
Interim Report

on

Cost Recovery and Tariff Practices for Urban Water Supply and Sanitation in India

Chandigarh Case Study

Prepared for
Water and Sanitation Program – South Asia

June 2008

CHANDIGARH

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CHANDIGARH

1 Context and Background

In order to access funds for water supply and sanitation improvements under Jawaharlal Nehru National Urban Renewal Mission (JNNURM), municipal service providers are required to levy 'reasonable user charges' so that operation and maintenance (O&M) costs are recovered within seven years.

The Ministry of Urban Development (MoUD), with assistance from the Water and Sanitation Program - South Asia (WSP-SA), has prepared guidelines on the design and implementation of user charge reforms in line with JNNURM's requirements. These guidelines are available as a separate document (volume 1 of this publication).

The guidelines draw on lessons from a review of current user charges and cost recovery arrangements in 23 cities in India. This report focuses on one of those cities: Chandigarh.

2 City Profile

Chandigarh is a Union Territory serving as the state capital of both Haryana and Punjab. It is a political center and the economic hub of the two states. It was the first planned city in India, and was designed by Le Corbusier, who conceptualized the city as a human body, with a head (the capitol complex), heart (the city center), lungs (the leisure valley, open spaces and sector greens), intellect (cultural and educational institutions), circulatory system (the road network) and viscera (the industrial area).

2.1 Physical environment and topography

Chandigarh is located in the foothills of the Shivalik range, which forms part of the Himalayas. The city is spread over 114 square kilometer (km²), three quarters of which falls under the jurisdiction of the Municipal Corporation of Chandigarh (MCC).

2.2 Demography

Chandigarh was planned for a population of half a million, but has undergone rapid growth in the last 40 years. By 2007, the population had reached the one million mark and this is projected to double by 2021.

2.3 Socio-economic profile

Chandigarh has enjoyed good economic growth in recent years and by 2002-03 the per capita annual income had reached Rs. 51,341 compared to a national average of Rs.18,912. With encouragement from the state and national governments, the economy of Chandigarh is undergoing transformation from a traditional manufacturing base to a knowledge-based one. It is a growing Information Technology (IT) center and many multinational companies are relocating here from Bangalore.

3 Institutional Framework for Water Supply and Sewerage Services

As a Union Territory, Chandigarh has been administered by the Governor of Punjab since 1984.

3.1 Municipal Corporation of Chandigarh

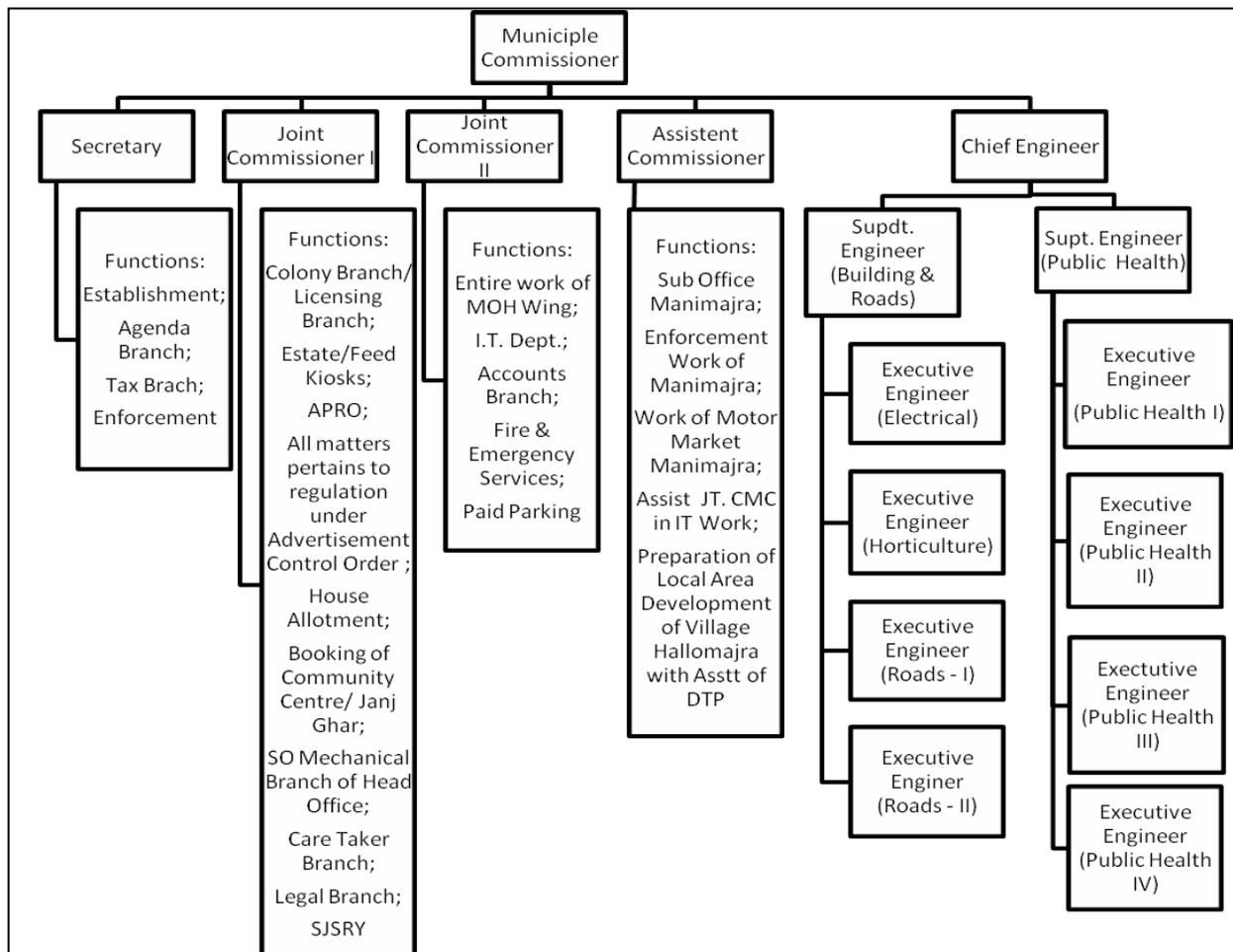
While the MCC manages an area of 79.34 km², its water supply service area is 114 km² (this includes Mani Majra), so that the total population to be served is 11,50,000.

