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Sector Profile ■

Table 1: SUMMARY OF RESULTS FOR 18 UTILITIES

	Chengdu	Colombo	Delhi	Dhaka	Ho Chi Minh	Hong Kong	Jakarta	Karachi	Kathmandu	Average (18)
Production/Population (m³/d/c)	0.38	0.48	0.30	0.22	0.37	0.38	0.27	0.34	0.11	0.40
Water Coverage (%)	83	69	69	72	84	100	51	58	83	79
Sewerage Access (%)	85	33	60	30	12	100	2	50	22	51
24-hour Availability (%)	100	60	1	0	75	100	92	0	0	67
Consumption/Capita (l/c/d)	138	119	110	115	167	187	77	197	68	165
Nonrevenue Water (%)	18	55	53	40	38	25	51	30	37	34
Average Tariff (US\$)	0.14	0.22	0.07	0.06	0.18	0.35	0.29	0.07	0.09	0.24
Connections Metered (%)	98.5	70.0	32.7	50.7	100.0	100.0	98.8	0.3	38.0	76.5
Working Ratio	0.5	0.52	2.45	0.89	1.13	2.41	0.8	1	1.04	1.05
Staff/1,000 Connections (ratio)	33.8	7.6	19.9	11.6	3.5	2.3	5.3	6.4	15.2	8.3
New Connection Fee (US\$)	1*	129	2	29	53	146	13	3	21	212
Revenue Collection Efficiency (%)	100	94.8	70.4	82	100	99.8	98	54	70	87.7
Capital Expenditure/Connection (US\$)	176	8	78	140	72	115	47	7	17	88

* Connection fee in Chengdu is in US\$ per square meter of floor area.

	Kuala Lumpur	Manila	Osaka	Phnom Penh	Seoul	Shanghai	Tashkent	Ulaanbaatar	Vientiane	Average (18)
Production/Population (m³/d/c)	0.44	0.56	0.53	0.23	0.39	0.47	1.04	0.44	0.27	0.40
Water Coverage (%)	100	58	100	84	100	100	99	49	63	79
Sewerage Access (%)	80	7	100	41	98	68	85	48	0	51
24-hour Availability (%)	100	88	100	100	100	100	100	48	50	67
Consumption/Capita (l/c/d)	132	127	263	104	205	251	328	278	110	165
Nonrevenue Water (%)	43	62	7	26	25	17	27	36	28	34
Average Tariff (US\$)	0.30	0.14	1.37	0.24	0.49	0.10	0.01	0.19	0.04	0.24
Connections Metered (%)	100.0	100.0	100.0	100.0	99.8	100.0	8.3	80.3	100.0	76.5
Working Ratio	1.34	1.22	1.08	0.46	0.57	1.08	0.47	0.83	1.1	1.05
Staff/1,000 Connections (ratio)	1.4	4.4	1.7	5.4	1.4	5.7	5.6	823.3	10.5	8.3
New Connection Fee (US\$)	13	107	1506	87	850	83	32	454	74	212
Revenue Collection Efficiency (%)	95	97.3	87.2	99.7	93	93.5	76.8	90	76.8	87.7
Capital Expenditure/Connection (US\$)	173	18	224	203	100	38	3	1,978	47	88

COMMENT AND ANALYSIS BY CITY

Chengdu

This utility provides consumer satisfaction and sound financial management although coverage for both water supply (83%) and sewerage (85%) could be improved. Small-scale water providers serve about 15% of the population. While there is excess water supply capacity at present, water pollution and reduction in forest cover threaten future water sources for the city. Human resources management (33.8 staff/1,000 connections) needs improvement.

Colombo

Management weaknesses are reflected in low coverage (69% for water supply; 33% for sewerage), 24-hour supply to only 60% of the population, and high NRW (55%). Water resources management could be improved by addressing NRW, low rate of connections metered (70%), and phasing out of standpipes in the tenement gardens. Working ratio is good at 0.52 although collection efficiency (94.8%) can be improved.

Delhi

Consumer satisfaction is low with only 69% of the population provided with water supply and 60% with access to sewerage; only about 1% of connections enjoy 24-hour supply. Water resources management could be improved by reducing NRW (53%) and increasing the low rate of consumer metering (32.7%). Working ratio is high (2.54) which can be addressed by increasing revenue collection efficiency (70.4%) and increasing tariff which has a very low average of US\$0.07/m³. Human resources management (19.9 staff/1,000 connections) also needs improvement.

