PAPER 3

WATER

TARIFFS & SUBSIDIES IN SOUTH ASIA

Tariff Structures in Six South Asian Cities

***REFORM OF THE WATER AND SANITATION SECTOR** is occurring in many countries, and offers the potential to improve services to all. Of particular concern, however, is the situation of the poor, and reform must be designed so that they receive increased access to affordable services. A key issue in this regard is water pricing, which is one of the main variables affecting the distribution of benefits between different stakeholders. However, experience shows that water pricing, and the subsidies which are often delivered through water tariffs, can be a source of major inefficiencies in the sector.*

While affordability has been one of the prime concerns of those setting tariffs and designing subsidies, there may be significant flaws in many common pricing strategies and subsidy delivery mechanisms. Rather than providing affordable water to the poor, these may in fact be leading to financial unsustainability of utilities, lack of access to services, and inequity. The reform process provides the opportunity to rationalize and reconsider the design of tariff and subsidy structures, and seek new ones which may provide better results.

This series of papers is designed to examine these issues in South Asia. It is designed to present the basics of tariff and subsidy issues, to disseminate recent research findings, and to stimulate debate on the subject.
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Do they target subsidies well?

Picture by Indo-USAID FIRE-D Project

Moves towards urban water sector reform have brought with them a great deal of debate about tariff levels, and the issue of affordability for the poor. However, tariff structure can be as important as tariff level from the viewpoint of the poor. This paper examines the tariff structure and billing patterns in six large South Asian cities (Dhaka in Bangladesh, Kathmandu in Nepal, Colombo in Sri Lanka and Chennai, Hyderabad and Bangalore in India) to determine the extent to which their tariff structures effectively target subsidies and benefit the poor. While these cities are not necessarily representative of the region as a whole, some interesting lessons can be drawn from the data available from them – the paper concludes that poorly designed tariff structures have resulted in ineffective targeting, resulting in subsidies intended for the poor flowing to the better off, and even resulting in the poor paying more for water than their richer neighbors.

Water and Sanitation Program
PPIAF
PUBLIC-PRIVATE INFRASTRUCTURE ADVISORY FACILITY
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TARIFF STRUCTURES IN SIX SOUTH ASIAN CITIES – DO THEY TARGET SUBSIDIES WELL?

Tariff structures in the surveyed cities – subsidies are an integral part of tariff design

The cities surveyed use a combination of metered tariffs, a non-volumetric flat rate tariff or a non-volumetric water tax. In cities where a flat rate or non-volumetric tariffs are applied the rate is usually common to all households. Where a water tax is levied (in Chennai as a separate water tax, in other cities as part of property tax), the amount of the tax is linked to the physical characteristics of the property, usually through a calculation of the annual rental value of the property.

Table 1 presents some of the key features of each of the tariff structures. The tariff tables themselves are found in Annex 1.

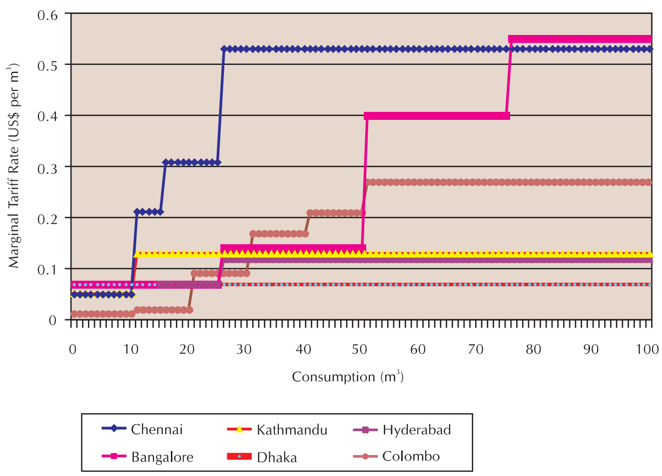
The tariff structures for metered domestic water in the surveyed cities are presented graphically in *Figure 1*. (The figure shows the price per cubic meter for each level of consumption, but does not include minimum charges.) Tariff structures in several of the surveyed cities are designed to operate a cross subsidy between high volume-consuming households and low volume-consuming households. In the case of Chennai and Bangalore there is also a cross subsidy between non-domestic (industrial and commercial users) and domestic consumers. However, in these cities this is having the effect of causing the large industrial users to exit the system; in Bangalore, a 1998 KPMG study found that industries had steadily reduced their dependence on

Table 1: Key features of the tariff structure in surveyed cities (data as of 2001)

