DISCUSSION PAPER

# Coming to Grips with Issues of Pricing Urban Water and Intra-City Bus Transport*

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## *Introduction*

The need to fix an appropriate charge or a price for urban water and city bus transport and to re-evaluate the current system of pricing them has been strongly advocated in recent years. Several reasons are advanced in support of re-evaluation. One: urban water and bus transport services are underpriced in relation to costs incurred on their provision, raising serious concerns about the financial viability and sustainability of urban water utilities and transport corporations. Two: underpricing has resulted in poor service and reduced incentives to expand the spatial coverage of services. Inadequate level of water and transport services has emerged as a major impediment to accelerating economic growth and productivity. Three: the main objective of charging low prices on grounds of lack of affordability by the poor has not been achieved. The benefits of low prices and subsidies have tended to leak out to the non-poor urban households. Four: there is no clarity with respect to the argument that urban water and bus transport should be priced below the marginal cost on account of externalities, i.e., positive health impacts from water and avoidance of congestion costs from public bus transport. Five: underpricing has affected the finances of state governments which have either

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absorbed the losses of water utilities and transport corporations by meeting a part of their recurrent expenditure or adjusted the losses by reducing the capital-account support to them for capacity expansion. Although the macroeconomic consequences of low water prices and bus fares are difficult to assess, these two services may cost the state governments the equivalent of 0.7 percent to 0.9 percent of their gross domestic product.

Seen in this light, the proposition that increasing user charges for water and bus transport will improve welfare is compelling. Increased prices, it is argued, will generate more resources which will, in turn, improve welfare by financing the expansion of services and improving service quality. Increased charges may also induce the consumer to use the services more prudently, thus freeing up capacity for those who value the services most.

Urban water supply and city bus transport are important to economic growth and productivity. Their financial viability and sustainability have consistently been emphasised in water and transport policies enunciated in the successive five year plans. The Working Group set up to formulate the Ninth Plan strategy for urban water proposed adoption of the principle of ***full cost recovery*** in order to enhance the financial viability of the water sector and full autonomy for institutions responsible for water supply in determining water tariff and tariff policy. It proposed that subsidies for the poorer sections should be selective, well-targeted and transparent to ensure that there is no excessive cross-subsidization from other sectors like industry or commerce[1]. Apart from laying emphasis on the financial aspects of urban water utilities and considering that urban water has important implications for productivity and quality of life, the Ninth Five Year Plan has underlined the importance of universal coverage of population by water supply, adequacy in terms of water consumption norms, integration of water supply with

1 Ministry of Urban Affairs and Employment, 1996. Report of the Working Group on Urban Water Supply and Sanitation Sector for the Ninth Five Year Plan (1997-2002). New Delhi.

liquid waste management, recycling of waste water and sewage, and privatisation and participation of the community in the management of water supply systems[2]. In a recent paper titled, ***Urban Water Supply and Sanitation***, the World Bank has made similar observations, stating that water tariff setting must increasingly focus both on economic efficiency and financial viability, without losing sight of social affordability[3]. Tariff rationalisation, according to the paper, is an essential pre-requisite to financial viability of agencies responsible for water supply, and for increasing the financial flows to the sector.

Cost recovery or ***getting the prices right*** forms the cornerstone of urban transport policies. The governments have, from to time, observed that an efficient transport system is critical for productivity and growth. The Ninth Five Year Plan, for instance, has noted that an inefficient traffic and transportation system in the urban areas results in an annual loss of Rs. 20 billion in terms of travel-time and vehicle-operating costs. A draft of a recent World Bank report states the following: "The urgent need is to rationalize user charges for urban transport facilities and services. The fare levels of public transport systems in urban areas are distorted. Though enjoined to operate on business principles, the State Transport Undertakings are not free to fix the tariff for their services. The fares are fixed by the respective state governments. Though the objectives are clearly stated, political considerations, rather than economic reasons, decide the fare levels. In practice, the state governments tend to pass on their social obligations onto the transport undertakings under them. Fares are not revised in tune with the increased cost of inputs. These factors cumulatively are having a detrimental effect on the economic viability of the undertakings"[4].

2 Planning Commission, 1997. Ninth Five Year Plan. New Delhi.

3 The World Bank. 1999. Urban Water Supply and Sanitation. Allied Publishers. New Delhi.

4 The World Bank. 2000. Chapter 8. Urban Transport.. Washington D.C. Mimeo.

This paper is an attempt to bring out issues that are relevant and crucial for determining appropriate prices for urban water and city bus transport. Using a small sample of annual reports and accounts of urban water utilities[5] and city-based transport services[6], this paper examines the cost-price linkages in respect of urban water and urban bus transport services. It looks at the implications of the existing pricing structures and argues that setting appropriate prices for urban water and city-based transport services is a complex exercise, that it is somewhat simplistic to wholly focus on an upward revision of water tariffs and bus fares as a response to the many problems that surround water utilities and bus transport companies, and that there are pre conditions to be met for a successful price reform.

Besides this introduction, the paper is divided into three sections. Section two is devoted to a discussion of issues of pricing urban water. Urban water in India, it should be pointed out, is a state subject; the central government's responsibility in respect of water is limited to the regulation and development of inter-state rivers and river basins[7] and provision of support for such programmes as the accelerated urban water supply, low cost sanitation, and establishment of water monitoring systems. For the reason that urban water is a state subject, institutional arrangements[8] for its provision and management and systems of pricing including price structures vary across states. Participation of the formal private sector in urban water provision and management is negligible, mainly because of water being

5 Urban water utilities refer to state-level water supply and sewerage board (Delhi Jal Board), city-level water supply and sewerage boards, and municipal bodies responsible for water supply.