Dhaka

Consumer satisfaction improvements in coverage (72% for water supply; 30% for sewerage) and water availability (none with 24-hour supply) are needed. While it is efficient in water resources (0.22 m³/d/c) and low consumption (115 l/c/d), the utility needs to reduce NRW (40%) and improve metering (50.7%). Working ratio (0.89) is reasonable but grant financing (75%) needs to be addressed and revenue collection efficiency (82%) further improved. Staff/1,000 connections (11.6) could also be improved.

Ho Chi Minh City

Water resources is relatively well managed with low water production/population (0.37 m³/d/c) needed, manageable NRW (38%) and 100% metering. Consumer satisfaction could be improved by increasing water supply coverage (84%) and extending water availability (75%) to more consumers. Sewerage access is very low (12%) although this not the responsibility of the utility. While collection efficiency is 100%, working ratio (1.13) is weak. Human resources management is strong with 3.5 staff/1,000 connections.

Hong Kong

Consumer satisfaction is provided by this utility with 100% water coverage and 24-hour water supply to all consumers. Water resources is well managed with 25% NRW and 100% metering of connections although consumption (187 l/c/d) could be reduced. Working ratio (2.41) is very high despite high average tariff (US\$0.35/m³) and 100% grant financing. Human resources are well managed with 2.3 staff/1,000 connections.

Jakarta

While private sector participation (concessions) which was introduced in 1998 improved the utility's overall performance, coverage (51% for water supply; 2% for sewerage) remains low and consumption (77 l/c/d) is also low although 24-hour water supply is available to 92% of the served population. High NRW (51%) needs to be addressed. Financial management is sound with no grant financing, working ratio of 0.8 and collection efficiency of 98%. Human resources management is strong with 5.3 staff per 1,000 connections.

Karachi

The utility provides low consumer satisfaction with coverage of only 58% for water supply and none of the served areas enjoying 24-hour supply. Only half of the population in the service area has access to sewerage. There is very little metering (0.3%) with flat rate tariff based on floor areas of residences resulting in high consumption (197 l/c/d). Collection efficiency (54%) needs to be improved as well as working ratio (1.0) and total reliance on grant financing. On the plus side, NRW is 30% and staff/1,000 connections ratio is 6.4.

Kathmandu

The utility provides water supply to 83% of the population but none of them enjoy 24-hour supply. Sewerage access is very low (22%). Consumption is very low (68 l/c/d) pointing to a resource constraint (0.11 m³/d/c). While NRW is a reasonable 37%, metering needs to be increased from only 38% of connections metered in 2001. Financial management needs improvement in collection efficiency (70%) and working ratio (1.04). Human resources management is also weak with 15.2 staff/1,000 connections.

Kuala Lumpur

This is a well performing utility in terms of providing consumer satisfaction and water and human resource management. It provides 24-hour water supply to all its population and sewerage access to 80%. All connections are metered but NRW (43%) needs to be reduced further. Capital investments are funded though tariff and collection efficiency is 95%, but working ratio (1.34) needs to be improved. It manages its human resources very well with a staff/1,000 connections ratio of 1.4.

Manila

Privatization of the utility in 1997 has not resulted in expected improvement as coverage is still low (58% for water supply; 7% for sewerage) and NRW deteriorated to 62% for the combined performance of the two concessionaires. Many communities are provided with bulk supply but are not directly served by the concessionaires. Water availability (88% with 24-hour supply) to the served population needs to be improved as well. High working ratio (1.22) has to be addressed with appropriate tariff adjustment and further improvement in collection efficiency (97.3%). Human resources management is sound with staff/1,000 connections ratio of 4.4. While these performance indicators are for the combined service area, the concessionaire for the east zone is performing better especially in coverage, NRW reduction and financial management.

Osaka

The utility provides consumer satisfaction and sound management of its water resources except for high consumption (263 l/c/d). It provides total coverage and access for water supply and sewerage, respectively, as well as 24-hour supply. Financial management needs to be improved in terms of working ratio (1.08) and collection efficiency (87.2%). The utility is strong in NRW (7%) reduction and human resources management (1.7 staff/1,000 connections).