The importance of water supply to MCC is indicated by the vision statement in the City Development Plan (CDP), which envisages Chandigarh as ‘a beautiful eco-friendly city for all, providing 24x7 water supply.’

Organizational structure

MCC is headed by a Commissioner and has elected councilors in accordance with the 74th Constitutional Amendment Act (CAA). It has a lean organizational structure with institutional roles clearly defined, and some decision making responsibilities have been decentralized to designated officers. For example, a water connection up to ½” diameter can be sanctioned on the spot by a Sub Division Engineer, provided basic documentary requirements are met by the applicant.

Figure 1.1: Organogram of MCC



To endorse the 74th CAA's tenets of decentralized planning and management, committees have been constituted comprising councilors and municipal officials (often Executive Engineers) for a variety of functions including water supply and sewerage and street lighting. These committees also review revenue collection and prepare a draft annual budget for incorporation into the city's main budget.

The water supply and sewerage function comes under the domain of the Chief Engineer, supported by the Superintending Engineer (Public Health) and a team of four Executive Engineers. A total of 979 staff is currently employed, against a sanctioned quota of 1,260. This equates to a ratio of seven staff per 1,000 connections. Figure 1.2 delineates the organizational functioning of the Public Health Department, and key responsibilities of each Public Health Division are discussed below.

Division 1

This Division is responsible for the generation, treatment, transmission and pumping of water for the city of Chandigarh and four villages falling under the jurisdiction of MCC (Badheri, Butrela, Attawa and Burail). This includes the operation and maintenance (O&M) of a number of tubewells that supplement the main raw water supply.

Division 2

This Division is responsible for providing water connections to consumers, replacing defective meters, and billing and collection. It also maintains the water supply and sewerage services, and storm water drainage, for the whole of Mani Majra town and adjoining colonies, and some small irrigation networks in parks and green areas.

Division 3

This Division is responsible for tertiary distribution in the city and a number of villages and rehabilitation colonies. It also operates one tubewell, maintains some supply lines, boosts the supply in low-pressure areas and manages some small irrigation works for parks and green belts.

Division 4

This Division is responsible for the maintenance of the sewerage network and storm water drainage, and the operation of a sewage treatment plant.