6 City-based transport corporations refer to those corporations which are responsible for bus transport in major cities. Here, data of only those corporations which are affiliated to the Association of State Road Transport Undertakings (ASRTU) are used.

7 The central government has armed itself with a *River Board Act, 1956* and *Inter-State Water Disputes Act, 1956* to deal with problems of inter-state river basin disputes.

8 A hierarchy of institutions are involved in urban water provision and management: (a) Public Health Engineering Departments (PHED) like in Rajasthan which is responsible for water supply throughout the state; (b) a state-level agency with state-wide jurisdiction like the Kerala Water Authority and the Delhi Jal Board, (c) metropolitan-level agency like the Bangalore Water Supply and Sewerage Board, and (d) municipal corporations in Gujarat and Maharashtra. All institutions are subject to some regulation in matters relating to tariff setting.

viewed as a natural monopoly. Private sector participation in such areas as billing, maintenance of pumps, and the like is observed in some cities, but its efficiency implications are still to be tested. This section gives examples of different price structures and attempts to assess their impact on the finances of urban water utilities.

Issues of pricing city-based bus transport are dealt with in section three. City-based bus transport is run by corporations set up under the provisions of the *Road Transport Corporation Act, 1950*. *The Road Transport Corporation Act 1950*, which is a central act, empowers the state governments to constitute transport corporations[9], and entrust them with functions, among others, to operate road transport services and perform other ancillary functions. Article 22 of the *Act* lays down that such corporations are to run on ***business principles***. At the same time, their powers to borrow and raise resources and in matters relating to the maintenance of resources and disposal and treatment of profits are determined by state governments. Bus fare structures are laid down by transport corporations in consultation with the state governments. This section examines the impact of bus fares on the finances of city-based transport corporations. The last section sums up issues of pricing urban water and city bus transport and attempts to lays out key spheres for reform and further investigation.

## *Urban Water and its Pricing*

### Status of urban water

Issues of urban water have, in recent years, acquired increasing complexity, partly on account of the continuing pressures of urbanisation and urban population growth, and partly during to the limited water that is available for urban use. Urban

9 State-wide transport corporations even when they serve the urban areas are not reviewed in this paper.

population in the country has been increasing at rates that are twice the rural population growth rates; on the other hand, urban water accounts for 5-6 percent of the total water consumption in the country which is grossly inadequate in relation to water demand. The result of the continually rising demand for water and inflexible supply is that although water is accessible to approximately 85 percent of the country's total urban population, it is 30-60 percent lower than the nationally established water consumption norms. Almost without exception, water distribution system is unreliable. Most households face limited hours of service and low pressure[10], and 20-60 percent of water is lost in the distribution system and for unauthorised use by urban households.

**Public expenditure on urban water**

Public expenditure on urban water supply and sanitation accounts for 1.2 percent to 1.8 percent of the total plan investments, and is significantly short of requirements. For example, notwithstanding an aggregate budgetary investment of Rs. 243.41 billion in the urban water and sanitation sector over the successive five year plans (Table A-1) combined with off-budget institutional investments[11], investment gaps are large. *The Rakesh Mohan Committee* estimates the magnitude of investment to be of the order of Rs. 860.2 billion for the period 1996-2006 in India's urban areas. The Planning Commission has a made a provision of Rs. 117 billion for a period of five years (1997-2001), which leaves a large unmet investment gap. A direct consequence of inadequate provision is manifest in sharp deterioration of service levels. Economic and social costs of under-provision of water are assessed to be extremely high.

10 Recent studies have pointed out that the costs of supplying intermittent water supplies are high both to the service providers as the pipes in the primary distributions system have to be of a larger diameter to deliver water at a peak flow, and to the consumer for investing in storing tanks and pumping motors.

11 Institutional finance mainly from the Life Insurance Corporation of India (LIC) and more recently from HUDCO is an important funding source for the water sector. Yet, it is not anywhere close to what the sector needs to eliminate the deficit and meet the future investment requirements.

## Instruments of urban water charging

Three types of instruments are generally used for charging water. One is a connection fee or a fixed access charge. Such a fee is levied to provide to the user a connection to a municipal water supply. A connection fee or charge is based on the size of the plot or holding or on the size of connection and ferrule. It is unclear if the connection fee which is high in some cities is designed to contain an element of capital/fixed cost that is involved in laying out the distribution network[12]. Two: a water tax for which a provision exists in most state municipal acts. It is a tax which is unrelated to water use or consumption. It forms part of property taxation and is leviable on the annual rateable value of land and property and is meant to essentially serve as a general tax. Conditions under which a water tax may be levied are prescribed in the state municipal acts, which among others include categories of water users who may be exempted from payment of water taxes, ceiling on the rate at which water tax may be levied, and the use to which receipts from such a levy may be applied. For example, the *Uttar Pradesh Municipalities* Act lays down that a water tax may not be levied on properties which have an annual value of less than Rs. 300; the *Orissa Municipal Act, 1950* has laid down an upper limit of the rate at which a water tax may be imposed; and the *Uttar Pradesh Municipal Corporation Act, 1959* lays down that the proceeds of water tax (and drainage and conservancy taxes) may be pooled and used for purposes connected with the construction, maintenance, extension, and improvement of the service. The *Maharashtra Municipal Act, 1965* provides for a general water tax as a part of the consolidated tax on property and a special water tax for water supplied by the municipal council. It further lays down that a municipal council instead of imposing a special water tax may fix rates for supply of water by measurement.

12 Connection charges are as high as Rs. 40,000 for a 25 mm (1") water connection in Hyderabad. It is also high in medium-sized cities like Guntur where it is reported to be Rs. 12,000. It is low in several cases, explained in part by the fact that users have paid for access through property taxes. Another factor in determining the fee, besides the size of water connection, is the size of the plot area.