	Chennai	Bangalore	Hyderabad	Kathmandu	Colombo	Dhaka
Service Area (km^2)	174	368	200	50	110	360
Population (Millions)	5.7	5.3	4.7	1.1	1.0	9.5
System used for charging for domestic water:						
Measured	Yes	Yes	Yes	Yes	Yes	Yes
Unmeasured	Yes	No	Yes	Yes	Yes	Yes
Water Tax	Yes	No	No	No	No	No
Level of metering – Domestic connections	Less than 5%	100%	90%	80%	97%	75%
% of installed meters that are working[1]	About 60%	Almost 100%	About 40%	About 60%	Not Available	Not Available
Number of Blocks in IBT structure	4	5	4	2	6	N.A.
Size of Initial Block (m^3)	10	25	15	10	10	N.A.
Cost of Highest Block (US$/m^3)	0.53	0.70	0.29	0.12	0.27	0.07
Minimum Payment (US$ per month)	1.06	1.38	1.17	0.53	0.61	none

[1]There are no hard data to substantiate these estimates, which are based on discussions with utility managers. It is hypothesized that these numbers are generally overestimates.

Figure 1: Domestic Tariff Structures (2001)



utility-supplied water as other sources are cheaper, and in Chennai, industries have invested in their own treatment plants to recycle used water[2].

Five of the cities use increasing block tariffs (IBTs) to charge for all or some of the metered consumption. This is not surprising, as IBTs are a common tariff structure in South Asia. The 1997 Asian Development Bank Water Utilities Databook reports that 20 out of 30 utilities surveyed in Asia use IBTs. A 2001 study of 260 Indian cities by the National Institute of Urban Affairs in India found 38 use IBTs; this included all the urban centers surveyed in the states of Rajasthan and Kerala (where an IBT is adopted statewide), and eight of the 23 metro cities in the country. In total, it is estimated that about 38% of the population of urban India live in cities which use IBTs[3].

One of the most commonly stated reasons for the use of an IBT is the need to provide water to the poor by charging affordable rates for a volume designed to cover basic needs; this is the amount of the first block and is priced at a very low level, usually below the cost of production. (In fact, in many South Asian cities, the lowest block historically had a zero tariff, so that up to a certain volume, water was free. In Kerala [South India] the first slab was free in the 1970s and 1980s, and in Coimbatore in Tamil Nadu, South India, the utility still does not charge for the lowest block[4].) Higher blocks are then charged at a rate which both generates a cross subsidy and provides an incentive to large volume users to conserve water.

While all the surveyed cities charged for the lowest block of the IBT, the cost of water supplied is significantly higher than the price of the lowest block, and in all cases was also more than the second block *(see Table 2 on page 4)*. Dhaka does not have an IBT but levies a uniform volumetric rate, which is also below the cost of supply.

Where an IBT exists, the size of first block varies widely, but in every case is well above what would be considered a true 'lifeline' block to meet basic human needs.

It is clear from the data presented in *Table 1* that, where an IBT exists, the size of first block varies widely, but in every case is well above what would be considered a true 'lifeline' block to meet basic human needs. For instance, a family of five using 40 liters per capita per day for 30 days requires 6 m^3 in a month; this is the 'lifeline' block used, for instance, in South Africa. All first blocks in the surveyed cities are greater than this, and in the case of Bangalore it is more than four times this amount.

[2]Industries may also be interested in establishing a more reliable supply, as well as a less expensive one.
[3]Foster, Vivien (2001) The Design of Pro-poor Subsidies in Urban Water and Sanitation Services in India: Maximizing the Social Dividends of Reform.
[4]NIUA 2001; Urban Water Supply and Sanitation: Status and Investment Implications (Usha P. Raghupathi, Study Coordinator)

Table 2: Cost of production and tariffs in surveyed cities (US$ per m^3, 2001)

	Chennai	Bangalore	Hyderabad	Kathmandu	Dhaka	Colombo
Production cost of water* (estimates)	0.27	0.34	0.26	0.17	0.08	Not available
Lowest domestic tariff block	0.05	0.07	0.07	0.05	0.07	0.01
Second lowest domestic tariff block	0.21	0.14	0.07	0.12	0.07	0.02

**Cost of production has been estimated as operation and maintenance costs, all overheads and capital charges (capital charges in Bangalore, Dhaka and Kathmandu relate to debt service charges and in Chennai, Hyderabad and Colombo capital charges relate to depreciation). It must be noted that the production cost figures are based on historical data and do not take into account the large future investment required in most of these cities, which will mean that long-run marginal costs will be much higher.*

The number of blocks in the tariff structure also varies between cities. A large number of blocks makes billing complicated and opaque, and it is difficult for users to know what block they are being charged in and modify their consumption accordingly.