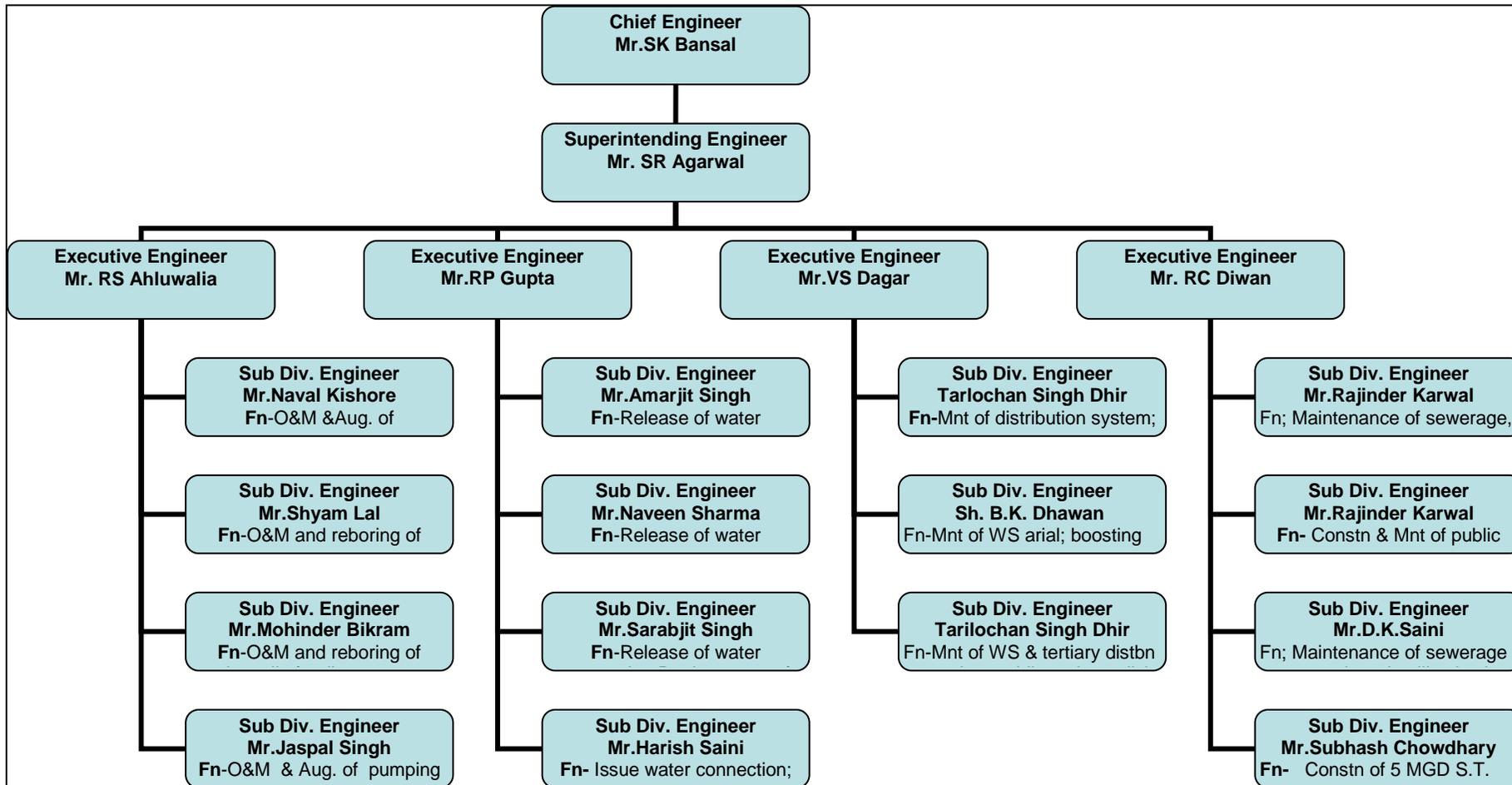
3.2 Other agencies

Other government organizations concerned with infrastructure in Chandigarh include:

1. Chandigarh Housing Board;
2. Chandigarh Industrial and Tourism Corporation;
3. Chandigarh Transport Undertaking; and
4. Chandigarh, Punjab and Haryana Public Works Departments.

Coordination between these agencies and the various municipal departments responsible for infrastructure development is less than ideal, and the boundaries of institutional responsibilities are not entirely clear. For example, while the Engineering Department is legally responsible for the development of infrastructure within new housing colonies, Chandigarh Housing Board also takes care of some of this work. In some schemes developed by cooperative societies, however, residents take up occupancy and start developing their own water supply and sanitation arrangements before official approval has been given.

Figure 1.2: Municipal Corporation of Chandigarh’s Organization Structure for Water Supply and Sewerage Services



4 Current Service Provision

Source

Raw water for the Chandigarh supply is sourced primarily from canals, which are estimated to provide some 291,000 kiloliter (kl) per day, plus 192 tubewells on the city outskirts which provide approximately 91,000 kl. Since there are no meters at source, the actual figures are unknown.

Transmission

Surface water is carried 27.5 kilometer (km) to Chandigarh, and this involves pumping both before and after treatment. It is then distributed to five water works serving various parts of the city, but not the rehabilitation colonies or Mani Majra town which are served by tubewell water.

Distribution

The city slopes from north to south, enabling gravity-based distribution of the water supply. There are seven distribution zones, each with headworks, but it is planned to introduce subzonal headworks due to problems of low pressure and high demand, which cannot be met by current arrangements.

MCC supplies approximately 334 liter per capita per day (lpcd) to its one million population, which is the second highest provision in India after Goa. The supply operates for 16 -18 hours per day on average, and has improved in recent years.

Key data on water supply and sewerage infrastructure is presented in Table 1.1.

Table 1.1: Water Supply and Sewerage System Details		
SOURCES OF WATER SUPPLY Own Source	Source	Production (in kl) /day
	Canal	263320
	Number of tubewells	192
	Drawl from tubewells	90800
Total water supply /water produced	381360 kld/350851 kld (8% unutilized capacity)	
Total water demand or water shortage	499000 kld	
Total s.i.e. the demand-supply gap (on water produced)	148149 kld against actual supply	
Total area served by water supply	100%	
Total population served by water supply	100%	
Total water supply coverage (in %)	100%	
Total sewerage coverage (in %)	100%	
Average hours of supply	16-18 hours	
Liters per capita	334 lpcd	
TOTAL TRANSMISSION INFRASTRUCTURE FOR WATER SUPPLY AND SEWERAGE	WATER SUPPLY	
	No. of schemes currently running: 4 schemes for rising mains in progress	
	New schemes introduced/proposed in this financial year: 3 . schemes for rising main and augmentation of pumping machinery and reboring of 18 tubewells	
	Total pipeline length: 1500 km	
	Diameter range: 80 mm to 1200 mm	
	No of standposts: 128	
	No of tankers: 20	
	No of handpumps: Nil.	
	Water treatment plants: 317800 kld (70 mgd)	
	SEWERAGE	