A third method of charging is a water charge. Conceptually designed as a charge on consumption, it is an ubiquitous instrument for charging both metered and unmetered water supplies. Besides a connection fee, a water tax and a water charge, there are other minor instruments such as a meter rent, a license fee, a water cess, a meter maintenance charge where meters are provided by the water supplying agency, development charges,[13] and fixed charges for capital renovation of the water system[14] which are used for operating water supply systems. Many of the instruments yield little revenue, raising questions about the purpose for which they are being kept on statutes or rules.

## Water pricing regime and structures

Marginal cost pricing is an indispensable aspect of water pricing rules. A basic premise for the creation of autonomous water boards, for instance, was that they will be able to set tariffs equal to the marginal cost of providing services to each category of consumers. Adherence of this premise, however, appears questionable[15]. Moreover, water pricing structures in India are extremely complex and clumsy. At one level, price structures distinguish metered connections from unmetered supplies as also bulk provision from non-bulk, discrete provision. At another level, price discrimination is common with (a) categories of water users which comprise not only the principal categories of domestic users and non-domestic users but also the assorted categories consisting of water use for washing motor vehicles, passages and stalls, cattle sheds, stables, and the like, and (b) income groups of households, assumption being that low-income households use less quantity of water and high income households have higher consumption

13 Development charges are meant to cover the cost of the water and sewer lines, and are payable by plot holders. *See* the Schedule of rates of the Delhi Jal Board.

14 Fixed charges for capital renovation are a feature of the water charging system in Rajasthan. *See* the Notification of the Public Health Engineering Department, dated 28 May, 1998.

15 Implementing the principle of marginal cost prices for such services as water may be difficult on account of difficulties in defining and estimating costs and allocation of costs to particular services.

levels. Water pricing also differs with the quality of water supplies, e.g., filtered, unfiltered, tube-well supplies and the like. ***Cross-subsidy is central to the principle of price discrimination.*** As would be seen later, non-domestic users subsidise the domestic sector. High income households using larger quantities of water subsidise low income households, raising questions about the desirability of overloading certain categories of water users.

Several types of water tariff are used in the water sector:

- Block tariff: A block tariff is a series of prices that increase in steps as consumption rises. One feature of block tariff is that it contributes to equity by allowing low income households to pay lower rates for water than other households[16]. Water utilities in Bangalore, Delhi and Hyderabad use block tariff for domestic and non-domestic supplies in combination with other price structures. Bangalore uses five water blocks, with each block of 25 kls; the price per unit in the fifth block is set 9.4 times the price in the first block. In Delhi, there are four blocks of 10 kls each, with the unit price in the terminal block being 8.6 times that in the initial block. Hyderabad uses four blocks of unequal sizes, and the price per unit of water in the fourth block is set 3.7 times higher than the price in the first block[17] (Table 1).

**Table 1. Examples of Block Tariff for Domestic Use**

| City | Size of the initial block (kl) | Number of blocks | Water tariff/kl Rs |
|---|---|---|---|
| Bangalore | <15 | 5 | 3.5 |
| Delhi | <10 | 4 | 0.35 paise plus 50% per 1000 ltrs. |
| Hyderabad | <15 | 4 | 3.7 |

16 John Boland and Dale Whittington have shown that in most situations, the size of the initial block is much too large with the result that the benefits of low tariff are taken advantage of by the non-poor urban households. See John Boland and Dale Whittington. "The Political Economy of Water Tariff Design in Developing Countries: Increasing Block Tariff versus Uniform Price with Rebate". 2000. Mimeo.

17 A survey conducted by the Asian Development Bank (ADB) showed that the majority of the utilities in their sample used an Increasing Block Tariff (IBT) structure. Ibid.

Increasing block tariff is commonly used in non-domestic metered supplies. Compared with domestic supplies, the price structure for non-domestic supplies is several times higher although on account of the differences in the size of blocks, comparisons are difficult to arrive. In Bangalore, the average differential between published non-domestic and domestic tariff is about 6:1. In Delhi, the non-domestic tariff is placed at Rs. 5/kl (plus 50 percent per 1000 ltrs) upto a ceiling of 50 kls beyond which the tariff rate is doubled.

**Table 2. Examples of Block Tariff for Non- Domestic Use**

| City | Size of the initial block (kl) | Number of blocks | Water tariff/kl Rs |
|---|---|---|---|
| Bangalore | <10 | 6 | 33.0 |
| Delhi | <50 | 2 | 5.0 paise plus 50% per 1000 ltrs. |
| Hyderabad | <50 | 4 | 8.0 |

- A uniform volumetric charge forms an important part of water price structures in several cities and towns. A uniform tariff, however, may differ according to the category of users. Although simple to use, a uniform rate does not provide any incentive to consumers to effect savings on water use.

**Table 3. Examples of Single Tariff Rate**

| City | Uniform Tariff (Rs./kl) | |
|---|---|---|
| | Domestic | Industry |
| Kanpur | 2.0 | 10.0 |
| Indore | 2.0 | 22.0 |
| Surat | 2.0 | 8.0 |
| Madurai | 5.0 | 20.0 |

- A linear water charge which rises with consumption is prevalent in states such as Kerala where a monthly water charge is specified for discrete quantities of water. Thus, a consumer in Kerala is required to pay a monthly charge of Rs. 22 for a consumption not exceeding 10 kls; the charge increases to Rs. 25 for a consumption level of 11 kls, and rises to Rs. 550 for a consumption of 100 kls/month.