The generally low level of metering, and the substantial numbers of inoperational meters suggests that while IBTs may be 'on the books' of utilities, they are often not applied. Consumers often do not have any incentive to keep their meters operational, as without the meter they are charged either a flat rate or on the basis of past average consumption, which is often less than actual consumption.

Picture by Indo-USAID FIRE-D Project

Billings vs. costs – subsidies received often increase with consumption

Figures 2 to 6 graphically present the monthly water bill paid by metered households in the survey cities in the consumption range of 0 m^3 to 100 m^3, and the cost incurred by the respective utilities for supply (assuming a linear relationship between volume supplied and cost). (Colombo has been excluded as average cost data were not available.) These figures show that *all* households in Hyderabad, Dhaka, Bangalore and Kathmandu are subsidized at *all* levels of consumption in the range. In Hyderabad, Kathmandu and Dhaka, the amount of the subsidy *increases* with volume consumed (the distance between the two lines gets progressively larger). In Bangalore, households consuming between 40 and 60 m^3 get the most subsidy, while others, both those consuming less than 40 m^3 and those consuming more than 60 m^3, get less subsidy. In Chennai, only consumption below 30 m^3 is subsidized, and thereafter the household pays more than the cost of production, with the difference between billing and cost progressively increasing. (However it should be noted that less than 5% of domestic connections in Chennai are metered, so most customers in that city are not billed under this structure. In addition, few domestic

