows the trend in proportion, water receipts have formed of total expenditure and revenue expenditure on water. The table shows that when total expenditure was taken into account, water receipts covered only 50 percent a few years ago (in 2001-02) but since has been declining. The situation is obviously much better with revenue expenditure since there have been instances when water receipts [(i.e., from user charges) have covered more than 90

percent, but since 2000-01, that has also been declining. For the financial year 2002-03, the total production cost of water (in dollar (INR) per kilolitre)] excluding capital expenditure was \$0.05 (INR 2.06) (including distribution losses), with revenue income per kilolitre being only \$0.02 (INR 0.92). As of 2002-03, revenue income covered roughly only 45 percent of the total production cost of water (with or without distribution losses).

**Table 9:** Trend in Share of Revenues from Water, LMC

<b>Financial year</b>	<b>Water own receipts as percent of water total expenditure</b>	<b>Water own receipts as percent of water revenue expenditure</b>
1997-98	31.50	37.91
1998-99	45.58	54.27
99-2000	19.95	37.82
2000-01	48.12	92.50
2001-02	49.14	66.07
2002-03	32.17	44.17
2003-04	40.55	48.35

**Source:** LMC

The story with regard to sewerage receipts is even worse, since as of 2003-04, receipts from the service covered only one-third of total expenditure, and a little over half of the revenue expenditure (*Table 10*). Water and sewerage being basic services, their capital expenditures cannot be covered through user charges, but for financially sustainable service delivery, at least the O&M expenditures should be covered. While our hypothesis implies that capital expenditures should lead to better service delivery, in this particular case, the decline in service levels of water supply and sewerage need not be necessarily 'caused' by a decline in capital expenditures, but they seem to be moving together.

Take the hypothesis that financial self-reliance does not imply much for service delivery. First, note the financial independence of the LMC has just meant reliance on octroi. Once that is abolished, self-reliance might well become a myth. Note that even the apparent financial independence has not resulted in an adequate level of the service in this city. So it is a little difficult to imagine what would happen to service levels in the aftermath of the abolition of octroi, and in the midst of increasing demand for public services, due to rising population density and continual in-migration.

**Table 10:** Trend in Revenues from Sewerage, 1996-2003, LMC

Year	Sewerage own receipts as percent of sewerage total expenditure	Sewerage own receipts as percent of sewerage revenue expenditure
1997-98	24.53	34.25
1998-99	13.55	18.37
99-2000	7.32	12.63
2000-01	17.34	27.83
2001-02	14.97	28.83
2002-03	40.83	54.41
2003-04	33.75	52.45

**Source:** LMC

*Table 11* summarises the service level for sewerage in LMC. It shows declining levels of population access to sewerage since 1999-00, when capital expenditure also started declining.<sup>9</sup>

Further, over and above the relationship between financial performance and service delivery, note that LMC's pattern of expenditure does not imply much for whether these services are reaching the city's poor. This is partly a result of the research design. Note, however, that it is not an objective of this paper to examine the equity of public service delivery, but to examine the reform of public services overall. If public services cannot be improved overall because of the city's financial and/or institutional problems, there is no way in which the poor can be favourably affected by better service delivery. In fact, they would be more negatively affected in the event that the city undergoes financial or institutional problems.

To definitively say something about the impact of the public services on the poor, one would have to do some type of expenditure tracking or get information (through a digitised spatial mapping system) on the distribution of public services (such as water supply, sewerage) and the location of poor, which, as has been discussed, is outside the scope of the study. Given the caveats that there is no data regarding the distribution of city's income or spatial dispersion of

**Table 11: Sewerage Access over Time, LMC**

<b>Description</b>	<b>1996-97</b>	<b>1997-98</b>	<b>1998-99</b>	<b>1999-00</b>	<b>2000-01</b>	<b>2001-02</b>	<b>2002-03</b>
Population access to sewerage (in numbers)	731000	775000	1000000	1050000	720000	740000	834350
Population served through sewer house connections (in numbers)	437500	464000	680000	724500	649000	584860	585928
Population served through soakage pits/ septic tanks (in numbers)	130000	135000	438000	306000	715000	717000	849072
Population served by independent institutional sewerage (in numbers)	60000	65000	70000	150000	70000	72000	72000
Population served through conservancy system (in numbers)	100000	100000	250000	100000	10000	10000	10000
Actual number of sewer connections	70000	71000	75000	105000	110000	116972	121985
Number of institutions having independent sewerage system	20	22	22	22	22	22	22
Total average daily sewerage flow in MLD	300	310	351	400	400	267	292
Length of intercepting sewer (in kilometer)	73.7	73.7	75	77	93	101	96
Length of lateral/branch sewer (in kilometer)	569.28	710	724	743	797	903	964
Total length of sewer (in kilometer)	642.98	783.7	799	820	890	1004	1098

**Source:** Punjab Water Supply and Sewerage Board.

expenditure of the design, we noted the following (see framework from the World Development Report, 2004).