Table 4: Example of Increasing Water Charge, Kerala

| Kl Consumption/ Month | Charge including meter inspection charge (Rs) |
|---|---|
| 10 | 22 |
| 11 | 25 |
| 12 | 28 |
| 13 | 31 |
| 25 | 67 |
| } | |
| 50 | 182 |
| } | |
| 100 | 550 |

- For unmetered supplies, price structures most commonly used are either annual fixed charges as shown below, or charges that vary with the size of water connection. Separate pricing structures are applied to standpost connections where such charges are provided for in the rules.

Table 5: Examples of Pricing Structures of Unmetered Supplies

| City | Annual flat rate (Rs.) | | Annul ferrule based prices (Rs.) | | |
|---|---|---|---|---|---|
| | Domestic | Industry | Ferrule size | Domestic | Non-domestic |
| Madurai | 240 | 3360 | | | |
| Chennai | 600 | 4800 | | | |
| Indore | 720 | 3600 | | | |
| Vadodra | - | - | 1" | 1440 | 25,200 |
| Calcutta | - | - | 1" | 780 | 18,000 |
| Jaipur | - | - | 1" | 4500 | 5,760 |

- A minimum charge for a fixed quantity of water is observed in most cities and towns. Conceptually, it is in the nature of a rent payable by all users having a water connection, whether or not water is consumed. The minimum charges are so fixed that they are lower than the tariff rate laid down for the initial block, giving advantage of lower tariff to low water consuming households.

The purpose of giving these examples is to demonstrate the complex nature of water price structures in India. Variations are far too large to be able to test their

adequacy with respect to the objectives that underlie in designing pricing systems and structures. Most pricing systems particularly those where water is a municipal responsibility are historically-driven with little change having been effected in their format and structure. Examples of these are found in the schedule of water rates of the Calcutta Municipal Corporation[18] where for the levy of a connection fee, users have been divided into 49 categories. In others where the responsibility for water provision rests with a statutory board, attempts have been made to simplify the pricing structures and periodically adjust them in line with costs. In Bangalore, tariffs have been revised six times between 1991-2000; the Bangalore Water Supply and Sewerage Board is endowed with powers to adjust the tariff if it is warranted on account of an increase in power tariff rates; for adjustment of tariff on account of other factors like salary increase or additional maintenance costs, approval of the government is essential. The Chennai Metropolitan Water Supply and Sewerage Board has also taken steps to simplify the tariff system. More progressive municipal corporations like the Mumbai Corporation have also adjusted the tariff structure in order to meet the rising cost of water provision, although it retains the inherited complex pricing regime.

## Cost-price linkages

It is a common knowledge that prices charged for urban water do not cover the costs that are incurred on its provision. A recent country-wide study[19] showed that (a) the costs of water provision were in excess of recoveries in nearly 76 percent of cities and towns, and (b) in the aggregate, revenue account costs in supplying water, costs referring to the operation and maintenance costs of water supply systems, were approximately 22 percent higher than the receipts from water

18 The schedule of water rates in Calcutta lays down that the connection fee for water would vary with the type of user. Users have been specified to include professions classified by the value of their paid-up capital; business classified by the monthly rent of property; class of persons like medical practitioners, freight broker, agents, kaviraj or hakims, sculptors, bankers, and the like. There are 49 classes of persons whose liability to pay connection fee differs from each other.

charges and water tax levied in lieu of water charges. The deficits i.e., costs in excess of revenue receipts, are estimated at Rs. 524/Mld; the same study showed that the annual deficits on account of water (average annual per capita expenditure minus average annual per capita revenue) were Rs. 20 per capita in metropolitan cities, Rs. 40 per capita in cities in the population range of 100,000 and one million, and Rs. 30 per capita in towns which have a population of over 50,000 but less than 100,000 persons. Reckoned on the basis of losses shown by the survey, the annual losses on just operating and maintaining the urban water supply systems would be anywhere between Rs. 9,000-Rs. 10,000 million. From all counts, inadequate cost recovery and losses on revenue account are a common feature with urban water utilities.

The cost-price linkages are further explored in respect of selected urban water utilities with summary results provided in table 6. Receipts here represent the collections from water taxes where these are levied in lieu of charges and water charges, while the expenditure are the costs incurred on water provision and delivery, although in some cases, these may comprise costs on the production of water.

**Table 6: Revenue Receipts and Revenue Expenditure of Urban Water Utilities**

| City | Year | Revenue Receipts (million Rs) | Revenue Expenditure (million Rs.) | % deficit uncovered by revenue receipts | % surplus after meeting revenue expenditure |
|---|---|---|---|---|---|
| Bangalore | 1998/99 | 1936.3 | 2035.9 | 5.1 | - |
| Chennai | 1999/00@ | 2070.1 | 1818.1 | - | 12.2 |
| Delhi | 1999/00 | 2162.7 | 3175.8 | 46.8 | - |
| Hyderabad | 1997/98 | 1062.3 | 1365.5 | 28.5 | - |
| Mumbai | 1999/00# | 9712.1 | 5820.8 | - | 40.0 |

@ Inclusive of debt services.
# Inclusive of capital expenditure

19 National Institute of Urban Affairs. Urban Water Supply and Sanitation: Status and Investment Implications. 2001. New Delhi. Draft Mimeo.

Results show that in Bangalore, revenue receipts were able to cover about 95 percent of the revenue expenditure, leaving an uncovered deficit of 5.1 percent on revenue account in 1998/99. The deficits of the Bangalore Water Supply and Sewerage Board which is responsible for water supply have sharply declined over the years, thanks to the periodic revision of water tariff rates. The Bangalore Board applies a block tariff pricing structure.