Phnom Penh

This is an efficiently managed water utility that has shown dramatic improvements in performance in the last 5 years although it can still improve its water coverage (84%). Consumer satisfaction is high with water available 24 hours a day in the served areas. NRW (26%) is under control with 100% metering and low consumption (104 l/c/d) reflects sound water resources management. Financial management is strong with working ratio of 0.46, collection efficiency of 99.7% and very minimal grant financing (2%). It has sound human resources management (5.4 staff/1,000 connections) as well.

Seoul

The utility is another well performing utility providing consumer satisfaction with 100% of the population having 24-hour water supply and 98% with sewerage access. Water resources are well managed with 17% NRW and 100% consumer metering although consumption (205 l/c/d) is quite high. Working ratio (0.57) is good but it can improve on eliminating grant financing (9%) and increasing collection efficiency (93%). It practices good human resources management (1.4 staff/1,000 connections).

Shanghai

While the utility provides consumer satisfaction and manages its water resources well, it needs improvement in financial management by reducing its working ratio (1.08), increasing collection efficiency (93.5%), and reducing dependence on grant financing (100%). The city is unique in that water is provided by 156 water supply companies in the urban and rural areas under a bureau with 24-hour supply to 100% of the population. All connections are metered and NRW is manageable (17%) but it can improve on reducing consumption (251 l/c/d). Human resources (5.7 staff/1,000 connections) is managed well.

Tashkent

While there is consumer satisfaction for this utility, management of water resources needs improvement. Very high consumption (328 l/c/d) is a reflection of low metering (8.3%). Domestic consumers pay a flat rate resulting in an equivalent average tariff (US\$0.01/m³) that is even lower than the domestic rate (US\$0.023). NRW of 27% is reasonable but the high consumption requires a high production per population (1.04 m³/d/c). Collection efficiency (76.8%) needs improvement as well as elimination of reliance on grant financing (14%). Working ratio (0.47) and human resources management (5.6 staff/1,000 connections) are good.

Ulaanbaatar

This is a weak utility with low consumer satisfaction as it distributes water partly by piped connection and partly by tanker trucks to public water kiosks. Coverage is low (49% for water supply; 48% sewerage access) and 24-hour piped water supply is available only to 48% of the population served. Water resources management needs improvement by reducing consumption (278 l/c/d), NRW (36%) and increasing the metered connections 80.3%. Financial management is sound but further improvements can be made in the working ratio (0.83) and collection efficiency (90%). The very high staff/1,000 connections ratio (823) needs to be addressed. (The seemingly abnormal figure is due to the bulk supply nature of

connections to apartments and to water kiosks. However, the ratio is still high (13) if ratio is based on number of families served instead of number of connections)

Vientiane

This utility is strong in water resources management but weak in consumer satisfaction and financial management. Water supply coverage (63%) needs improvement as well as water availability (50% of connections with 24-hour supply). Working ratio should be lowered with adjustment of present low tariff (US\$0.04/m³) and improvement in collection efficiency (76.8%). NRW (28%) and consumption level (110 l/c/d) are reasonable. Staff/1,000 connections ratio (10.5) could still be improved.

COMMENT AND ANALYSIS BY PARAMETER

Production per Person (Average – 0.40 m³/d/person)

This parameter measures overall efficiency of water resource use. The very low figures of Kathmandu (0.11), Dhaka (0.22), and Phnom Penh (0.23) reflect a shortage of water resources. High figures reflect either high levels of NRW, such as in Colombo (0.48) and Manila (0.56), an abundance of water resources for nondomestic purposes as in Tashkent (1.04), or a high demand (consumption) as in Osaka (0.53).

Water Supply Coverage (Average – 79%)

Out of the 18 utilities, 5 indicate 100% coverage and another has 99%. Ulaanbaatar (49%), Jakarta (51%), Karachi (58%), and Manila (58%) have the lowest coverage because of shortage of water resources for development. It is of some concern that about two thirds of the utilities studied show a strong need to improve coverage. Apart from development of water resources, more effort needs to be put into advocacy and public awareness to increase willingness to pay for new services.