- Poorer households have settled around the river and the outskirts of the city, where the water channels have been laid already by the LMC.<sup>10</sup>
- Second, even if expenditure is increased in these poorer neighborhoods, the question is whether that ensures better service. That is, if the poorer households are getting water, is that safe, potable water? This is a serious question, given that many pollutants are being discharged into the river.
- Many a time, poorer households cannot afford the resources it takes to gain access to these services. In Ludhiana, this lack of demand appears to be the reason why poorer households in the city's periphery have been denied access to these service networks.

#### 5.5.1 Debt

The LMC floated a bond for \$4.02 million (INR 178,000,000) in 1999-2000, of which \$2.22 million (INR 98,512,000) had been paid towards interest, and \$868,700 (INR 38,500,000) was expected to be paid towards the principal as of January, 2005. The data on repayment of loans in the water budget indicated that the repayment increased from \$67,690 (INR 3,000,000) in 1997-98 to \$426,450 (INR 18,900,000) in 1999-2000, reflecting interest payments toward this bond issue.

Apart from the bond issue, LMC had secured a loan from the Housing and Urban Development Corporation (HUDCO) for \$4.4 million (INR 194,600,000) in 2001-02. The LMC has been making repayment of this loan as well towards interest and principal amounts. No separate repayment schedule was available from LMC for the HUDCO loan. In 2003-04, LMC's total repayment towards loans jumped to \$1.6 million (INR 73,000,000) in 2003-04 reflecting payments towards HUDCO loan as well. In total, after repayments have been accounted for, a sum of \$10.4 million (or INR 460 million) more (\$6.25 million (INR 277 million) for the bond issue and roughly \$4.15 million (INR 183 million) for the HUDCO loan (principal plus interest)) is required to retire the city's debt.

A review of the LMC's financial position thus indicates that there is no room for complacency. It shows that the need for service delivery reform in Ludhiana is financial as well, with the Government of Punjab about to issue an ordinance to abolish octroi in the state. Further, the city's expenditures do not indicate commensurate

increase in capital expenditure or developmental works to increase the quantum or quality of public services. The LMC also has a looming burden of public debt with onus of repayment.

## VI. Roadblocks and Bottlenecks to Reform

The question arises as to why the financial and service delivery performance in this city has been less than satisfactory, when judged against national benchmarks set by India's National Commission on Urbanisation or the Zakaria Committee, and what are the bottlenecks to better service delivery and reform.

### *6.1 Institutional Arrangements for Water and Sewerage Services*

Despite the importance of financial resources for reforming service delivery, consider the final hypothesis that it is likely that other factors such as institutional arrangements impact service delivery. There are 17 state-level pieces of legislation and 23 pieces of central legislation that affect the functioning of municipal areas in Punjab. Among many other things, we identified a statutory overlap of functions for planning, preparation and execution of water supply and sewerage schemes with the PWSSB (*PWSSB Act, 1976*) that also vests with the LMC (as per the Punjab Municipal Corporation Act, 1976). As discussed earlier, the broad demarcation is that while the PWSSB undertakes the planning, development and construction of *major* water and sewer networks, the operation, maintenance and the execution of *minor* developmental works is provided by the municipality. This distinction does not, however, exist in the statute (see, *Table 12*). *Table 12* summarises the provisions of various acts at the national, state and local level, their overlaps and implications.

The statutory overlap is a bottleneck as it creates unnecessary confusion regarding the roles of the LMC and the PWSSB in the execution of any given project. In reality, the classification of a project as 'major' or 'minor' tends to become arbitrary and the service takes a 'passing the buck' attitude.

Apart from the issue of statutory overlap, sometimes it is *desirable* to have local autonomy in certain functional areas. It is obvious that the LMC would be in a better position to judge, which localities are served better, and those which would need infrastructure upgradation or replacement.