The Delhi Jal Board's losses are legendary. In 1999/2000, it reported a deficit of Rs. 1013.1 million which was 46.8 percent of the total revenue receipts. The revenue expenditure of Rs. 3175 million does not include debt repayment which, if included, would push up the losses to about 96 percent of the total revenue receipts. Per Kl losses in Delhi are estimated at Rs. 0.71. The Hyderabad Water Supply and Sewerage Board has been incurring losses which, in 1997/98, amounted to about 28.5 percent of the receipts. Both cities use a block tariff pricing system.

On the other hand, the Chennai Metropolitan Water Supply and Sewerage Board which enjoys considerable autonomy in tariff rate fixation and overall management of water has consistently been posting a surplus of earnings over cost. In 1999/2000, the Chennai Metro Board generated a surplus of Rs. 252 million, after meeting the total expenditure. The cost structure of Chennai Metro comprises expenditure on power, chemical, fuel and lubricants, payment to and provisions for employees, debt servicing, and taxes. It uses a block tariff structure where the tariff for the terminal block of 25 kls is ten times than that of the first block. Similarly, the Municipal Corporation of Mumbai in 1999/2000 has posted a substantial surplus of 40 percent over the expenditure. The Mumbai Municipal Corporation has been consistently posting profits on water account, which has been made possible partly on account of periodic tariff adjustment, and partly owing to the fact that industry contributes an overwhelmingly large proportion of revenues on water

account[20]. The Mumbai Municipal Corporation uses a flat tariff which varies with the category of users; the tariff structure has, however, been revised several times since 1987, features of which are shown in the following table.

**Table 7: Water Tariff in Mumbai**

| User | Rates Effective from | | | | | |
|---|---|---|---|---|---|---|
| | April 1987 | April 1993 | May 1994 | April 1996 | June 1997 | April 2000 |
| Domestic | 0.30 | 0.50 | 0.60 | 0.60 | 2.00-2.75 | 3.00 |
| Industry | 4.50 | 7.50 | 7.50 | 11.00 | 11.00 | 15.00 |
| Commerce | 8.00 | 12.00 | 12.00 | 18.00 | 18.00 | 22.00 |
| Hospitals, Halls, etc | 3.00 | 4.50 | 4.50 | 6.00 | 6.00 | 8.00 |
| Race course, Hotels, etc. | 10.00 | 23.00 | 23.00 | 35.00 | 35.00 | 35.00 |

An important aspect of the finances of water utilities relates to their cost structure. Cost structures of water utilities are often difficult to determine on account of the problems of allocating costs to specific services. In Delhi, where the *Delhi Jal Board* incurs heavy losses, power charges which are used for pumping water account for nearly 50 percent of the total cost incurred in water production and delivery. Wages and salary, which are known as the establishment costs, constitute 35.5 percent of the costs. In Bangalore, power costs constitute 60 percent of the operating costs. In Chennai, power costs account for 26.7 percent of the expenditure. It is significant that exogenous factors over which water utilities have little control exert a strong influence over the structure of their costs. The exogenous influence of the cost structure is thus an important factor to be faced in any scheme of price reform of water utilities.

The issue of water metering has been extensively debated, with the general view being that water supplies should be metered in order to both effect economies in water use as also to achieve financial sufficiency and economic efficiency. The desirability of water metering is thus unquestionable. Yet, the fact is that metered

20 The tariff rates for the domestic (non-slum) sector have been raised ten times over a period of 13 years, from 0.30 paise per cubic meter in 1987 to Rs. 3.00 per cubic meter in 2000, and for

water supply forms an infinitesimal proportion of urban water supply system in the country. Moreover, even where metered supplies are extensive, there are serious problems of non-functional meters. In Mumbai, for instance, of the total number of water connections, 73 percent are metered but 81 percent of them were reported to be non-functional.

**Table 8: Metering in Mumbai, 2000**

| | | |
|---|---|---|
| Number of connections | 300,744 | |
| Number of metered connections | 220,744 | 73.4% |
| Non-working meters | 178,350 | 80.8%(59.3%) |

This is a bare account of the pricing system of urban water in four metro cities. It should be noted that the levels of revenue income and revenue expenditure of urban water utilities are impacted by a series of factors which, among others, include (a) estimates of water lost in transmission and distribution; (b) estimates of water that is supplied free; (c) estimates of water that is stolen from the system; and (d) the extent of metered supplies versus unmetered supplies. Reliable data on any of these factors are unavailable, making it difficult to take them into account in this paper.

Several observations are pertinent to add on the issue of cost-price linkages. First: the water tariff paying households, i.e., those who pay a water charge and a water tax in lieu of a water charge, constitute a relatively small proportion of the total number of urban households. Using proxies such as the number of connections and adjusting them to account for the multiple use of single connections would place the proportion of tariff paying households at anywhere between 30-40 percent of the total number of urban households. The balance would account for those households who are supplied free water through standposts and those who have acquired illegal water connections. The narrow

industrial establishment, from Rs. 4.50 in 1987 to Rs. 15 per cubic meter n the year 2000. Tariffs

tariff base is perhaps the most disconcerting aspect of the urban water supply system in the country. Second: the revenue base of water utilities is grossly unbalanced in that the non-domestic sector which uses 15-25 percent of water contributes 60-80 percent of the total revenues. In Chennai, the commercial sector used only 16 percent of the total water but contributed 46 percent of the revenues. On the other hand, the domestic users consumed 69 percent of the total quantity of water but contributed 40 percent to the income. This situation is replicated in several cities where industry and commerce contributes, in proportionate terms, a significantly larger share of revenues from water. Although such cross-subsidization may be justified on grounds of financial sufficiency, it is detrimental to economic growth and productivity and may need to be reviewed. Thirdly, to exacerbate the unbalanced nature of the revenue structure, significant inefficiencies are observed in collecting tariff from domestic water users. The Bangalore Water Supply and Sewerage Board is able to recover only 35 percent of the cost incurred on water provision to the domestic sector; on the other hand, the non-domestic and industrial sector pays over 350 percent of the cost of water provision so as to neutralise non-payment of dues by domestic users. In the domestic sector, the one category of consumers which is able to achieve full cost recovery that which consumes over 100 Kls of water per month. Thus, in the existing water regime, the domestic sector is a major contributor to the poor finances of urban water utilities.