Sewerage Access (Average – 51%)

Sewerage access has always lagged behind water supply development universally. It is nevertheless a very important complement to water supply as it impacts on the quality of groundwater and surface water sources. Of the 18 utilities studied, only 2 have 100% coverage and another has 98%. About half the cities have less than 50% of the population enjoying access to sewerage. The implications for pollution of water sources need to be addressed.

24-hour Water Availability (Average – 67%)

Only 8 of the 18 utilities provide a 24-hour water supply to 100% of those connected. This is of some concern, because it is not only a risk to health, but also affects metering and ability to reduce NRW levels. Dhaka, Kathmandu, and Karachi have no areas with 24-hour supply. Delhi can provide continuous supply to only 1% of its service population. Full metering combined with adequate tariffs can help achieve 100% coverage with 24-hour water supply.

Consumption (Average – 165 l/c/d)

There has been considerable debate over the amount of water people need for domestic purposes and the amount they use. Often it has been stated that for religious or other

reasons, people in hot tropical countries need to bathe several times per day and they are not wasting water. Be that as it may, of necessity, people make do on far less when water is in short supply. Some areas of low consumption are Kathmandu (68 l/c/d) and Jakarta (77 l/c/d). By contrast, there are a number of high consumption areas, such as Tashkent (328 l/c/d), Ulaanbaatar (278 l/c/d), Osaka (263 l/c/d), and Shanghai (251 l/c/d). One can reflect that Hong Kong (187 l/c/d), Ho Chi Minh (167 l/c/d), Chengdu (138 l/c/d), Kuala Lumpur (132 l/c/d), and Manila (127 l/c/d) get by on much less.

Nonrevenue Water (Average – 34%)

The worst examples of NRW are Manila (62%), Colombo (55%), Delhi (53%), and Jakarta (51%). The best examples are Osaka (7%), Shanghai (17%), Chengdu (18%), Seoul (25%), and Hong Kong (25%). Given the shortage of water resources, low coverage and low water availability, more must be done by most utilities to reduce NRW levels. In order of priority, this must be elimination of public taps, 100% metering of production and consumption, repair of visible leaks, elimination of illegal connections, and identification and repair of invisible leaks. Strong leadership and disciplined management are essential.

Average Tariff (Average – US\$0.24/m³)

Among the 18 utilities, the average tariff ranges from lows of US\$0.01/m³ (Tashkent), US\$0.04/m³ (Vientiane), US\$0.06/m³ (Dhaka), and US\$0.07/m³ (Karachi and Delhi) to highs of US\$1.37/m³ (Osaka), US\$0.49/m³ (Seoul), and US\$0.35/m³ (Hong Kong). The average tariff is a good measure of the financial discipline of a utility and its autonomy to cover operational costs with revenues from tariffs. The average tariff must be the main tool in imposing demand management on the consumer public and for financial sustainability of the utility.

Connections Metered (Average – 76.5%)

This is perhaps the single most important area requiring improvement among water utilities. More than half the utilities do not have 100% metering of consumption (let alone regular replacement of meters). Five have incomplete metering, three some metering, and two very little. If one assumes only 60% of meters are functioning correctly (an optimistic assumption) then less than 50% of all connections are adequately metered. Metering is required to fully account for water production and consumption as a first step in reducing NRW.

Working Ratio (Average – 1.05)

A low operating ratio means revenues from tariffs cover the operation and maintenance (O&M) costs comfortably. A ratio above one means they do not cover O&M costs. Nevertheless, some utilities include depreciation and debt service in the O&M costs and others do not, so it is not always fair to compare two utilities on this parameter. Nine of the 18 utilities meet O&M costs. The worst performers are Delhi (2.45), Hong Kong (2.41), Kuala Lumpur (1.34), and Manila (1.22), while the best are Phnom Penh (0.46), Tashkent (0.47), Chengdu (0.50), Colombo (0.52), and Seoul (0.57).

Staff/1,000 Connections Ratio (Average – 8.3)

This ratio varies from lows of 1.4 (Kuala Lumpur and Seoul), 1.7 (Osaka), and 2.3 (Hong Kong) to highs of 33.8 (Chengdu), 19.9 (Delhi), and 15.2 (Kathmandu). Ulaanbaatar at 823.3 is exceptionally high because of the mainly bulk supplies. Some utilities that have low ratios contract out a number of their services, such as billing and collection and leak repairs. High staff numbers indicate low efficiency.