**Table 12: Statutory Overlaps in Ludhiana and their Implications**

S.N	Tier	Act	Institution Formed/ Governed	Provisions	Overlap	Implications
1.	National	74 <sup>th</sup> Constitutional Amendment Act, 1992	All Urban Local Bodies (ULBs)	Definition of urban areas, municipal areas and municipal bodies, describing their composition and enlisting their powers and function	The panchayats and municipalities to prepare a development plan but no mention about the unavailability of technical expertise required to do so.	At first instance, the economic planning along with social sector development will take place followed with a infrastructure plan, but landuse planning and development controls which are to be worked out later will take a back seat, the idea of integrated development will be lost.
				1. District planning committees (DPC) to consolidate the plans prepared by the panchayats and municipalities to prepare a draft development plan for the district		
				2. Urban planning including town planning, regulation of landuse and planning for economic and social development	The service are included as the functions and responsibilities of the city corporation, but no light on the planning, implementing and execution side of the services	
				3. Services including water supply for domestic, industrial and commercial purposes, public health, sanitation and solid waste management		
				4. Public ammenities i.e. Roads, Bridges street lighting, parking lots and public convenience	Terms like "development plan", "social justice" and "integrated development" require clarity which is absent	
				5. Slum improvement and upgradation and poverty alleviation		
				6. Taxes, duties, tolls, fees and charges		
2.	State	Punjab Municipal Corporation Act, 1976, Amended 1994	Ludhiana Municipal Corporation (LMC)	1. The constitution of the municipal corporation delineation of the powers, functions and appointment of the commissioner.	Functions for planning, preparation and execution of water supply and sewerage schemes also vests with the PWSSB, as specified by the PWSSB Act	Dichotomy in urban management where the municipal corporation and the specialised agency pass the blame for inefficient services.
				2. The construction and maintenance of works and means for providing supply of water for public private purposes – Obligatory Function.		
				3. The construction, maintenance and cleaning of drains and drainage works and of public latrines, urinal and similar convenience – Obligatory Function	Detailed description of the type of services provided doesn't mention any time frame for the completion, which results in delays.	Dirtier cities with unhygienic living conditions and poor quality of life
				4. The scavenging , removal and disposal of filth rubbish and other obnoxious or polluted matter – Obligatory Function		

**Table 12: Statutory Overlaps in Ludhiana and their Implications (contd.)**

S.N	Tier	Act	Institution Formed/ Governed	Provisions	Overtap	Implications
				5. The construction, maintenance, alteration and improvements of public streets, bridges and culverts– Obligatory Function 6. The lighting, watering and cleansing of public streets and other public places- Obligatory Function 7. The laying out or the maintenance of public parks, gardens or recreation grounds – Obligatory Function 8. The improvement of the City in accordance with improvement schemes approved by the Corporation Discretionary Function	Improvement schemes – conception and approval, are just a discretionary function, its not surprising that LMC doesn't pay heed to it and to the Ludhiana Improvement Trust	
3.	State	Punjab Town Improvement Act, 1922	Ludhiana Improvement Trust (LIT)	1. All improvement trusts to be under the administrative control of department of local government. 2. Improvement and expansion of towns in the state and for that purpose undertaking various types of improvement and development schemes 3. The Municipal Corporation shall pay to the Trust an amount per annum equal to two percent of gross annual income	"Improvement schemes" have not been explained in detail. Improvements just by beautification or improvement by better functioning? The meaning of the term will lead to altogether different schemes If the clause was put, then suitably town improvement schemes should have been made the obligatory function of the LMC	Since the activities are under the control of a separate department, delays would be common, plus it doesn't make sense for another authority to approve it, who might not even be familiar with Ludhiana.
4.	State	Punjab Water Supply and Sewerage Board Act, 1976	Punjab Water Supply and Sewerage Board (PWSSB)	1. Investigate and survey the requirements of water supply and sewerage, prioritising water supply and sewerage schemes with approval of the state government.	Functions for planning, preparation and execution of water supply and sewerage schemes that also vests with the LMC, as specified by the Punjab Municipal Corporation Act.	Dichotomy in urban management where the municipal corporation and the specialised agency pass the blame for inefficient services.

**Table 12: Statutory Overlaps in Ludhiana and their Implications (contd.)**

Table 12. Statutory Overlaps in Ludhiana and their implications (contd.)						
S.N	Tier	Act	Institution Formed/ Governed	Provisions	Overlap	Implications
				2. Planning, preparing and executing schemes for the purpose of providing supply of drinking water and sewerage facilities in the areas of one or more local authorities.	Nothing specified in the act pertaining to the working of PWSSB as a contractor of LMC for water and sewerage works, which is the existing system.	
				3. Laying down the norms of staff to be employed by a local authority for maintenance of water supply and sewerage works.		
5.	State	Punjab Regional and Town Planning and Development Act, 1995	Punjab Urban Planning and Development Authority (PUDA)	1. Establishment of PUDA, provisions for setting up special authorities for particular areas and setting up of the new Town Planning and Development	PUDA being a state wide authority is not very effective when it comes to city level plans, which the TCP prepares. The act's weakness is not setting up a separate development authority for Ludhiana, which would do all the planning work.	Organisational failure, landuse planning in complete disarray. Plans not even there on paper.
				2. Provides legal sanctity for town planning and development		
				3. The highest decision making body for regional and town planning is the Punjab Regional and Town Planning and Development Board, set up under the act.		
				4. Preparation of master plans and regional plans.	Regional planning authority not provided any powers to rule over other authority	
				5. Development and regulation of landuse as per the plan.		
				6. Preparation of town development schemes for upgradation of existing areas.	No stress on the implementation and executing side of the master plan. No clause stating the implmentating agencies and stressing on the legal penalties if the agencies do not implement plan.	
				7. Provision of levy, assessment, and recovery development charges.		