	Total length of sewer line: 982 km		
	Rising main (in km): 220 km		
	Number of mainholes: 38000		
	Number of pumping stations 9		
	Number of STPs/sewerage farms 2./35 mgd		
	Number of sewer seats (if applicable): 227354 (Approx.)		
Total Water Storage Capacity	Current Capacity	Number	Capacity
	OHT:	None	
	Underground storage:	Clear Water = 46. Raw Water = 7	52 mg 42 mg
	TOTAL	53	94 mg

Sewerage

Main sewer lines run from west to east, with interconnecting lines from south to north. The topography of the city means that little pumping is necessary. The sewerage network covers the entire city population, with a total length of 742 km. The size of the main line varies from 64” to 6” in size in the city. Taking 80 percent of water produced as sewerage, the average sewerage generated per day is 280,465 kld. There are two sewerage farms but no treatment plants.

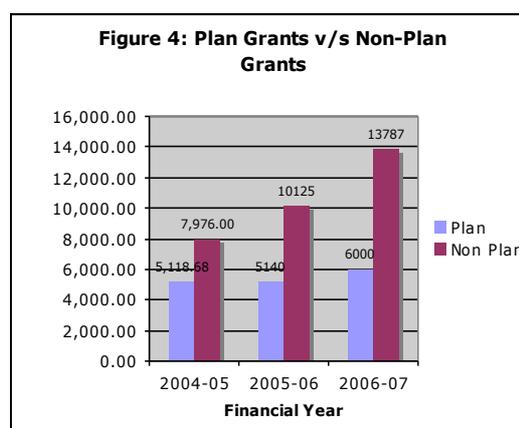
4.1 Key issues in service delivery

1. While the total production is estimated at 127,750,000 kl per annum, municipal records indicated that consumption is only 75 percent of this amount, suggesting a substantial level of unaccounted for water;
2. The MCC has inadequate sewage treatment capacity and the problem will become harder to manage when the bulk supply is increased;
3. While 90 percent of connections are metered and billing computerized, there are no flow meters on bulk water sources or major distribution points, nor modern leakage detection instruments. This makes it very difficult to locate and reduce losses; and
4. The MCC has not audited the energy consumption of pumps and other electrical machinery used on the network, with a view to maximizing efficiency.

5 Water and Sewerage Finances

5.1 Financial Profile of Municipal Corporation of Chandigarh

For the last **three** years, the MCC has shown a growing surplus in aggregate terms. However, it has an operating loss since revenue is 40 percent less than expenditure. The city is, instead, dependent on plan and nonplan grants from the Chandigarh Administration. This dependence has decreased from 61 percent in 2004-05 to 48 percent in 2006-07, but the ratio of nonplan to plan grants has increased, indicating that MCC has been drawing on ad hoc funds to meet its establishment and operational expenditures.



Receipts

Apart from grants, nonplan receipts include income from property tax, nontax income from public health, buildings and roads, medical office, and estate (rent) receipts . MCC’s own source revenue has increased at a cumulative rate of 60 percent over the **last three** years thereby decreasing dependence on grants. In addition, the ratio of tax revenue to nontax

revenue improved between 2004-05 (5:95) and 2006-07 (16:84). Total receipts have increased at a cumulative rate of 39 percent. However, the increase in own receipt revenue is mainly through receipts from the sale of assets (land and rights).

Expenditure

MCC is debt-free - it has no outstanding loans because most of its additional funding is provided through grants from the Chandigarh Administration.

Of the plan expenditure, building and roads accounts for 53 percent while the Public Health Department receives 30 percent.

Of the total nonplan expenditure, 47 percent is spent by the Public Health Department. Overall, establishment costs constitute half of the nonplan expenditure while spending on O&M has been around 45 percent over the last three years.

