

ASIAN WATER SUPPLIES

Reaching the Urban Poor

A Guide and Sourcebook on Urban Water Supplies in Asia for Governments, Utilities,
Consultants, Development Agencies, and Nongovernment Organizations

Arthur C. McIntosh

Asian Development Bank and International Water Association

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Foreword

Most people living in cities would like to be connected to a 24-hour supply of piped water. Unfortunately, in most Asian cities less than 30% of the residents enjoy 24-hour supplies, and low service coverage and intermittent water supplies are the norm. The Asian Development Bank (ADB) would like to change this. ADB's "Water for All" policy emphasizes, among other things, expanding the delivery of water services, conservation of water, increased efficiencies, facilitation of the exchange of water sector information and experience, and improving governance. *Asian Water Supplies—Reaching the Urban Poor* has been produced for ADB by staff member Arthur McIntosh to provide greater understanding and awareness among key stakeholders on these matters. The book is particularly focused on ADB's overarching goal of poverty reduction.

There are three voices in this book: that of ADB (based on policy and the findings of regional consultations), the author (based on his more than 20 years' experience in Asian water supplies), and other noted authors in the sector (based on papers and publications). Structuring the book in this manner has provided some degree of balance and given Arthur McIntosh a certain amount of freedom to be frank when addressing sensitive issues, such as governance and corruption. This is the case in the first chapter, where the author brings attention to some of these issues by polarizing them. While ADB does not necessarily endorse every view of Arthur McIntosh put forward in this book, it does respect his opinions and endorses the overall thrust of this work.

In this first guide and sourcebook of its kind dealing with water supplies in developing countries, the author makes some provocative suggestions in separating myths and misconceptions from realities. He analyzes the reasons for poor performance of water utilities, proposes some solutions, and concludes that governance and tariffs are at the core of the problems and any possible solutions.

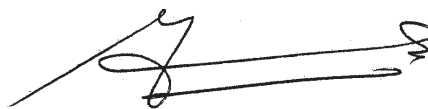
When considering governance, the main message is that transparent government policies must come first, followed by independent regulators. Civil society participation is also needed to ensure that policies are implemented. When operating water utilities, it is time to develop more autonomy, ensure staff performance is based on incentives, and stop the use of civil servant rules and salaries. Regulation based on policies, not contracts, should be developed for both public- and private-operated utilities.

In his examination of tariffs, it is suggested that the great inequities, which result in the poor subsidizing the rich, can only be rectified when consumers pay the full cost of water provision and when the money trail no longer runs through governments. It is surprising to learn, for instance, that in Manila those not connected to a 24-hour piped water supply (mostly the poor) pay around \$20 per month for 6 cubic meters of clean water, while those connected (mostly the rich) pay around \$4 per month for 30 cubic meters of clean water. This is the basis for two controversial recommendations: (i) hike the tariffs to help the poor, and (ii) fund development directly out of tariffs.

In some cities, there may be a link between high non-revenue water and low service coverage. The author suggests that leakage may be used to cover up the illegal use of water, because operators derive considerably more revenue (both official and unofficial) from selling water to vendors than from formally connecting consumers to the piped supply. As long as poor regulation encourages the status quo, there is little incentive for operators to do otherwise.

Business as usual is not an option. The inequities affecting the poor are begging for attention. ADB believes governments need to seriously consider the author's recommendations, as there are no other solutions on the horizon that could have the same impact. With this in mind, I commend the efforts of Arthur McIntosh in identifying the problems and proposing solutions.

This guide and sourcebook will be useful for governments, utilities, consultants, development agencies, and nongovernment organizations. The main finding of ADB's regional consultation in 2002 on *Water in Asian Cities—The Role of Civil Society* was the general lack of understanding and awareness of the sector among stakeholders. This book is expected to improve the situation. It is aimed at professionals in the sector, especially newly arrived professionals, who may not be aware of all the problems. It will be valued (as were ADB's water utilities data books) for its up-to-date data on Asian water supplies. The best measure of this guide's success, however, will be governments' readiness to enact reforms and civil society's readiness to keep governments accountable for their policies.