The LMC, however, does not have the financial resources or the technical expertise to execute water supply and sewerage projects independently (which is presumably why the PWSSB is currently entrusted with undertaking work of a capital nature). The technical expertise is lacking, as the proportion of the city's area covered under regular employment is continually shrinking; the city itself is expanding and retirements do keep occurring.

So what is desirable from an institutional perspective is not readily feasible due to shortages of skills and resources at the local level.

## *6.2 Institutional Arrangements for the City's Landuse*

Recall LMC's high population density in relation to state and national average (*Figure 1*), high traffic usage, and low land area in relation to vehicle usage. Institutional arrangements for landuse in Ludhiana is another example of service delivery failure (see Sridhar, 2006). *The Punjab Town Improvement Act of 1922* provides for the constitution of improvement trusts for improvement and expansion of the towns in the state. In Ludhiana, the Ludhiana Improvement Trust (LIT), is in principle, under the administrative control of the state's department of local government. The LIT is entrusted with the task of proposing ways of improving the landuse of the city, and developing new schemes for its development. However, the problem is that city improvement is the LMC's *discretionary* not *obligatory* powers, under the *Punjab Municipal Corporation Act, 1976*.

*The Punjab Regional and Town Planning and Development Act* was enacted in 1995, requiring a planning agency for the preparation of Master Plans for cities, and their enforcement. In Ludhiana, the town and city planning department (TCP) prepares a plan in consultation with the Punjab Urban Development Authority (PUDA), which is approved by the state's department of local government. The Punjab Urban Development Authority set up under the *Punjab Regional and Town Planning and Development Act*, is a state-wide authority. As may be clear, because of its centralised nature, it is not effective in local planning.

While it is accepted that the TCP or the LIT are in a much better position to plan for the city's development and its infrastructure, it is not clear what the separate roles of the TCP and LIT are in city planning and improvement. This results in a situation of 'passing the buck' when it comes to removal of 'illegal' encroachments on public land. Recall that Ludhiana has a large slum

population, compared with other cities of the same size. The role of the private sector in land development is confined to the developers that buy plots from the LIT.

The *Punjab Town Improvement Trust Act, 1922, Section 67, Chapter 7*, provides that “..the Municipal Committee shall pay to the Trust....an amount per annum equal to two percent of the gross annual income of such Committee.” According to this, the LMC owes the LIT 2 percent of its gross receipts every year, which the LMC stopped paying to the Trust in 1974, cumulatively adding up to \$10.4 million (INR 460,000,000) as of the current financial year. The fact that the LMC has not paid the due 2 percent of its revenue to the LIT is apparently because LIT's contribution to development schemes of the city is not clear.

To the LIT, the lack of payment from the LMC of its due share affected its task negatively. As long as it was getting its due share from the LMC, the LIT, in fact, had developed several housing schemes that were handed over to the municipality in 1973 (see, *Table 13*).

Subsequently, owing to non-payment of dues by the LMC, the LIT had not been able to develop new schemes, because of the lack of a resource base. LIT even had some cases pending in the court over the compensation to be paid for land acquired several years ago. LIT does make some money through sale of its schemes to developers. While residential plots are sold by lottery, commercial plots are sold by auction to the highest bidder.<sup>11</sup> The LIT is currently working with four schemes (see, *Table 13*) through these revenue sources and bank loans.

The proliferation of institutions for landuse in this city is, however, by no means, isolated. Experience from cities in other countries is similar. As Sridhar (2006) highlights, the Royal Town Planning Institute in Ireland (2001) documents a similar experience regarding institutional arrangements for landuse and transport in the Greater Dublin area, which highlights the urgent need for integration of planning and delivery of urban development. Auzins (2004) documents a similar set of common problems faced by the central and east European countries in their land management processes primarily because of conflicting legislation.