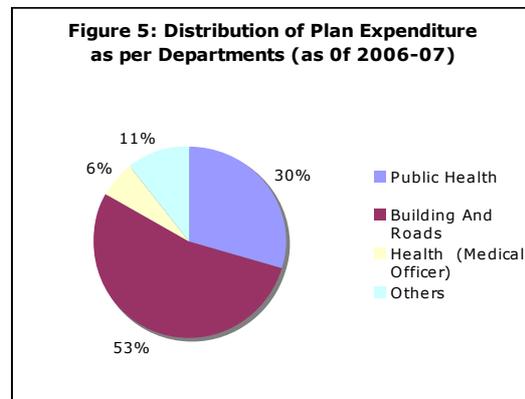


Table 1.2 : Operative Account of Municipal Corporation of Chandigarh (in Rs. million)			
	2004-05	2005-06	2006-07
Plan and Nonplan Receipts			
Total Receipts	21,42.44	3507.73	4121.33
Own resources revenue	552.28	658.940	928.89 ¹
Loans	-	-	-
Grants	5,11.86	514.00	600.00
Financing Institutions	-	-	-
Plan Receipts	5,11.86	514.00	600.00
Tax (Property Tax)	25.84	82.51	146.90
Nontax	5,26.44	576.34	781.98
Grants (Chandigarh Administration)	7,97.60	1012.50	1378.70
Estate Receipts	2,80.69	1322.37	1213.74
Nonplan Receipts	16,30.57	2993.73	3521.33
Total Expenditure	16,19.69	1803.23	2213.40
Public Health	1,84.07	126.77	182.80
Building and Roads	51.67	141.04	333.34
Health (Medical Officer)	10.81	14.49	37.71
Land Acquisition	6.60	4.88	0
Others	33.06	33.29	65.21
Plan Expenditure	2,86.23	320.49	619.07
Establishment (Wages and Salaries)	6,92.26	763.14	812.73
Operation and Maintenance	5,97.93	673.99	777.39
Interest Payments	0.00	0.00	0.00
Others	43.26	45.59	4.20
Nonplan Expenditure	13,33.46	1482.73	1594.33
Operative Surplus/Loss	881.18	823.79	665.44
Total Surplus/Loss	8,08.97	20,24.99	25,26.99

¹ Tax + Nontax revenue.

Table 1.3: Municipal Corporation of Chandigarh’s Operating Account for Water Supply and Sewerage Services (in Rs. million)

		Income								Expenditure					Surplus/Loss	
	Financial Year	Water Charges (inc meter rent)	Sewerage Cess	Misc Receipts	Total Own Source Revenue	Plan Grants	Non-Plan Grants	Total Grants	Total Income	Total Establishment Expenditure	Total OM Expenditure	Total Operating Expenditure	Capital	Total Expenditure	Operative Surplus/Loss	Total Surplus/Loss
1	2	3	4	5	6(3+4+5)	7	8	9 (7+8)	9(6+9)	10	11	12 (10+11)	13	14(12+13)	15(6-12)	16(9-14)
1	2002-03	285.941	11.480	9.689	307.110	--	--	--	--	145.740	376.984	522.724	--	--	-215.614	--
2	2003-04	400.576	11.910	6.514	419.000	2.889	7.229	10.118	429.118	159.209	413.097	572.306	51.548	623.854	-153.306	-194.736
3	2004-05	392.155	11.698	8.987	412.840	5.119	7.976	13.095	425.935	165.391	427.784	593.175	29.111	622.286	-180.335	-196.351
4	2005-06	415.082	13.860	7.378	436.320	5.140	10.125	15.265	451.585	167.263	476.966	644.229	184.077	828.306	-207.909	-376.721
5	2006-07	449.622	23.011	19.694	492.327	6.000	13.787	19.787	512.114	178.600	539.692	718.292	182.801	901.093	-225.965	-388.979
6	Apr-Dec 2007	--	--	--	275.500	2.300	9.097	11.397	286.897	--	--	--	276.641	--	--	--

Figure 6: Distribution of Own Sources of Revenue in PH Department (as of 2006-07)

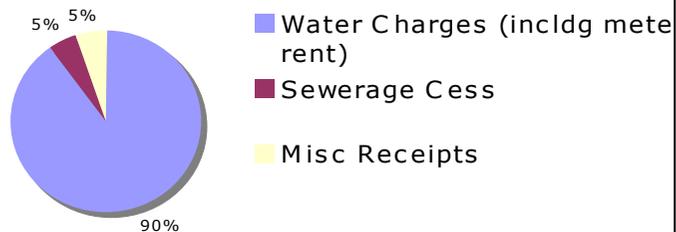
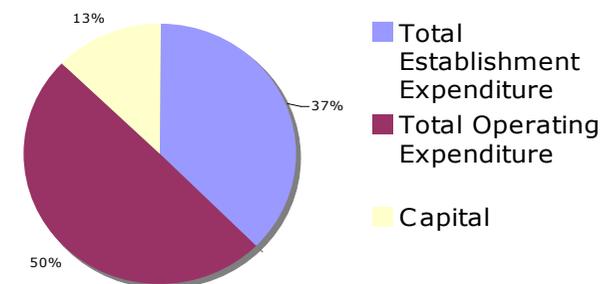


Figure 7: Distribution of Expenditures in the PH Department (as of 2006-07)



5.2 Tariffs and Cost Recovery

Accounting systems are currently being converted to double entry accrual, but depreciation has not, up to now, been taken into account in the Public Health Department accounts.

Presently, the Department recovers roughly 68 percent of the operating costs of water supply and sewerage services from revenue, but MCC aims to increase this to 100 percent by 2008-09. To this end, it is taking the following steps:

- Working towards 100 percent metering; Installing a **Supervisory Control And Data Acquisition (SCADA)** water accounting system to reduce technical losses; and
- Introducing an increasing block tariff to discourage wasteful consumption.

Two other trends in departmental finances are notable. Firstly, the contribution of grants to total income is comparatively low, varying at 2-4 percent over the last four years.

Secondly, capital expenditure has increased from 8 percent of the total budget in 2003-04 to 20 percent in 2006-07, due to the development of augmentation schemes. O&M expenditure has dropped from 66 percent in 2003-04 to almost 60 percent in 2006-07. It should be noted here that Chandigarh does not face the high costs in sourcing water (for example, due to distance or hydro-geological factors) that arise in some other cities.