Figure 2: Water Bills & Costs-Bangalore

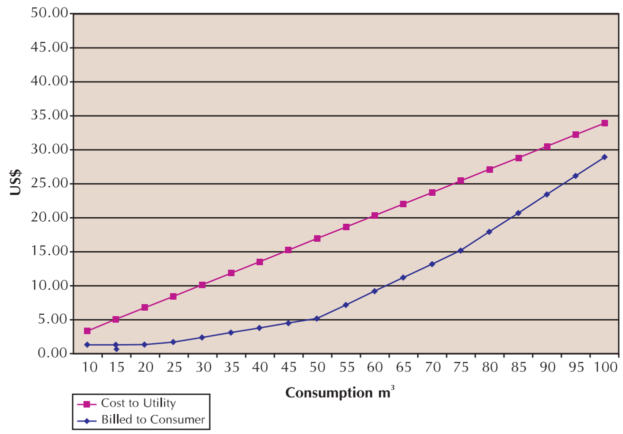


Figure 3: Water Bills & Costs-Hyderabad

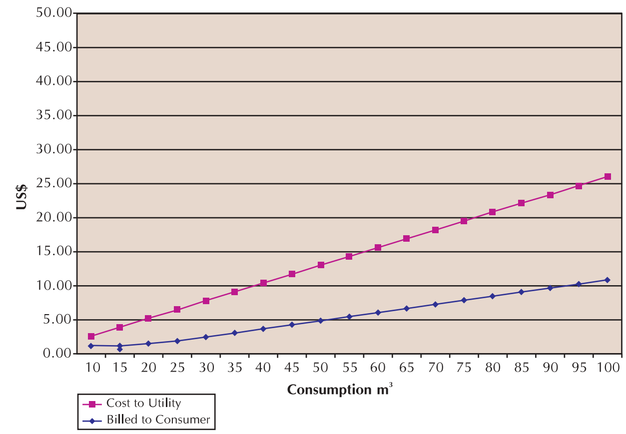


Figure 4: Water Bills & Costs-Kathmandu

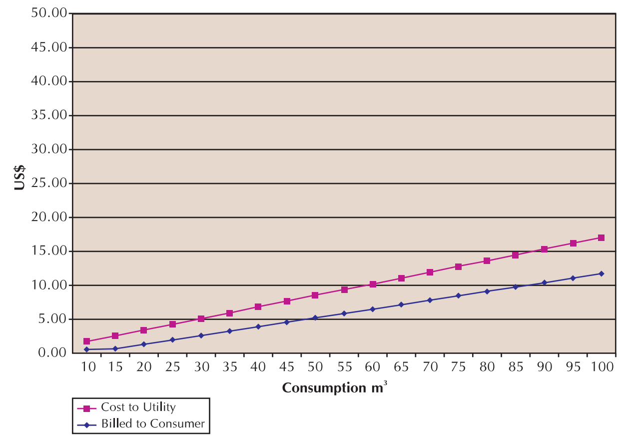


Figure 5: Water Bills & Costs-Dhaka

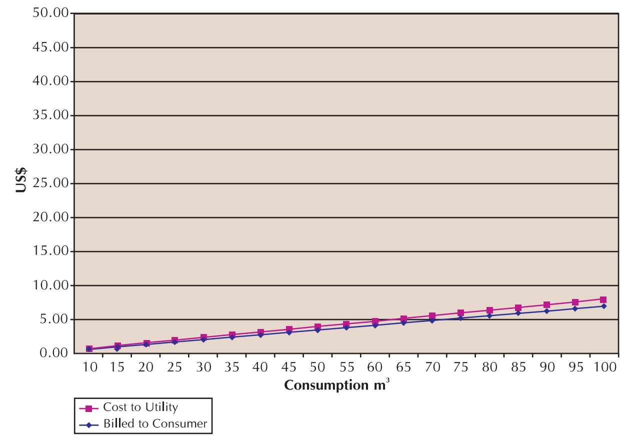
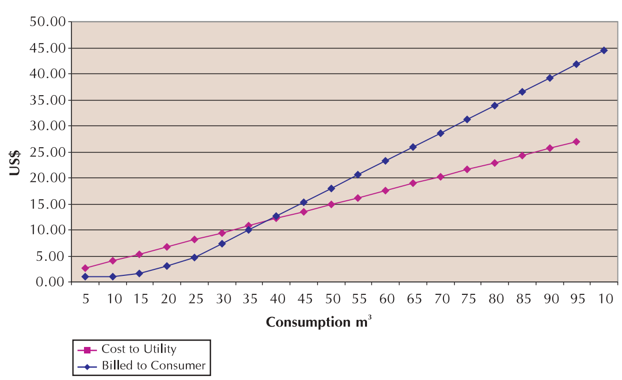


Figure 6: Water Bills & Costs-Chennai

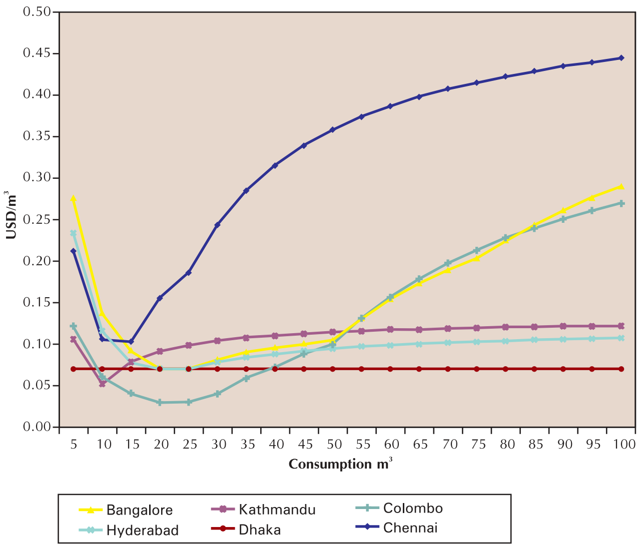


customers would use more than 30 m³ per month, so in practice cost recovery would seldom occur.)

Effective volumetric rates are high for low volume consumers

Figure 7 presents the effective per cubic meter water rates for metered households at different levels of monthly consumption. Due to the minimum monthly charges levied in many cities, the effective volumetric rate below 10 m³ is substantially higher than it is at much larger volumes of consumption; for instance in Bangalore a family consuming 5 m³ and billed the minimum monthly charge of US$1.40 is paying US$0.28 per cubic meter, a rate only matched by a consumer using 95 m³ or more. This is unfair to those households who use small amounts of water (assumed, according to the logic of the IBT, to be chiefly poor households, though there is little evidence to support this). A tariff structure with a minimum monthly charge for a fixed amount of water does not allow households the option of limiting consumption to reduce costs. In some cities, for example Bangalore, the initial block is so big (25 m³) that truly poor households cannot possibly be using all the subsidized water in this block. Those consumers who have high water consumption, and who do use the full block, are thus getting more subsidy.

Figure 7: Effective water rates paid by domestic consumers



Flat rate tariffs suffer from the same problem of high effective volumetric rates: a poor family using less water than a rich family, but paying the same flat rate, is paying a higher price per cubic meter.