Jan P. M. van Heeswijk

Director General

Regional and Sustainable Development Department

Asian Development Bank

Preface

Objective

The purpose of this book is to give stakeholders a point of reference and some tools with which they can move forward. In this way, it is hoped that the mistakes of the last 20 years will not be repeated. It should not be necessary for a new generation of water professionals to learn everything all over again. Instead, they should be able to take what has been learned up to now and move on. To help facilitate this process, this book was designed to create greater understanding and awareness of the issues and possible solutions among all stakeholders in the sector.

Scope

This guide starts by identifying some myths, misconceptions, and realities. It then looks at problems and solutions related to a number of important topics. Governance and tariffs are identified as both core problems and core solutions. A new approach to the development and management of water supplies is proposed, which is based on transparent government policy and regulation and the involvement of civil society. Appendixes include (i) 19 city water profiles, (ii) 6 case studies on utilities, and (iii) 6 examples of small-scale water providers, all based on recent data from the field.

Approach

To the extent feasible, I have confined my views to areas of my own experience. On some topics—particularly water resources management, private sector participation, and sanitation—I have additionally included the pronouncements of others in the sector. Material sourced from outside the Asian Development Bank or my own experience is shown in italics. Although most chapters of the book deal with the problems and the solutions for a given subject, one of the findings is that problems cannot be solved in isolation. They can only be solved in the context of the big picture. While there is a chapter on sanitation, it scarcely does the topic justice, since sanitation deserves to be the subject of a book on its own. Additionally, the Asian water supplies sector as a whole is dynamic. For this reason, some of the data in this book might soon be out of date, but the principles outlined are expected to apply for some time. In those instances where cities and countries (such as Manila and India) are named, it is felt that the matters covered are common to many parts of the region and therefore do not reflect negatively upon the entities mentioned. Likewise, where I have been critical of governments in terms of governance, it should be noted that my statements do not necessarily apply to all governments.

How to Use the Book

This book can be read from cover to cover, or it can be used as a reference on a given topic. There is some repetition, but only on important points. Chapters were chosen to be topical, and there is not necessarily a flow from one to the next. However, Chapter 2 (Problems and Solutions) binds them all together. The chapters have introductions and “nutshell” summaries. Important pronouncements appear in red. When I use “we” and “us,” these refer to all stakeholders. Everyone involved in water supplies in developing countries can learn something from this book, especially new professionals in the sector, who will find this resource particularly useful in getting quickly up to speed.

Arthur C. McIntosh

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Many people have contributed to this book. In terms of content, my Asian Development Bank (ADB) colleagues Graham Jackson, Alex Jorgensen, and Rudolf Frauendorfer made many useful comments and contributions. Philip McNamara, as editor, was responsible for some major restructuring, which greatly improved readability. He also showed great perseverance with the microediting, striking a balance between ADB's rules and my more casual style. Grendel Salvador and Josephine Pagunsan made changes to numerous drafts. Vic Angeles and Anna Juico ably directed the ADB Printing Office inputs of Ronnie Elefano (cover design) and Ruben Marmita (map). Rose Arcano did a great job on the typesetting to make the book user-friendly. Haris Pinidiya, Rick McGowan, and Nancy Barnes made contributions on specific topics. Cesar Yniguez offered advice on the structure and flow. Akira Seki, ADB's former Director General, Regional Sustainable Development Department, gave me the green light and encouraged me to produce this book. Brad Philips, Director, Agriculture, Natural Resources, and Social Sectors Division, Regional and Sustainable Development Department, helped keep my feet on the ground and guided me professionally. Geoff Bridges pulled together the Study on Water in 20 Asian Cities (Appendix 1), which provided a factual basis for my work. Lynette Mallery (Publications/ADB) was encouraging and helpful in the presentation (title and cover design and guidance on typesetting) and in moving approvals through official channels. I would also like to thank Wouter Lincklaen Arriens, K. E. Seetharam, Almud Weitz, and Maria Paniagua for their contributions to regional technical assistance relevant to the book.