### *Pricing City Bus Transport*

#### Status of city bus transport

Public bus transport system in India owes itself to the *Road Transport Corporation Act, 1950*, under which the state governments have set up road transport corporations and entrusted them with the responsibility of providing, securing and promoting ***an efficient, adequate, economical and properly***

are particularly high for race course, hotels etc.

***coordinated system of road transport services***[21]. The road transport corporations serve as ***monopolies***, regulated by the government[22]. The monopoly status of transport corporations which have shown signs of weakening an account of growing public-private partnership in bus transport is justified on the grounds that— (a) only a government monopoly is able to cross-subsidize between profitable and unprofitable routes; (b) a monopoly has the advantage of operating services on the basis of overall economic viability and of spreading the cost of providing services evenly among different users of the system; (c) that it is able to ensure provision of other ancillary amenities in the form of bus stations, bus sheds and the like; and (d) it is able to maintain affordable bus fares. The case for public provision is also proffered on such considerations as the need to maintain safety, environment quality, affordability and some minimum level of public service. It is also argued that unrestricted participation of transport providers could lead to undisciplined and uncoordinated bus operations in urban areas.

Intra-city bus transport in India is limited to large, metro cities. Other cities are served by services which are operated state-wide. In cities which are served by such services, bus transport is the principal means of mobility, particularly for the low-to-middle income population. While estimates of its share in passenger traffic is difficult to establish, it is crudely placed at about 40-45 percent of the total passenger traffic in cities endowed with such services. Its importance can be assessed by the fact that in 1998/99, public bus transport in cities which are served by public transport companies carried over 6610 million passengers, covering some 59300 million kilometer[23]. Moreover, even with rapid motorisation in Indian cities, bus traffic has been increasing exponentially; over the two year period 1996/97 to

21 Road Transport Corporation Act. 1950.

22 The proposal to create monopolies for transport services was initially made by the *Michell-Kirkness Committee*. The Committee observed: we think that the evils attending unlimited competition are now such that the alternative, namely monopoly, would be preferable. In any event, we believe a controlled monopoly will be necessary to encourage enterprise on less popular routes.

23 Central Institute of Road Transport, State Transport Undertakings: Profile and Performance. 1998/99. The survey of the Central Institute covered 13 city-based transport corporations.

1998/99, city bus traffic registered an increase of 42 percent, while the kilometer coverage rose by 34 percent. In 1998/99, the city-based transport corporations had a capital base of Rs. 11,772 million which included the contribution of state governments amounting to Rs. 4,990 million.

On most counts, the city-based bus transport is poorly developed and stands overstretched. The supply side, representing the size of the bus fleet, has expanded at a much slower pace compared to the mobility requirements of fast increasing urban population, and resulted in an increased use of private vehicles and other forms of transport. As will be shown later, the finances of city-based transport corporations are in a shambles and have impacted on the finances of state governments. The much-discussed gains from subsidised bus transport, e.g., reduced congestion, impact on poverty, and environmental impacts have not been realised. Setting bus fares below the cost and meeting the deficit from general taxation on the ground that the average income of public transport users is below the average income is also not substantiated.

**Instruments of charging bus transport**

Several instruments are in position for charging transport infrastructure of which bus transport is one constituent. These comprise both tax and non-tax instruments - excise on fuel and vehicles, motor vehicle license fee/registration fee, driving license fee, wheel tax, street tax, tolls, and fines from traffic violation. In the case of public bus transport, bus fare or bus ticketing is the only pricing instrument available with transport corporations. Bus fares vary with the product, e.g., higher fares for the premium and luxury services and lower for the ordinary services. Bus fares are set to cover the operating cost of service. However, using the principle of price discriminion, bus fares are set in a way these are able to—

- free or subsidised bus travel to certain categories of population which include students (positive externalities from education), police service personnel on grounds that they contribute to public purpose, and often on social considerations (old age groups);

- provide rebate to regular users in the form of monthly or daily passes in order to ensure that they have a stable share in passenger traffic; and

- provide rebate to long distance travel such that long distance travel cost increases but at a decreasing rate.

Examples of bus fares are given in table 9.

**Table 9: Examples of Bus Fares in Selected Cities, 1998/99**

| City | Minimum fare (Rs.) | Distance (km) | Maximum fare (Rs.) | Distance (km) |
|---|---|---|---|---|
| Delhi | 1.00 | <3.00 | 5.00 | >12 |
| Mumbai | 2.00 | <2.5 | 9.50 | >34 |
| Calcutta | 1.50 | <4.00 | | |
| Pune | 2.50 | <2.00 | 12.00 | >24 |

**Cost-price linkages**

With few exceptions, urban transport systems in developing countries stand heavily subsidized, India is no exception. In 1998/99, the city-based public transport services reported that its expenditure exceeded the revenue income by over Rs. 5,406 million; in 1997/99, the same was placed at Rs. 4,235 million. In the aggregate, the revenue income of urban transport corporations was able to meet just about 75 percent-77 percent of the cost incurred on the provision of bus services, leaving a large portion of losses for absorption by the state governments.