Almost everyone who is connected to the network gets a subsidy

If the cities surveyed for this paper are any indication, there is a significant lack of information in South Asian cities relating to the profile of consumers in each tariff block, the volume of consumption in each tariff block, the number of people using shared connections, and the number of people unconnected to the water network. Data were obtained for two of the cities[5] *(see Tables 4 & 5)*. (However, it should be noted that these data are estimates made on the basis of available data extrapolated to the whole utility or to the whole year.) Domestic consumers form the single largest customer block for BWSSB, and account for nearly 52% of total

Table 3: Domestic consumption, tariff and cost recovery in each tariff block – Bangalore Water Supply and Sewerage Board (BWSSB), 2001

Tariff Blocks (m³)	No. of connections billed within the block	% of connections	Daily qty. sold (MLD)	% of daily quantity sold (MLD)	Tariff (US$/m³)	Cost recovery (Cost of production = US$0.34/m³)
0-25	171,800	65.7%	72	36.5%	0.07	21%
25-50	72,020	27.5%	81	41.1%	0.14	41%
50-75	14,314	5.5%	28	14.2%	0.40	118%
75-100	2,525	1.0%	6	3.0%	0.55	162%
>100	822	0.3%	10	5.1%	0.70	206%
Total	**261,481**		**197**			

[5]*Since the research for this paper, Bangalore has made major adjustments to tariff levels within the tariff blocks. These data relate to the situation in 2001.*

consumption. However, they contribute only 39% of the revenues of BWSSB.

Customers with consumption levels of 0 to 25 m³ and 25 to 50 m³ account for about 78% of the total domestic consumption. However, this category accounts for less than 15% of the total revenues (domestic plus industrial). This is because the tariffs charged to these consumers are significantly below the estimated cost of production[6] (21% of cost in the first block, and 41% in the second block).

Table 4 shows that more than 65% of consumers in Hyderabad are billed in the first block, which is clearly more than the proportion of the poor in the city (estimates put the percentage of the urban population which is poor at 30%[7]). In total, over 93% of domestic consumers are billed in the first two blocks, both of which are subsidized. The amount of billings in the other three blocks in which prices are higher than costs does not come close to offsetting the subsidies provided through the first two blocks.

As in case of Bangalore, in Hyderabad domestic connections also account for the largest proportion of all connections (about 94% - 330,128 out of 354,209); and 70% of domestic connections are billed in the first block. In fact, only the last block of the tariff, for consumption of over 500 m³ a month which few, if any, domestic users could attain, is not subsidized, so effectively all domestic customers receive a subsidy.

Picture by Indo-USAID FIRE-D Project

Few of the poor are connected anyway, and connection costs pose a barrier

An analysis of the 'connection gap' in a few of the cities reveals that the current number of connections cannot be serving all the households in the service area

Table 4: Domestic consumption, tariff and cost recovery in each tariff block – Hyderabad Metro Water Supply and Sewerage Board (HMWSSB), 2001

Tariff Blocks (m³)	No. of connections billed within the block	% of connections	Daily qty. sold (MLD)	% of daily quantity sold (MLD)	Tariff (US$/m³)	Cost recovery (Cost of production = US$0.26/m³)
0-15	231,503	70%	86	51%	Flat rate 1.17 per month	Not possible to estimate
15-25	65,025	20%	42	25%	0.07	30%
Above 25*	33,600	10%	41	24%	0.12	48%
Total	**330,128**	**100%**	**169**			

**There is a fourth block (over 500 m³) but it is assumed that no domestic consumers fall into this block*

[6]Operation, maintenance, depreciation and current debt service only – does not include future investment costs.
[7]World Bank (2000) India, Policies to Reduce Poverty and Accelerate Sustainable Development, Poverty Reduction and Economic Management Unit, South Asia Region, The World Bank, Washington, D.C.

with a private connection, even allowing for the fact that some connections serve multi-unit dwellings.

Households which do not have connections are unlikely to benefit from a subsidy delivered through the water tariff, especially through an IBT. If these households use network water at all, it may well be through shared connections at which the volume used pushes consumption into the higher blocks, or from vendors who have to add their own overheads to the retail price of the water.

In some of the water utilities, the area of the plot on which the house stands is the criteria used for calculating water connection charges (for example, Hyderabad and Chennai, for which data are presented in Tables 6 and 7). In the case of Hyderabad there is clearly an attempt to ensure affordable connection charge for houses on small plots, which we can assume is targeted towards the poor. In Chennai, however, the minimum official charge is US$41, which would present a significant barrier for a poor household.