Demand, collection and arrears

In 2006-07, the total production was 127,750,000 kl. Of this, roughly one quarter was unaccounted for (due to technical losses and theft) and a total of 89,727, 428 kl was billed, for approximately 121,000 metered connections. Another 6,570,000 was supplied free through standposts.

MCC has a computerized bimonthly billing system based on meter reading for the majority and a flat rate system for rehabilitation colonies. Bills can be paid at the MCC offices, cash collection centers or e-Sampark² centers. Despite these user-friendly arrangements, and low water tariffs, there is a high level of nonpayment and the collection efficiency, which has been low for years, has deteriorated from 74 percent in 2003-04 to 66 percent in 2006-07. In an effort to address this, MCC has introduced a penalty mechanism and a disconnection clause, based on a one-time surcharge of 10 percent on current demand though no surcharge is levied on arrears. This is a fairly lenient system and since the penalty does not accumulate, there is no incentive for consumers to settle their debts quickly.

In 2006, MCC introduced additional byelaws to assist revenue collection and since then has registered 4,012 cases of disconnection for nonpayment of bills.

A further obstacle to the recovery of debts is that consumers often dispute the arrears via the courts or the Dispute Redressal Committee established in 2006, on the basis that their charges have been wrongly assessed.

² IT enabled centers where citizens can go and pay their tax dues or register their complaints.

Table 1.4 : Demand Collection and Balance Statement for of Municipal Corporation of Chandigarh's Water Supply and Sewerage Services

Financial Year	Demand (Rs.)			Collection (Rs.)	Balance (Rs.)			Collection Efficiency
	Arrears at the beginning of the year	Current year demand	Total Demand	Total recovery	Past years' arrears at the end of the year	Current Demand arrears at the end of the year	Total arrears at the end of the year	
	3	4	5(3+4)	6	7	8	9(7+8)	10(6/5)
03-04	92986809	415385102	508371911	373926057	92986809	41459045	134445854	74%
04-05	134445854	424518421	558964275	390014910	134445854	34503511	168949365	70%
05-06	168949365	432630007	601579372	410025753	168949365	22604254	191553619	68%
06-07	191553619	485239375	676792994	445011874	191553619	40227501	231781120	66%
07-08 (Apr-Aug)	231781120	238754285	470535405	256609684	231781120	17855399	213925721	55%

Tariff Structure

MCC applies a volumetric water tariff. For most domestic customers, an increasing block tariff is used, though in the case of rehabilitation colonies and slums, flat rate charges are applied for house connections while nondomestic consumers are charged a uniform rate per kl. Separate rates are levied on garden connections, which are also metered.

MCC has full autonomy in setting tariffs. A number of changes have been made in the last few years (Table 1.5) and at the time of the study, the next revision was due after the elections in December 2007. Recent revisions have included an increase in the rate for consumption in the second block (for domestic customers) and a 300 percent increase (since 2000) in the rate for nondomestic consumers.

There are, in addition, fixed charges for specific items such as domestic connections and meter rent and other items. For a new connection, Rs. 500 is collected as security and Rs. 30 as an installation charge. For a sewerage connection, a one-off fee is applied. This ranges from Rs. 500 to Rs. 3,000 depending on plot size.

MCC is planning to convert flat rate connections in low-income colonies into metered ones, by the end of the financial year 2008-09. This step is being taken to reduce wastage, which is substantial.

Consumer Category	Rates Till June 5, 2000	Rates on June 5, 2000	Rates revised on Dec 18, 2002	Rates revised in Sept 2006
WATER SUPPLY				
Domestic (Metered)				in Rs.
0-15 kl	0.70	1.40	1.75	
15-30 kl	1.30	2.60	3.50	
30-60 kl			5.00	
Above 60 kl			6.00	
Flat Rate Connections to Poor	1.80	100/flat	100 per month/flat	
Lawns				
Lawn (metered)	1.25	2.50	2.50	
Lawn (unmetered)			50/ kanal	
Other lawns over 1 acre			500/acre/month	
Institutions			9.00	
Government/Semi Government	3.00	6.00	12.00	
Industrial/Semi Industrial			11.00	

Unit/Commercial				
Tanker			300/tanker; free for religious bodies	
Construction				
Construction including government			1% of total construction cost	
New private residential/nonresidential construction			3.25/sq ft	5/sq ft
SEWERAGE				
Residential			5.00/WC/month	
Others			30/WC/month	

5.3 Consumer profile

The total number of metered water connections within the municipal boundary as of January 2008 was 111,395, while unmetered connections stood at **20,676** (Table 1.6).

Consumer Category	2006-07			Jan 2008
	Chandigarh City	Mani Majra	Total	Chandigarh and Mani Majra
Domestic	87540	7722	95262	
Domestic being misused	5920	596	6516	
Lawns	2240	3	2243	
Institutional	516	40	556	
Semi commercial	23	0	23	
Commercial	4784	752	5536	
Government	800	0	800	
Industrial	1851	1	1852	
Total Metered	103674	9114	112788	111395
Flat Rate	6851	1408	8259	
Standposts/tubewell/parks	271	0	271	
Unmetered supply in villages	17119	1	17120	
Unmetered supply in villages	2127	0	2127	
Total Unmetered	26368	1409	27777	20476

At the time of the study, MCC aimed to achieve 100 percent water metering by 2008, by persuasion or force. Most unmetered connections were in the rehabilitation colonies where the majority of residents no longer had low income status, and the application of a flat rate amounted to an unintended subsidy for many households.