New Connection Fee (Average – US\$212)

Despite much talk, little appears to have been done to assist lower-income people to facilitate taking up a direct connection to their households. Many of those not connected in cities are low-income families who pay much more to small-scale water providers or vendors. Only a handful of utilities have introduced staggered payment of the connection fee—a small deposit and the balance in installments with water consumption charges over a period of 12 or more months. Some house connection fees (Osaka US\$1,506, Seoul US\$850, and Ulaanbaatar US\$454) are extremely high. The continued use of public taps and high connection fees are certainly significant reasons for the low coverage rates in many utilities.

Revenue Collection Efficiency (Average – 87.7%)

This parameter, together with average tariff and working ratio, impacts on the financial health of a utility. Only 7 utilities reported collection efficiencies of 95% or better—

100% (Ho Chi Minh and Chengdu); Hong Kong (99.8%); Phnom Penh (99.7%); Jakarta (98%); Manila (97.3%); and Kuala Lumpur (95%). Low efficiencies reported were 54% (Karachi), 70% (Kathmandu), 70.4% (Delhi), and 76.8% (Tashkent and Vientiane). Collection efforts can be supplemented with awareness campaigns to encourage consumers to pay their bills on time.

Capital Expenditure per Connection (Average – US\$88)

It is certainly significant that almost half of the utilities are spending more than US\$100/connection per year on capital improvements. Given that coverage is generally inadequate, significantly more funds are needed for capital development to overcome the present situation, in which utilities are always striving try to satisfy existing demand. Greater advocacy for the sector must be combined with more public awareness.

General Conclusions

The analysis of data indicates that the utilities studied are improving in terms of customer satisfaction and water and human resources management, but they need to arrest the ongoing deterioration in financial management. Gains in coverage are minimal and NRW levels are high. Attention needs to be focused on the following:

- advocacy for more investment in the sector and greater coverage,
- 24-hour water supply,
- demand management by pricing and public awareness,
- 100% metering,
- phasing out of public taps,
- reduction of NRW levels,
- reduction of staffing levels,
- reduction of grant financing,
- installments for payment of connection fees, and
- higher domestic tariffs and improved collection efficiency.

**CHANGES FOR 15 UTILITIES FROM SECOND DATA BOOK TO 2001
(1995–2001 Data)**

Parameter	1995	2001	Change in Average (%)
Water Production (m ³ /day)	1,675,420	1,823,360	+8.8
Groundwater (% of production)	18.3	22.3	+22
Number of Connections	665,830	886,250	+25
Water Coverage (% of population)	77.3	78.0	+0.9
Domestic Consumption (l/c/d)	145	164	+13
Average Tariff (US\$/m ³)	0.195	0.175	-10
Staff Numbers	5,030	5,270	+4.6
Nonrevenue water (% of production)	43.5	35.8	-18
Working Ratio (O&M Cost/Revenues)	0.93	1.12	+20

For 15 of the cities in the Water in Asian Cities study, there was sufficient information to compare the overall water supply situation in 1995 with that in 2001. The earlier data are from the *Second Water Utilities Data Book*¹, which used the same methodology as the present study. The three cities not included in the comparison are Chengdu and Osaka, which were not in the earlier survey, and Colombo, for which the service area considered in the present study was different from that in the earlier survey.

The data in the Table above show an overall improvement in the delivery of water supply services to the 15 cities over the 5-year period. The increase in water production resulted in an increase in per capita consumption. However, the increase in coverage was minimal despite the availability of more water and a 25% increase in average connections. This means that the rate of expansion was not enough to cope with population increase in these cities.

It is encouraging that there was a decrease in NRW level, although the average was still high in 2001 and efforts are needed to further reduce it. While there were improvements over the period in customer satisfaction, water resources management, and human resource management, there was deterioration in overall financial

management.

The average working ratio shows that revenues from tariffs were not able to cover O&M costs. This could be due to increasing O&M expenses or inadequate revenues—the latter attributable to low tariffs and inadequate revenue collection efforts. The average tariff decreased by 10% in US dollar values. Many currencies have been devalued against the US dollar since 1995, particularly in 1997 during the Asian financial crisis; in terms of local currencies, there was an average increase of 213% in the average tariff between 1995 and 2001. However, this seems not enough to cover expenses among the utilities. Despite the increase in average tariff, per capita consumption still increased, which may mean that tariff levels were still so low that demand was not responding to tariff increases.