**Table 13: Schemes, Ludhiana Improvement Trust**

List of Schemes transferred to Municipal Corporation, Ludhiana u/s 55 of P.T.I Act 1922				
No	Name of Schemes	Area in Acres	Landuse	Date of Transfer to LMC
1	Tagore Nagar Part I	6.00	Residential	11-09-70
2	Tagore Nagar Extension Part I	2.00	Res.cum comm.	11-09-70
3	Shaheed Udham Singh Nagar	33.35	-do-	01-11-71
4	Moti Nagar	22.72	-do-	12-03-85
5	Islam Ganj including Kidwai Nagar	34.50	Housing cum comm.	24-04-73
6	Shaheed Kartar S. Sarbha Nagar	287.00	Res. cum comm.	01-07-73
7	Dr. Saifudin Kitchlu Nagar	100.00	-do-	12-03-85
8	24 Acre Division Scheme	24.00	Residential	12-03-86
9	Model Town Extension Part II	146.28	-do-	05-06-85
10	5.53 acre Scheme on Sheep Shank Road	5.53	Housing	18-09-85
11	Bhadur House	3.50	Commercial	12-03-85
12	Lajpat Rai Market	0.44	-do-	--
13	Jawahar Nagar Market	0.50	-do-	--
14	Feroze Gandhi Market	13.00	-do-	12-03-85
15	Truck Stand	114.00	-do-	12-03-86
16	Grain Market	62.00	-do-	Handed over to Punjab Mandi Board
17	Dairy Scheme (Tajpur Road)	45.00	-do-	12-03-85
18	Cycle Market	2.62	-do-	--

**Table 13: Schemes, Ludhiana Improvement Trust (contd.,)**

List of Schemes transferred to Municipal Corporation, Ludhiana u/s 55 of P.T.I Act 1922				
No.	Name of Schemes	Area in Acres	Landuse	Date of Transfer to LMC
19	Ind. Area Ext. a Scheme	64.24	Industrial	--
20	Bhai Randhir Singh Nagar	550.00	Residential	01-08-94
21	Model Town Extension	400.00	Residential	01-08-94
22	Gian Singh Rarawala Market	6.00	Res. cum comm.	01-08-94
23	Dashmesh Nagar	4.00	Housing	01-08-94
Current Schemes with the Trust				
1	Shaheed Bhagat Singh Nagar			
2	Maharshi Bahmik Nagar			
3	Rajguru Nagar			
4	Sant Ishel Singh Nagar			

Clearly, local bodies everywhere have a problem with integrating policy making and implementation. Based on the instances of water supply and landuse, we find conclusive evidence for the hypothesis that, in addition to the finances, institutional arrangements negatively impact service delivery in this city.

### *6.3 Inability to Increase User Charges for Services*

The absence of appropriate user charges is an impediment to the effective delivery of services (see, Reedy, 1986), consistent with our hypothesis and corroborated by LMC revenues from water and sewerage. A municipal corporation's finances are closely related to the various user charges and other revenue sources that determine the levels and quality of service delivery, as also highlighted by Fox and Edmiston (2000). In India as well, the MUD and JNNURM have also been trying to support a commercial orientation as a financially sustainable approach to service delivery.

Over and above the issue of user charges not adequately covering production costs, the LMC provides public services to unauthorised slums that are not payers of property taxes. There is a need for raising water and other service charges, although in a phased manner, for both domestic and commercial users, if an attempt is made to relate water quality to the user charge, consumer willingness to pay might be forthcoming.

### *6.4 Quality of Services*

In the case of water, the city is faced with the problem of quality. Landuse has important effects on the delivery of water/sanitation, given that the main source of water supply in the city is underground water. Heterogeneous landuses are spread through the city; because of this, industry in the city is spatially dispersed. If industrial use had been spatially concentrated, it would have been feasible for a single sewage treatment plant to be set up for the effluents of all industrial units. However, given the spatial dispersion of industry, and the lack of a sewage treatment plant, most of the small units discharge their waste water and sewage into the open drains that enter the local stream, whose contamination has affected the ground water quality. This is causing a serious environmental sanitation hazard and the stream has become a virtual drain.

For solving this problem, the GoI has initiated the Sutlej river conservation plan. This project (Sutlej Action Plan (SAP)) has been



formulated to prevent pollution of the river and to improve its water quality. However, it is obvious that SAP is a short-term solution which treats the outcome, rather than the cause of the problem. The long-run solution is to encourage the spatial concentration of industry, through better zoning and implementation of the comprehensive plan. Zoning and comprehensive planning facilitate the regulation of landuse and pollution and make them spatially concentrated. Currently however, a laissez-faire approach has been adopted to city planning with the result that service quality is not monitored.