The financial performance of individual city-based transport corporation is grim, with all corporations uniformly posting losses. Operating losses of the Delhi

Transport Corporation (DTC) in 1998/99 were reported to be to the order of Rs. 2,073 million, forming close to 37 percent of the combined losses of all city-based transport corporations in the country and accounting for 33.5 percent of its total operating costs. The BEST which has a fleet of 3500 buses covered 80 percent of its operating expenditure, with the losses forming 25 percent of the combined losses of all corporations. Losses are notably high in Calcutta; revenues of the Calcutta bus transport corporation (CSTC) were able to cover only about 38 percent of the total operating costs. Other corporations have also reported losses. A key point to note is that with the exception of Delhi[24], operating losses of other city-based transport corporations have risen over the period 1996/97 to 1998/99. On a per kilometer basis, city transport corporations incurred a loss of Rs. 4.4; in several cities, losses on a per kilometer basis were reported to be as high as Rs. 13.3 in Calcutta, Rs. 5.7 in Delhi and Rs. 5.5 in Mumbai.

**Table 10: Operating Losses of City-Based Transport Corporations**

| City-based Corporations | Operating losses as a % of total operating expenditure | | | Operating losses/Km (Rs) | | |
|---|---|---|---|---|---|---|
| | 1996/97 | 1997/98 | 1998/99 | 1996/97 | 1997/98 | 1998/99 |
| Ahmedabad (AMTS) | 20.1 | 17.9 | 25.0 | 3.1 | 3.0 | 4.7 |
| Mumbai (BEST) | 16.4 | 15.9 | 19.2 | 4.1 | 4.3 | 5.5 |
| Chandigarh (CHNTU) | 0.2 | 8.2 | 8.3 | 0.2 | 0.8 | 0.9 |
| Calcutta (CSTC) | 59.9 | 61.5 | 61.5 | 11.0 | 12.9 | 13.3 |
| Delhi (DTC) | 63.1 | 39.4 | 33.5 | 17.6 | 6.9 | 5.7 |
| Kolahapur (KMTU) | 7.7 | 24.5 | 20.8 | 11.7 | 2.6 | 3.3 |
| Pune (PMT) | 10.3 | 12.7 | 15.4 | 1.5 | 2.0 | 2.5 |
| Chennai Division I | 15.6* | 9.2 | 22.9 | 2.0 | 1.3 | 3.5 |
| Chennai Division II | - | 13.1 | 19.7 | - | 2.0 | 3.1 |
| Urban | 31.0 | 23.4 | 23.4 | 6.0 | 4.4 | 4.4 |

* PTC combines Division I and II

A key factor in the cost structure of a transport corporation is the high component of personnel cost. Personnel costs form 58 percent of the total

[24] The losses of the Delhi Transport Corporation (DTC) were written off in 1996/97 when it was transferred from the central government to the Government of National Capital Territory of Delhi. This explains the decline in their operating losses.

operating expenditure in city-based transport corporations. The share of these costs has risen at a worrisome rate over the period 1996/97 and 1998/99, signaling that the potential price reform effects may be neutralized by the number of staff deployed per bus and rising personnel costs. The staff bus ratio of these corporations ranges between a low of 6.8 persons in Bangalore transport corporation and a high of 12.5 persons for the Calcutta transport which, in comparison with staff-bus ratio observed in private transport companies, is significantly higher. A break-up of staff shows that for each bus, there are, on an average, 3.58 driver, 4.22 conductors, 2.1 maintenance staff, 1.32 administrative support staff and 0.77 miscellaneous staff. These averages are for BEST. There is the general notion that fuel costs which are determined exogenously are an important factor in the financial viability of transport corporations. As a proportion of total operating expenditure, fuel costs account for 15-25 percent of the total operating costs. Although important as a cost component it has shown no abnormality; indeed, over the years, the fuel costs in proportionate terms have shown a marginal decline.

Table 11: Personnel Cost in City-based Transport Corporations

| City-based Corporations | Personnel cost as a % total operating expenditure | | Personnel cost/km (Rs.) | |
|---|---|---|---|---|
| | 1997/98 | 1998/99 | 1997/98 | 1998/99 |
| Ahmedabad (AMTS) | 46.8 | 52.5 | 7.9 | 9.9 |
| Mumbai (BEST) | 49.0 | 75.2 | 13.2 | 21.7 |
| Chandigarh (CHNTU) | 38.8 | 53.1 | 3.9 | 5.9 |
| Calcutta (CSTC) | 50.4 | 54.0 | 10.6 | 11.7 |
| Delhi (DTC) | 57.5 | 50.6 | 10.1 | 8.7 |
| Kolahapur (KMTU) | 45.9 | 47.2 | 6.6 | 7.4 |
| Pune (PMT) | 45.8 | 47.2 | 7.1 | 7.7 |
| Chennai Division I | 47.0 | 52.3 | 6.5 | 8.1 |
| Chennai Division II | 50.0 | 56.3 | 7.5 | 8.7 |
| Urban | 50.4 | 58.9 | 9.4 | 11.0 |

Most city-based transport corporations exempt certain groups of population from payment of bus fares or provide concessional fares. It is often contended that

such concessions add to the financial instability of transport corporations. The limited data indicate that concessions are significant in such corporations as Chennai, Pune, Kolahapur and Ahmedabad, but insignificant in Mumbai and Calcutta. The Chennai corporation reported that such concessions formed 35.8 percent to 43.1 percent of the total operating costs, while the same was 22.8 percent in Pune and 18.9 percent in Ahmedabad. In sum, the problems of city-based transport corporations lie, on the one hand, in the inability to set bus fares that would cover the operating costs and, on the other hand, the inability to contain personnel costs and limit concessional and free travel.