In terms of revenue generation, domestic users represent 92 percent of all consumers but generate just 45 percent of the total revenue. Nondomestic consumers amount to just 8 percent of the total but generate 55 percent of the total revenue (Table 1.7).

Of the one million-plus population, 1,50,000 Chandigarh residents are provided free water through standposts while there are roughly 1,32,000 registered customers. This implies that around 50,000 families are unserved or simply unregistered. No property tax is levied hence it is not possible to cross-check these figures with the property tax register. It appears, however, that many of these 50,000 families live in buildings under multiple occupation (such as high-rise blocks) with a single registered connection. The abundant water supply enables multiple users to access adequate water from a single connection.

Table 1.7: Revenues per Connection

Consumer Category	No. of Connections	% to Total Metered Connections	Revenue Collected in 2006-07	% to Total Revenue Collected
Domestic	104021	92%	199083802	45%
Commercial	6359	6%	165589706	37%
Institutions	556	0%	53437223	12%
Industrial	1852	2%	26901143	6%
Total Metered Connections	112788		445011874	

6 Analysis

6.1 Cost recovery

MCC does not recover O&M costs of water supply and sewerage services, despite relatively low costs of production. The immediate shortfall is approximately 33 percent, but if capital expenditure is included (without depreciation) then the gap widens to 45 percent.

Table 1.8: MCC's Cost of Water

Financial Year	Total Water Generated (kl)	Total O&M Expenditure (Rs.)	Total Expenditure (Rs.)	Cost of O&M per kl (Rs.)	Cost of production per kl (Rs.)	Average revenue per kl (Rs.)
1	2	3	4	5 (3/2)	6 (4/2)	7
2005-06	115168450	476966000	828306000	4.14	7.19	
2006-07	127750000	539692000	901093000	4.22	7.05	3.52

One obvious factor in the current rate of recovery is the low tariff rates. Domestic water is charged at Rs. 1.75 per kl for the first 15 kl and Rs. 3.50 per kl for the next 15 kl (Table 1.8). (Very few domestic customers would consume more than 30 kl per month.) This generates an average revenue of Rs. 2.63 per kl, while O&M costs stand at roughly Rs. 4 per kl. There is, therefore, a strong case for revising the tariff structure and rates.

A second constraint on cost recovery is the level of nonrevenue water (NRW), which currently stands at 30 percent. This figure includes 5 percent supplied through standposts and 25 percent technical losses. In addition, Public Health officials believe that some 8 percent of the available production capacity is unutilized. Were MCC able to reduce NRW to the internationally accepted level of 10 percent, the water sold could generate an additional Rs. 155.9 million per year and there might be no need for further augmentation schemes.

O&M costs are also not recovered from revenue from sewerage services, even though no mechanized sewage treatment is used in Chandigarh. A sewerage cess is charged at Rs. 5 per toilet per month for domestic consumers and Rs. 30 per toilet per month for nondomestic users. These rates are low and hence recovery is difficult even for the establishment expenditure for sewerage services.

6.2 Economic efficiency

Low tariffs - for both metered and flat rate customers - do not deter wasteful consumption. This is a serious problem bearing in mind that the supply is so plentiful; very few other cities can offer 334 lpcd. Currently a typical metered household pays Rs. 79 per month for 30 kl

consumption, while users of flat rate connections (which are decreasing due to the drive to convert them to metered connections) pay Rs. 100 for a similar level of consumption. Flat rate connection holders who pay Rs. 21 more for equivalent consumption compared to metered connection users, still enjoy a subsidy of Rs. 20 per month, compared to the cost of water supplied (Rs. 4 kl X 30 kl water = Rs. 120 per month).

6.3 Equity and protection of vulnerable sections

Two questions to examine here are whether unmetered customers get a fair deal in comparison with metered customers, and whether industrial customers are treated fairly compared to domestic customers.

As indicated above, domestic metered customers typically pay less than those on the flat rate of Rs. 100 per month, even though the flat rate was intended to benefit lower-income customers in specific colonies. As noted earlier, many of the designated 'beneficiaries' of the flat rate no longer have a low-income status. However, MCC intends to achieve 100 percent metering, bringing this discrepancy to an end – though there may still be some metered customers who genuinely need assistance. The bulk of poor customers, however, live in slums with free standpost supplies. Ironically, the current tariff structure may be serving as an incentive for flat rate customers to switch to metered connections. In 2007, some 7,000 connections were converted.

For industrial customers, tariffs seem to be unreasonably high compared to rates for domestic users though the charges are lower than in many other cities in India.

6.4 Affordability

Average per capita income in Chandigarh is Rs. 4,278 per month, substantially above the Government of India's official poverty line of Rs. 559 per month for urban areas. Based on a subsistence consumption of 20 kl, the average family would pay 1.54 percent of its income for water if it used a metered connection, and 3.5 percent for an unmetered one. The World Health Organisation (WHO) suggests that a family should not have to spend more than 5 percent of its income on water, hence the tariffs in Chandigarh are probably affordable for the majority.