## VII. Triggers for Reform

Crises do trigger reforms, as in the case of the balance of payments crisis of 1991 that made India adopt the path of reform. There are some triggers that could make the reform happen in LMC. These are:

### *7.1 Abolition of Octroi and Financial Resources*

As our findings with respect to finances confirm, pre-existing financial resources are a crucial factor that determine the internal readiness for reforming public service delivery in most cities. A city with a large financial base and buoyant revenue sources (such as an appropriately designed property tax) need not reform its service delivery, as it is presumably in a position to offer an acceptable/adequate level of services, judged against benchmarks.

Heavily as the LMC's finances are dependent on octroi, the Government of Punjab might issue an ordinance any time in the near future to abolish octroi in the state. Given the fact that octroi accounts for more than 70 percent of LMC's own source revenues, surely the abolition will come as a trigger to persuade LMC to be financially more responsible. Some ways of making the LMC more financially responsible would be to bring into the tax net those residential properties that have remained exempt.<sup>12</sup> Further, our discussions indicated that there are frequent under-assessments in the city of taxed (commercial or business) property that range anywhere from 2-20 times of their reported value.

While not possible completely, one way to compensate for octroi abolition could be to increase water charges, by disseminating information regarding the user charge and quality relationship, which

could appeal to the public because of the questionable water quality in the LMC area. For instance, if water charges were to be raised and were used to finance the setting up of a second sewerage treatment (in addition to the one envisaged under the SAP), residents would be willing to pay more to get safe, potable water. Further, the LMC provides services to unauthorised slums that are not payers of property taxes. Provision of service upon payment is the sustainable option for better service delivery. This is consistent with what the literature finds with respect to developing countries [example, Fox and Edmiston (2000); Reedy (1986)], and with respect to India (Sridhar, Mathur, and Nandy, 2006).

If octroi were to be abolished, the state Government of Punjab will most likely come up with a compensation package for the local government. While our financial analysis indicates that transfers have not been important in the LMC context, with octroi abolition, they could well become very important in the transition period. If this were to happen, octroi abolition might not act as a trigger to make LMC more financially accountable and reform service delivery.

Other triggers in finances that could bring about reform in service delivery would be if property records were properly maintained by the city. In the past, lost records have meant litigation, court cases, and significant financial losses to the city. This could be attained with e-governance initiatives, in the steps of states like Karnataka and Andhra Pradesh that have successfully computerised all their land records, making them accessible, transparent, and accountable.

## *7.2 Privatisation in Service Delivery*

As is clear, the LMC (or the PWSSB, both being public or para-public entities) is the lead service provider of public services in most instances. The Ludhiana case demonstrates a different variant of the client-policymaker-service provider relationship highlighted by World Development Report (WDR) 2004. In the LMC, the policymaker is also the service provider in most instances and is directly accountable to the clients (public). Service delivery then depends on the motivation of the public sector entity in providing the service, implying not much discipline for public provision of the service.

It has been often said that privatisation is the panacea for a variety of problems in service delivery. While private participation in the provision of public services is limited in Ludhiana as should be

clear from the institutional arrangements to provide water supply, for example, note the private sector or contractors cannot move into a vacuum created by a total collapse of the public sector. The experience with the private sector world-wide has shown that, wherever governance is weak, privatisation of the essential water and sanitation services results in serious problems including raising costs and reducing access and quality for the less well-off (see also WDR, 2004). This suggests that strong governance that can *regulate* as well as enable *public participation in decision-making* and *project formulation*, can facilitate private sector participation, reduce cost of access and improve quality. So, public-private partnerships can work only if public sector governance is strong. Given strong public sector governance, privatisation stimulates efficiency because it ties performance to remuneration.

Take the example of water supply. As is clear, it is quite feasible to outsource the running of tubewells that is known to be a technically simple and not a very time consuming job. In many instances, as in the past, in the LMC, private tubewell operators have included individual shopkeepers, housewives, or senior citizens, in return for a small amount of remuneration. Compare this to the relatively higher salaries to government employees as tubewell operators in return for the usually poor level of services offered by them (for e.g., they do attend to repairs, but only with some time delay). Thus outsourcing is certainly welcome and will act as a trigger of change and better service. In addition to the monetary savings, outsourcing can bring about the much needed diversity in skills for service delivery. As is the case everywhere, the LMC has been unable to attract the skills required for executing various jobs. Even if available, they tend to be scarce because of various reasons: one is the monetary cost associated with their recruitment for the LMC. A second reason is the constant spatial expansion of the LMC that requires increasing number of employees to ensure service coverage. Because of these reasons, privatisation or even mere outsourcing can act as a trigger for financial and institutional reform in LMC.

Outsourcing has been introduced by the LMC in the running of tubewells, disposal works, and desilting of sewers. Currently, a large number of tubewells (240 out of 350) have been entrusted by LMC to private operators for operation and maintenance. The work of desilting interceptor sewers was given on contract by LMC during 1996-97, all steps in the right direction toward reforming these services, assuming LMC oversight.