*Issues in Pricing Urban Water and Bus Transport*

Pricing of urban water and city-based bus transport and other urban infrastructual services is a key failing in the country. Apart from their legendary inadequacy, both in quality and quantity, the prices that are charged for them constitute a relatively small proportion of the long-run marginal costs[25], even though this has adverse consequences. First: the institutions responsible for the provision of such services do not receive enough revenues to improve and maintain them adequately, resulting in poor service for those served and reduced incentives for extending water to additional population. Second: cheaper services encourage those with easy access to use them excessively. Third: such policies may adversely affect distribution, as low-income and poor households may pay a higher price than other higher income households.

The existing pricing system and structures are inadequate and unsustainable. Price reform under these circumstances would seem not only desirable but essential. An efficient system of urban infrastructural services is crucial for the economy of cities and national economy. Cities hold the key to economic growth.

25 The Bangalore Water Supply and Sewerage Board has recently estimated the long-run marginal cost of water to be supplied by Cauvery at Rs. 43/kl. As against this, the weighted monthly average tariff is about Rs. 14.

The competitiveness of nations, as the evidence from many developing countries shows, depends on the competitiveness of cities. Price reform of urban water and city bus transport is thus a crucial agenda. The issue is: ***what should prices reform in respect of these two services consist of?***

Past work in India on water and bus transport pricing has been limited and focussed on (a) the adequacy of tariff and bus fares; and (b) issues of leakages. In the case of water, the merits of intermittent supply *versus* a regular supply have been examined alongwith the cost of metering. In bus transport, alternative mechanisms of involving the private sector and mechanism to regulate the private sector operations have been probed. An upward revision of water tariff and bus fares to the point of full cost recovery and an indexation mechanism to allow for general price increase, reduction and possible elimination of leakages, changeover from unmetered to metered supplies in the case of urban water, opening up of the bus transport sector to competition under regulation, and greater efficiency in revenue collection have been highlighted in the agenda for improving the operations of these two services. These are important components in the financial viability of urban water utilities and transport companies.

This paper does not enter into a detailed discussion of what a pricing agenda should consist of; it requires a strong research back-up which is unavailable for this paper. The limited analysis of the finance data of urban water utilities and bus companies undertaken for this paper has, however, discerned several areas which, in a way, point to some directions in developing an agenda for reform. Four areas are underlined here. The first is of primary importance and relates to the relevance and effectiveness of the existing pricing systems and structures. As shown earlier, the pricing structures especially of urban water and to a lesser extent, of transportation infrastructure, are in several parts which are differentiated according to the nature of users, quality, quantity, and several other factors. Apart from the clumsiness of structures which was demonstrated by giving an example from the

schedule of water rates of the Calcutta Municipal Corporation, what tariff rate is appropriate for which part or sub-part, and which charging instrument is appropriate for which part stands neglected in most earlier works on pricing matters. It needs to be emphasized that the existing pricing structures do not make it possible to assess if they can achieve full cost recovery or even partial cost recovery. The pricing structures are obsolete, and need to be replaced with structures that are simple, easy to apply, and transparent.

A second issue which has received surprisingly scant attention is concerned with the tariff base which, as pointed out, is limited, which is narrow, and which is possibly over-exploited. Only 30-40 percent of urban households pay for water and other similar services; and if this proportion is held in other urban areas the likelihood of any price reform to achieve financial sufficiency and economic efficiency would be dim. The proportion of bus fare paying passengers to total number of passengers is not known; in the event of it also being high like the non-tariff paying households, the possible solution would be to work on measures to expand the base in advance of raising water tariff and bus fares. A wider tariff base is a *sin qua non* for the effectiveness of any price reform.

A third issue is linked to the unbalanced revenue base of water utilities, with much of the burden currently being borne by the non-domestic sector. The finance data of urban water utilities has clearly brought out the extent of cross-subsidies that exists in the water sector. It has two adverse impacts: (a) the non-domestic users, mainly the industry and commerce sector, pass on the costs associated with higher tariff to domestic users in the form of higher prices of their products; and (b) lower prices for households mean larger wastage of water. It is imperative for water utilities to move towards a more rational pricing structure which may mean price increases for domestic users and price decreases for the non-domestic sector. A rational structure may yield a positive net benefit as non-domestic users may be expected to pass on the cost savings associated with lower water prices in the form

of lower output prices. Fourth: a necessary condition for establishing efficient prices for goods such as water and bus transport is the complete accounting of their costs. Although this paper has utilised the finance data, there exists uncertainty whether all costs attributable to the two services have been accounted for. Doubts arise on account of the indivisibilities of cost components.

There is an obvious need for price reform in both the water and bus transport sectors. The implications of underpricing are well understood. But more needs to be learned about the structure and distribution of demand, the cost structure, and the magnitude of external costs associated with urban water supply and bus transport. This may mean a perspective that goes beyond pricing of services.

Table A-1

## Plan Outlays on Urban Water Supply and Sanitation (current prices in Rs. billion)

| Plan Period | Total plan outlay | Urban water supply and sanitation | % of total outlay |
|---|---|---|---|
| First Plan (1951-56) | 33.59 | 0.43 | 1.28 |
| Second Plan (1956-61) | 67.69 | 0.44 | 0.65 |
| Third Plan (1961-66) | 85.93 | 0.89 | 1.04 |
| Fourth Plan (1969-74) | 159.32 | 2.82 | 1.77 |
| Fifth Plan (1974-79) | 392.46 | 5.49 | 1.40 |
| Sixth Plan (1980-85) | 976.07 | 17.67 | 1.81 |
| Seventh Plan (1985-90) | 1797.42 | 29.66 | 1.65 |
| Eight Plan (1992-97) | 4334.84 | 59.82 | 1.38 |
| Ninth Plan (1997-01) | 7800.00 | 117.00 | 1.50 |

Source: Planning Commission, New Delhi.