In practice, the actual connection costs incurred by a household are far higher than the figures indicated in the tables above, as households must pay for the pipe costs to connect to the nearest main, re-establishment of the road surface if it is cut, and, in some cases, buying the meter. In many of the survey cities, there are other informal payments that need to be made to speed the process of getting connections.

For example, in Kathmandu, the connection costs are currently made up of the meter (NPR 1,000) and meter box (NPR 700), which must both be purchased

Picture by Kathleen Graham-Harrison

by the householder; a deposit of NPR 1,000 (which is in practice never recovered by the user and at the current lowest tariff block level represents 25 months of consumption); and pipe costs of NPR 1,600 for the first 100 feet and NPR 16.5 per foot thereafter. The total cost of a connection within 100 feet of the mains is thus NPR 4,300 (US$57). In practice, however, the connection costs are much higher in areas where the poor live as they tend to be further from the mains. A connection at 500 feet, for instance, would cost the user NPR 10,900 (US$145). A recent study of slum and squatter settlements in Kathmandu found that connection costs were historically in the order of NPR 11,000 to 15,000 (US$147 to $200).

It is interesting to view this combination of low connection rates and heavily subsidized tariffs in the light of the fact that many South Asian cities are contemplating private sector participation. Planners should bear in mind that requiring a private operator to

Table 5: Connection gap in three surveyed cities (2001)

	Kathmandu	Hyderabad	Bangalore
Population in service area (millions)	1.1	4.7	5.3
Households in service area, assuming six persons per household	183,333	783,333	883,333
No. of domestic connections	101,000	330,128	261,481
Estimated 'Connection Gap'	**82,333**	**453,205**	**621,852**

Table 6: HMWSSB connection charges for water supply (2001)

Plot area in m^2	Water connection charges in US$ for a 15 mm connection	Water connection charges in US$ for a 20 mm connection
1 to 100	19.15	234.04
101 to 200	74.47	234.04
201 to 300	117.02	234.04
301 to 400	234.04	425.53
401 to 500	234.04	425.53
Above 500	340.43	553.19

Table 7: CMWSSB connection charges for water supply (2001)

Plot area in m^2	Water connection charges in US$ for a 20 mm connection
Independent house - up to 200 m^2	41.06
If it exceeds 200 m^2	53.80

provide subsidized water to low-volume-consuming poor customers can pose difficulties, depending on how the contract is structured. Under a concession, for instance, the operator must pay for all investment costs, and relies on customer tariffs for revenue. In this situation, connecting and serving customers who cost more to serve than the revenues they bring in will be unattractive, unless other incentives or obligations are added to the contract. Under some other contract types, such as some leases, this is not a problem, as the operator does not make his revenues directly from customer tariffs; however in these cases investment funds for expansion and new connections must usually come from government.

Picture by Indo-USAID FIRE-D Project

Tariffs are often designed in an information vacuum

Interviews held with utility managers in the six cities as part of the background research for this paper revealed that they believe that an IBT is a good tariff structure, serves the poor well, is a politically acceptable solution, helps to conserve water and should be a key aspect of any future tariff restructuring. However, the interviews also revealed that these attitudes are not based on factual information, and five out of six utility managers interviewed admitted that they either do not have appropriate information to draw conclusions on the effectiveness of IBTs or have not attempted to analyze existing information to draw such conclusions. For example, in Chennai the utility manager said, *"... our metered connections are relatively limited; we do not have adequate data on slabwise consumption based on metered readings. We are planning to carry out continuous surveys to determine several bits of* *information about consumers and consumption patterns*." Bangalore is perhaps one example where a fair amount of block-wise consumption data are available, but the information has not been analyzed to assess the effectiveness of the structure of the IBT[8].

Discussions with utility managers revealed that, in their opinion, households that are not connected to the piped systems within the service areas of the system are invariably unconnected due to poverty – a connection is simply unaffordable for them. This clearly implies that the existence of an IBT and a subsidized first block is of little benefit to many poor households.

Due to an absence of information on shared connections, it is difficult to determine if poor households actually fall in the second or higher slabs of consumption, and thus are negatively impacted by the IBT structure. In the six cities studied, the utility managers generally believed that poor people do use shared connections, but were not able to quantify the extent to which this happens. For example, in Colombo the utility manager said, "*.... we are aware that several households, particularly belonging to Islamic communities, share their water connection; but unfortunately, we have not surveyed the profile of users of shared connections nor have we estimated the quantum of water they consume. It is our perception that they fall under a second tariff slab because of larger quantities of consumption.*"

Utility managers admitted they either do not have appropriate information to draw conclusions on the effectiveness of IBTs or have not attempted to analyze existing information.