Connection charges at their current levels of around Rs. 500 for 50 square yards to Rs. 2,500 for 1,000 square yards and above are, again, highly affordable.

6.5 Resource conservation

Excessively low tariffs defeat the purpose of resource conservation through volumetric charging, because there is no financial incentive for consumers to control their consumption. The achievement of 100 percent metering will not do much to reduce wastage unless tariffs are also changed.

Since per capita supply is already way above the national average, MCC would do well to follow the more prudent approach of reducing high levels of NRW than continuing to pursue augmentation schemes.

6.6 Tariff acceptability and practicality

The current water and sewerage tariff is widely accepted by consumers, given the low charges and generous water supply. In addition, MCC has introduced a number of user-friendly initiatives following its adoption of a Citizen's Charter, to simplify processes for new connections, billing and collection and complaint redressal. E-Sampark centers, a project

initiated by the Chandigarh Administration, provides a one-stop shop for bill payments to a host of departments, all under one roof.

The complaints process has been improved by the creation of active ward committees. Consumers can register their complaints in person, in writing, by e-mail or by telephone. MCC's website provides detailed information on this. The number of registered complaints relating to water services has increased gradually from 1,330 in 2004 1,600 in 2006.

6.7 Simplicity, feasibility and transparency

The volumetric tariff in Chandigarh city is practical and fair, enabling clarity and ease in the calculation of water charges.

7 Summary

The existing water and sewerage tariff structure in Chandigarh meets equity and affordability objectives but cost recovery and economic efficiency have to be improved. The principal obstacles to progress in cost recovery are three-fold:

- ✚ Tariff rates are too low to enable recovery of O&M costs. The lack of metering at production and distribution points impedes accurate calculation of unaccounted for water in the system. More needs to be done to reduce technical losses. A 10 percent reduction in NRW could make a huge difference, making further augmentation unnecessary in the short to medium term;
- ✚ Poor accounting practices make it difficult to monitor operating revenue and expenditure accurately. The failure to factor in depreciation distorts reports on the financial health of the service.; and
- ✚ Billing and collection efficiency needs improvement.

8 Recommendations

To improve cost recovery, the following steps are recommended:

1. Revise the increasing block tariff structure.

The tariff for the first slab (0-10 kl per month) should be raised from Rs. 1.75 to Rs. 3 per kl. The second slab should be charged at a rate of Rs. 4 per kl or more, so as to recover O&M costs. The third slab (20-30 kl) should be charged at a rate close to full cost recovery, which means Rs. 7 or more. At consumption beyond 30 kl per month, water should be priced at a level where capital costs along with depreciation can be fully recovered which, in this case, would be only Rs. 8. If these rates were adopted, monthly bills for domestic metered customers would be Rs. 30 for 10 kl, Rs. 70 for 20 kl and Rs. 140 for 30 kl. These bills, though higher than before, would remain affordable for the great majority.

For nondomestic consumers, tariff rates currently range from Rs. 9 for institutions to Rs. 12 for government users. Since Chandigarh is promoting itself as a regional commercial and industrial hub particularly for IT- and tourism-based services, lowering rates for select commercial establishments with water-intensive operations could prove economically beneficial for the city as a whole, though MCC should also bear in mind the need to conserve resources.

The proposed tariff structure is provided in Table 1.9.

Table 1.9: Recommended Tariff Structure

Consumer Category	Suggested Tariff Rates (Rs.)
Domestic	
0-10 kl	3
10 -20 kl	4
15-30 kl	7
30-60 kl	8
Above 60 kl	9
Institutions	9
Government/semi government	12
Industrial /semi Industrial Unit/commercial	10

If implemented, these changes could generate annual revenue in the region of Rs. 430.14 million from domestic customers against O&M costs of Rs. 388.5³ million.

MCC should also introduce a fixed charge for users of shared connections (for example, in multistoried buildings). Alternatively, it could adopt a two-part tariff structure wherein every household pays a fixed charge plus a volumetric rate based on consumption. This could have the added benefit of recovering some capital costs.

2. Reduce nonrevenue water

MCC should invest in leakage reduction measures and extended metering instead of new augmentation schemes. Reducing NRW to 10 percent could generate an additional Rs. 155.9 million per year. Private sector involvement in leak detection, system maintenance and meter maintenance could be explored as an option, with financial incentives linked to targets in the contracts. At the time of this study, MCC reported 15,297 defective meters, 15 percent of the total.

Slum dwellers currently served through standposts could be offered free house connections so that they become registered customers, and consumption subsidies used, if necessary, to ensure their ability to pay revised tariffs. Similarly, customers on flat rate tariffs in rehabilitation colonies should switch to metered connections.

3. Improve accounting and database management

While switching to the double entry accounting system, water supply and sewerage should be made a separate cost center, with the full costs of establishment, asset creation, O&M, depreciation, etc., factored in.

³ Total O&M expenditure for 2006-07 stood at Rs. 539.69 million, of which 72 percent was attributable to the domestic sector: Rs. 388.5 million.