The smaller rate of increase in total staff compared to the increase in connections is a good trend. It indicates an improvement in the management of human resources. Noticeable is an increase in the use of groundwater, but with the limitations of groundwater in many cities, this trend may not be sustainable.

It is clear that more effort must be exerted to increase water supply coverage in Asian cities. NRW must be reduced further to allow more efficient use of water produced. Utilities will have to improve their revenue collection efforts and review their tariffs to cope with costs of O&M and investments for expansion.

¹ McIntosh, Arthur C. and Cesar E. Yñiguez, eds. 1997, *Second Water Utilities Data Book—Asian and Pacific Region*, Manila, ADB.

VIEWS OF CIVIL SOCIETY ON CITY WATER SUPPLIES

The Regional Consultation Workshop on Water in Asian Cities – The Role of Civil Society was held at the Asian Development Bank (ADB) in Manila on 14–16 October 2002. The purpose of the Workshop was to explore the role of civil society in developing water supply and sanitation services in Asian cities. There were 110 participants and observers from 18 countries in the region including representatives of nongovernment organizations (NGOs), development institutions, international and regional organizations, and academe; and journalists, private contractors, and consultants. Participants from the cities in the study were asked to submit a one-page overview before coming to the workshop.

The workshop discussions were based on the findings of the Study on Water in Asian Cities covering 18 cities in the region, case studies of small-scale independent private water providers serving the urban poor in 8 of those cities, and the summary of the overviews from the civil society participants. Group discussions focused on identifying key issues and proposing ways and means of resolving them.

The main findings of the workshop, reflecting the views of civil society as articulated by the participants, were as follows:

Governance/Policy Development

- There is an ongoing debate on the social versus economic good of water, which has major implications regarding privatization.
- Governance and tariffs are key issues; socially acceptable policies and regulations are essential.
- Donors are working with local government units to provide local financing.

Conservation/Water Demand Management

- Rainwater harvesting is vital for the future sustainability of the cities.
- There are success stories of vastly improved water coverage, establishment of continuous supply, and major reductions in NRW, but discipline, leadership, and donor coordination are required for these to occur.
- Demand-side management is very important.
- Utilities should produce bottled water.
- ADB evaluations show that direct connections, continuous water supply, and sanitation are essential to improve the quality of life.

Water and the Urban Poor

- Take care of the poor and disadvantaged first through improved access to water services, specifically targeting the desperately poor through needs mapping, etc.
- Include women in access and distribution consultations.
- Involve the poor in managing water services.
- Civil society can give a voice to the poor.
- Community participation is essential, including that of local government.
- Flexibility and social recognition are required—there is no universal solution.

Water Awareness and Education

- All stakeholders need to raise their awareness and understanding of all the issues as well as the views of other stakeholders.
- NGO forums or city forums (coalitions of civil society groups including the private sector) should be used to improve dialogue and lobbying.
- Water and human values and culture are important; attitudes and values may have to change, overcome resistance to change, and adopt value-based approaches to education.
- Films are a powerful tool, but the message must be correct.
- Journalist networks and the media can play an important role.

Private Sector Participation

- Involve the private sector in the delivery of “Water for All” services.
- Reassess the role of and partnerships with small-scale water providers, which already provide 20–50% of water in many cities.
- Human rights views on private sector participation conflict with access, private commodities, and the concept of making a profit from water services.
- Improve public utilities before embarking on PSP.
- PSP is helping the poor and reducing connection fee obstacles.
- Property titles are not required in order to provide water services.
- Operators must have a social dimension—they need to involve customers.

Tariffs

- Full cost recovery is not impossible; demand management is required.
- The rich and middle class receive subsidies, but not always the poor.
- Consider subsidizing connection fees rather than the tariff.

Pollution Control and Sanitation

- Standards and their enforcement are essential for good water quality.
- Remove the biggest polluters from cities.
- Watersheds need to be protected and a water levy imposed on users.
- United Nations-Habitat emphasizes the key role of sanitation in achieving the Millennium Development Goals; also, political awareness, demand management, capacity building, education, and a focus on the poor are critical.