Picture by Kathleen Graham-Harrison

Public standposts pose pricing challenges

The use of public standposts to distribute water is very common in South Asian cities. Bangalore has over 7,000 standposts, Hyderabad over 5,000 and Kathmandu over 1,200. These public standposts are essentially unmetered public connections and users are not charged for the water they consume. In many cities the municipality or city corporation is responsible for paying the utility for the water consumed at standpost (often based on an estimate or a once-yearly measurement of consumption extrapolated to the whole year), but in practice this rarely happens.

Introduction of metering at standposts and levying of user charges could help both to achieve cost

[8]It should be noted that since the research for this paper was carried out, Bangalore has piloted shared connections in slums with an alternate tariff structure.

recovery and water conservation, but clearly an IBT could not be applied to these high-consumption connections. It may be possible to design a suitable tariff for standposts, but then the issue becomes how to collect this tariff, and what management options exist.

There are important implications for standposts which must be borne in mind in the case that a private operator takes over management of the utility's operations under a lease or concession contract. The operator is unlikely to receive any revenue for these under the current arrangements, which would impact upon a lease or concession operator's profitability. While it would be politically unacceptable for the operator to close them down without offering alternatives, there is an incentive for the operator to refuse to install new ones, to limit water supply to existing free ones, and to find ways to ensure that the standposts, if they are to continue providing water, also provide revenue.

Water supply tax is a part of the property tax; Chennai Metro Water Board collects water and sewerage taxes directly, amounting to 7% of assessed rental value. (The Chennai Municipal Corporation also collects taxes to finance services such as lighting, roads, and health; these amount to 23% of assessed rental value, so the total tax bill is 30%.)

The estimated cost of production is Rs.13/m^3 (US$0.27/ m^3); Cost of production = O&M costs and depreciation.

The estimated cost of production is around Tk 4.32/ per cubic meter (US$0.08/ per cubic meter). Cost of production = O&M costs and debt service charges. No minimum charge.

'Annual valuation of holdings' is based on rental value, not market value. These values are supposed to be updated every five years, but have not been updated since 1990.

Conclusion

All the six cities profiled here use tariffs to deliver consumption subsidies, five of them using IBTs with heavily subsidized first blocks. In most of the cities the production cost of water is much higher than the amounts billed to most consumers, so that almost everyone gets a subsidy, regardless of need. The subsidies increase with consumption, allowing households who consume more water to benefit more than those consuming less. Households which use small volumes of water also pay high volumetric rates due to fixed charges for the first block of consumption in IBTs, minimum monthly charges or flat monthly rates. IBTs also cause inequities for people using shared connections, and would be inappropriate for metered public standposts at which cost recovery was practiced.

Furthermore, we can infer from the data on the number of connections that many of the poor in the cities studied are not connected to the network, barring them from benefiting from these consumption subsidies. While some cities have tried to introduce low connection charges for the poor, in fact poorly developed tertiary networks and the existence of petty corruption mean that the costs of getting connected prevent many poor people from becoming customers of the utility. In this situation, direct connection subsidies and assisting the poor to connect may be more effective than consumption subsidies.

The wide variation in tariff structures and levels, and the dearth of information on consumers, suggest that cities in the region have suffered from the lack of a systematic and informed approach to tariff-setting. However, the advent of widespread water sector reform may provide an opportunity for utilities to rethink their approaches to service to the poor and the delivery of consumption subsidies through water tariffs.

ANNEX 1

Tariff Structures from Surveyed Cities (2001)

Bangalore

Category	Qty. of water per month	Rate (Rs.)/m^3	Rate (US$)/m^3
Domestic *(Minimum is limited to Rs.65 (US$1.40))*	Up to 25 m^3	3.50	0.07
	25.1 to 50 m^3	7.00	0.14
	50.1 to 75 m^3	19.00	0.40
	75.1 to 100 m^3	26.00	0.55
	Above 100 m^3	33.00	0.70

Cost of production is US$0.34/ m^3; Cost of production = O&M costs and debt service charges

Chennai

Category	Qty. of water per month	Rate (Rs.)/m^3	Rate/m^3 (US$)	Flat rate (Incl. sewerage charges)
Domestic	Up to 10 m^3	2.5	0.05	Rs. 50 (US$1.06) per month. This is also the minimum rate charged by the utility
	10 to 15 m^3	10	0.21	
	15 to 25	15	0.31	
	Above 25 m^3	25	0.53	