### *7.3 Public Participation*

Where accountability or public participation exist, there, service delivery is likely to be successful. The question is: do mechanisms or forum exist for grievance redressal and information sharing in the city? There are no NGOs or consumer organisations that deal with public service delivery issues in the city. The outsourcing of tubewell operations is an example of attempts to involve citizens in the delivery of public services. Although public services and their delivery/effectiveness are debated among the elitist groups of the city, there is no systematic discourse on the delivery of various services.

The media can do much to disseminate information and improve local government performance in public service delivery. Despite the city's above average literacy, we found that total newspaper circulation and readership in Ludhiana (of 65,700) covered only one-fourth of the city's households in 2001. Given the apparent lack of information to a substantial portion of the city's households, it is not clear what the incentives are for the policymaker-cum-service provider (the LMC/PWSSB) to be accountable to the public.

Currently a major problem with LMC functioning is the lack of public participation or discourse in budgeting. Ludhiana is conspicuous by its absence of NGOs working in the public service areas (compare this with drinking water as an area where SEWA, (Self-employed Women's Association) women have taken the lead in the western Indian state of Gujarat, India, for example.

The Public Affairs Centre in Bangalore, India, did several rounds of surveys to come up with periodic report cards on various services, and rated various public service agencies in Bangalore. The Public Affairs Centre subsequently prepared report cards on services in six other large Indian cities, mostly in partnership with NGOs and local civic groups that are interested in taking follow-up action. There are report cards also on specialised services such as hospitals and public transport. But in all cases, report cards have been used as a trigger for collective action by citizens and as a stimulus to get public agencies to respond.

Certainly, better information to the public and their participation in the provision of various services is likely to act as a rapid trigger for reform. Some initiatives here could be to enable web-

presence of LMC budgets, its priorities and public discourse regarding the various problems associated with service delivery.

#### *7.4 Master Plan*

Providing statutory status to the current master plan will provide signals regarding its mandatory nature, and is likely to act as a trigger for bringing about landuse reform in the city. This would ensure balanced allocation of resources to landuses that need them the most and also plan for the city's future development in a systematic manner (see for instance, Sridhar, 2005). Further, as discussed earlier, spatial concentration of industry would have advantages for efficient sewerage disposal. Finally, a comprehensive plan would enable the better estimation of demand for various services in different parts of the city, and the planning of infrastructure. Such enforcement would trigger a process that would narrow the demand-supply gap in the delivery and quality of water and sewerage services, traffic, and transportation management.

#### *7.5 Local Autonomy*

Decentralisation is known to promote better service delivery, accountability to citizens, and economic efficiency. While centralised systems have become less credible, decentralisation has now become a world-wide phenomenon, not just confined to India, but many emerging and new economies in East Asia, Latin America and Europe. Currently, in many countries, institutional arrangements impinge on the ability of the local government to influence policy pertaining to the development of water, sewerage, and landuse. It may be recalled that in the case of Ludhiana, the PWSSB and LMC are both actors in the water and sewerage sectors. Whereas in the case of landuse, the LMC and LIT are both actors, which is also the reason why LIT is not in a financially good position, having been denied its share from LMC revenues. Autonomy to these local government departments, with adequate financial and capacity building support in the initial stages, will trigger a process of institutional reform.

This certainly implies that the PWSSB should not interfere with the development, planning of water supply and sewerage in the LMC, honoring the LMC's responsibility accorded by the *Punjab Municipal Corporation Act*, since local autonomy is desirable in projects of a local nature. To facilitate this, initially at least, the PWSSB should extend logistic and technical support to the LMC to facilitate and speed up the process of local autonomy. At the

minimum, basic service responsibilities (e.g., construction *vis-à-vis* O&M work) have to be sorted. Specific gaps such as lack of technical expertise at the LMC are typically outsourced so that private services are effectively utilised. Further, in the case of landuse, the LIT has specific investment needs, which if given autonomy in city development and its due share in the city's financial resources, can act as the trigger for landuse improvements in the city, much needed.

## VIII. Summary of Findings and Concluding Remarks

Overall, this paper addresses the need for reforming urban service delivery; the relationship between finances and service delivery, any potential bottlenecks, and triggers for reforming service delivery in urban areas, taking the case of Ludhiana, India, as an example. The actual state of various services and several basic measures that we examine (growth of population density, traffic *vis-à-vis* road density, composition of landuse, service delivery and current finances, including debt) suggest a need for financial as well as institutional reform in Ludhiana. These observations continue to be valid even when we project some indicators under various assumptions. Besides, in the case of this city, we find a positive relationship between capital expenditure and service delivery specifically as they relate to water supply and sewerage, consistent with our hypotheses. Further, we find support for our other hypotheses that user charges and service delivery are related, and that financial self-reliance does not imply adequacy of the service level. In addition to financial constraints, we find conclusive evidence that the major bottlenecks to reforming service delivery are institutional, and pertain to existing arrangements for water, sewerage, and landuse.