Sewerage charges are 25% on water supply charges wherever sewer connections are provided

Hyderabad

Category - domestic supplies	Consumption slab in m^3 per month	Rate/m^3	Rate US$/m^3
Individual Connections			
a) Unmetered Connections	Flat rate per month	Rs.140.00	2.97
b) Metered Connections	Up to 15 m^3	Minimum charge*	Minimum charge*
	Above 15 m^3 - 25 m^3	Rs.3.75	0.07
	Above 25 up to 500 m^3	Rs.6.00	0.12
	Above 500	Rs.14.00	0.29

The estimated cost of production Rs.12-13/ m^3 (US$0.27/ m^3); Cost of production = O&M costs and depreciation
** Minimum charge per month : Rs.55 (US$1.17)*

Kathmandu

Monthly water tariff of tap with meter within valley (Domestic)

Size of tap (Inch)	Quantity of free/ discounted water (m^3)	Minimum tariff (NPR)	Minimum tariff (US$)	Tariff for every additional m^3 of water over discounted water (NPR)	Tariff for every additional m^3 of water over discounted water (US$)
½	10	40	0.53	9.70	0.12
¾	27	590	7.68	21.20	0.28
1	50	1,030	13.73	21.80	0.29
1½	140	2,883	38.44	22.15	0.30
2	235	4,840	64.53	22.75	0.30
3	700	14,415	192.20	23.35	0.31
4	1,400	28,830	384.40	24.00	0.32

Monthly water tariff of tap without meter within valley (Consumer)

Size of tap (Inch)	Main tap tariff (NPR)	Main tap tariff (US$)	Branch tap tariff (NPR)	Branch tap tariff (US$)
½	176.50	2.35	59.00	0.79
¾	1,323.60	17.64	442.00	5.89
1	2,206.00	29.41	736.00	9.81
1½	5,883.00	78.44	1,956.00	26.08
2	9,707.00	129.43	3,236.00	43.15
3	28,827.00	384.36	9,604.00	128.05
4	57,654.00	768.72	19,561.00	260.81

The estimated cost of production NPR.12.75/m^3 (US$0.17/$m^3$)
Cost of production = O&M costs and debt service charges. Most domestic users are on ½ " connections.

Dhaka

Category	Rates	
	Tk/ per cubic meter	US$/per cubic meter
Metered Domestic	4.30	0.07
Non-metered Domestic	27.80% per annum on annual valuation of holdings	

Colombo

Category	Qty. of water per month (m^3)	Rate/m^3 (SLRs)	Rate/m^3 (US$)	Flat rate
Domestic	0-10	1.20	0.01	SLRs. 240
	10-20	2.00	0.02	(US$2.67)
	20-30	7.70	0.09	per month
	30-40	15.00	0.17	
	40-50	19.20	0.21	
	Over 50	40.00	0.44	

Cost of production : Not available. Minimum charges per month : SLR 55 (US$0.61)

TARIFF STRUCTURES IN SIX SOUTH ASIAN CITIES – DO THEY TARGET SUBSIDIES WELL?

References:

Boland John J. and Whittington Dale; *Water Tariff Design in Developing Countries: Disadvantages of Increasing Block Tariffs (IBTs) and Advantages of Uniform Price with Rebate (UPR) Designs*

Foster, Vivien (2001) *The Design of Pro-Poor Subsidies in Urban Water and Sanitation Services in India: Maximizing the Social Dividends of Reform*

National Institute for Urban Affairs (NIUA) 2001; *Urban Water Supply and Sanitation: Status and Investment Implications* (Usha P. Raghupathi, Study Coordinator), Delhi

KPMG; June 1998; *Revision of Water Tariff (Bangalore Water Supply and Sewerage Board)*

KPMG; May 2001; *Issues Paper: Tariffs and Subsidies* (for USAID and WSP-SA)

McIntosh, Arthur C. and Yniguez, Cesar E.; 1997; *Second Water Utilities Data Book-Asian & Pacific Region,* Asian Development Bank, Manila

Lumanti, NEWAH, WaterAid and WSP-SA; July 2000; *The Water Supply and Sanitation Situation of the Urban Poor in the Kathmandu Valley - Results of a Research Study*

Enayetullah, Iftekhar Waste Concern, Dhaka, August 2001, personal communication

Conversion Rates used in this document:

1 US$	*1 US$*	*1 US$*	*1 US$*
INR = 47	Taka = 54	NPR = 75	SLR = 90

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