The major lessons and triggers that could make the reform happen in the LMC and other cities are clarifications in institutional arrangements for service delivery, encouraging privatisation in service delivery and public participation, and sustainable finances, with spending on capital expenditure, supported by user charges. Our study suggests that problems with institutional arrangements are not a local phenomenon confined merely to Ludhiana, India. As we have reviewed here, fixing institutional arrangements for the provision of local public services go a long way in improving service delivery at the local level everywhere. Further, proactive public participation, privatisation of required services along with needed oversight, and the requisite spending on capital work, certainly are likely to make

public authorities everywhere more accountable to the public and reform service delivery.

Similar experiences worldwide mean that local bodies everywhere have a problem with integrating policy making and implementation. As this case study demonstrates, policy and action coherence is as vital for effective financial management as it is for service delivery. India's 74<sup>th</sup> Constitutional Amendment Act formally recognised local governments as the third tier of government more than 13 years ago, but that has not affected their internal functioning. This case demonstrates the need to identify an umbrella agency from among the numerous existing agencies, which can oversee various aspects of planning in cities for better management of finances and reforming the delivery of services, for true local autonomy, and better public participation in city planning not only in India, but in all emerging and new economies in East Asia, Latin America, and Europe, where decentralisation has taken place.

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## Endnotes

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<sup>1</sup> These data are for urban areas in the country. It is possible that analogous, if not worse, problems exist in the rural areas regarding which reliable data are not available. However, if urbanisation is an inevitable occurrence, it is important to address these infrastructure problems in the urban areas. If such problems cannot be addressed in the urban areas, it would be much more difficult to address them in the rural areas!

<sup>2</sup> This and all other monetary data in this paper are based on the exchange rate US\$1 = INR 44.32, reported by the Reserve Bank of India on October 10, 2005.

<sup>3</sup> At the time work for this case study was completed, similar data were not yet available from the 2001 census.

<sup>4</sup> We attempted to get this data for Ludhiana Municipal Corporation (LMC) as well, only to find that the LMC limits contain only 10-15 percent of units in the area. Hence we report the district-level rather than the city-level data here.

<sup>5</sup> We attempted, but were unable to find data on any other measures of the city's contribution to state economic activity such as its contribution to the state's GDP.

<sup>6</sup> Analogous 2001 data were not yet available from the Census of India at the time this work was completed.

<sup>7</sup> The Census of India defines class I cities as those with population >100,000.

<sup>8</sup> Octroi is a tax levied on business activity, being a tax on the entry of goods into a municipal area for consumption, or sale. Most Indian states (except municipal corporations in Maharashtra, Gujarat, and cities in Punjab) have now abolished the octroi that is known to be a highly distortionary tax. As Rao, Pradhan, and Bohra (1985) point out, there are several reasons as to why octroi is distortionary in its effects. Production losses occur due to hindrances to smooth traffic flow. Next, time delays do invariably occur at checkpoints and give rise to arbitrariness and corruption. The tax is subjectively assessed being based on trust rather than on actual books of accounts. Further, efficiency losses occur because of taxation of inputs and capital goods. The same goods are taxed at multiple points in different municipalities. Finally, the cost of collection is high.

<sup>9</sup> Note that there is no anomaly in a decline in the number of persons having access to sewerage. In most cities, a sewer connection installed in violation of procedures predetermined by the service provider, is usually treated as unauthorised, and is likely to be disconnected without notice. For instance, see the Delhi Jal Board's website, <http://www.delhijalboard.nic.in/>.

<sup>10</sup> This finding is based on a visual, and crude examination of a map of LMC's water channels and that of the city.

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<sup>11</sup> In a major controversy on land allotment, in May 2005, allegations surfaced over nearly 27 acres of prime land for developing a city centre at the heart of Ludhiana, awarded by the LIT through a tender process estimated to be worth \$112,815,884 (INR 5,000,000,000). It was alleged that both the technical and financial eligibility criteria was overlooked by the LIT, in the case of the successful bidder, among the six leading developers who had put in bids for the project.

<sup>12</sup> Movement towards taxation of residential property involves transaction costs such as the identification of properties, their valuation, setting tax rates, revenue collection, and other compliance costs, that are not the focus of this paper.