There are a host of others who also helped make this book possible. I would like to offer my special thanks to the International Water Association for stepping in early with an offer to copublish. This will make a big difference in translating rhetoric into action. Winnie Flores (my household help), who is shown on the front cover, inspired me to champion the plight of the urban poor. Poshan Nath Nepal (Kathmandu), Mohammed Didi (Malé), Premakumar Fernando (Colombo), Perry Rivera (Manila), and Ek Sonn Chan (Phnom Penh) authored the case studies in Appendix 2. Herve Conan, Maria Paniagua, Fiscalina Amadora-Nolasco, Usha P. Raghupathi, Abu Rayhan Al-Beeroonee, Huynh Thi Hoai Nguyen, and Kishore Kumar Jha contributed to the examples of small-scale water providers (Appendix 3). I would like to give credit to Eric Sales (ADB), Yayasan Dian Desa (Indonesia), Nepal Forum of Environmental Journalists (Nepal), Sevanatha Urban Resource Centre (Sri Lanka), and Environmental Broadcast Circle (Philippines) for the photographs provided.

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Currency Conversion Equivalents

Currency	Rate to US Dollar (31 December 2001) ^a
Bangladesh taka	57.00
Cambodian riel	3,895
People's Republic of China yuan	8.28
Hong Kong dollar	7.80
Indian rupee	48.18
Indonesian rupiah	10,400
Japanese yen	131.80
Korean won	1,314
Malaysian ringgit	3.80
Maldivian rufiyaa	12.80
Nepalese rupee	76.48
Philippine peso	51.40
Singapore dollar	1.85
Sri Lanka rupee	93.16
Thai baht	44.22
Vietnamese dong	15,084

^a Figures have been rounded.

Source: International Monetary Fund's *International Statistics Yearbook 2002*.

Abbreviations and Acronyms

ADB	Asian Development Bank
BOT	build-operate-transfer
CGE-M	Generale des Eaux and Marubeni
CMWSC	Chengdu Municipal Water Supply Company
DMC	developing member country
DWASA	Dhaka Water Supply and Sewerage Authority
GC	Greater Colombo
HMGN	His Majesty's Government of Nepal
IWA	International Water Association
JWSE	Jakarta Water Supply Enterprise
KWSB	Karachi Water and Sewerage Board
MCWD	Metropolitan Cebu Water District
MWA	Metropolitan Waterworks Authority
MWCI	Manila Water Company Inc.
MWSC	Malé Water and Sewerage Company Pvt. Ltd.
MWSI	Maynilad Water Services Inc.
MWSS	Metropolitan Waterworks and Sewerage System
NGO	nongovernment organization
NRW	non-revenue water
NWSC	Nepal Water Supply Corporation
NWSDB	National Water Supply and Drainage Board
O&M	operation and maintenance
OPRRA	Old Philippine Railway Residents' Association
PLC	public limited company
PMC	Pune Municipal Corporation
PPWSA	Phnom Penh Water Supply Authority
PRC	People's Republic of China
PSP	private sector participation
PVC	polyvinyl chloride
SSWP	small-scale water provider
SWMC	Selangor Water Management Corporation Ltd.
UFW	unaccounted for water
USAG	Utility of Water and Wastewater Treatment Company
WSD	Water Supply Department
WSSCC	Water Supply and Sanitation Collaborative Council

Measurement Units and Symbols

Measurement units

cms	cubic meters per second
l/c/d	liters per capita per day
m ³	cubic meter
/m ³	per cubic meter
MLD	million liters per day

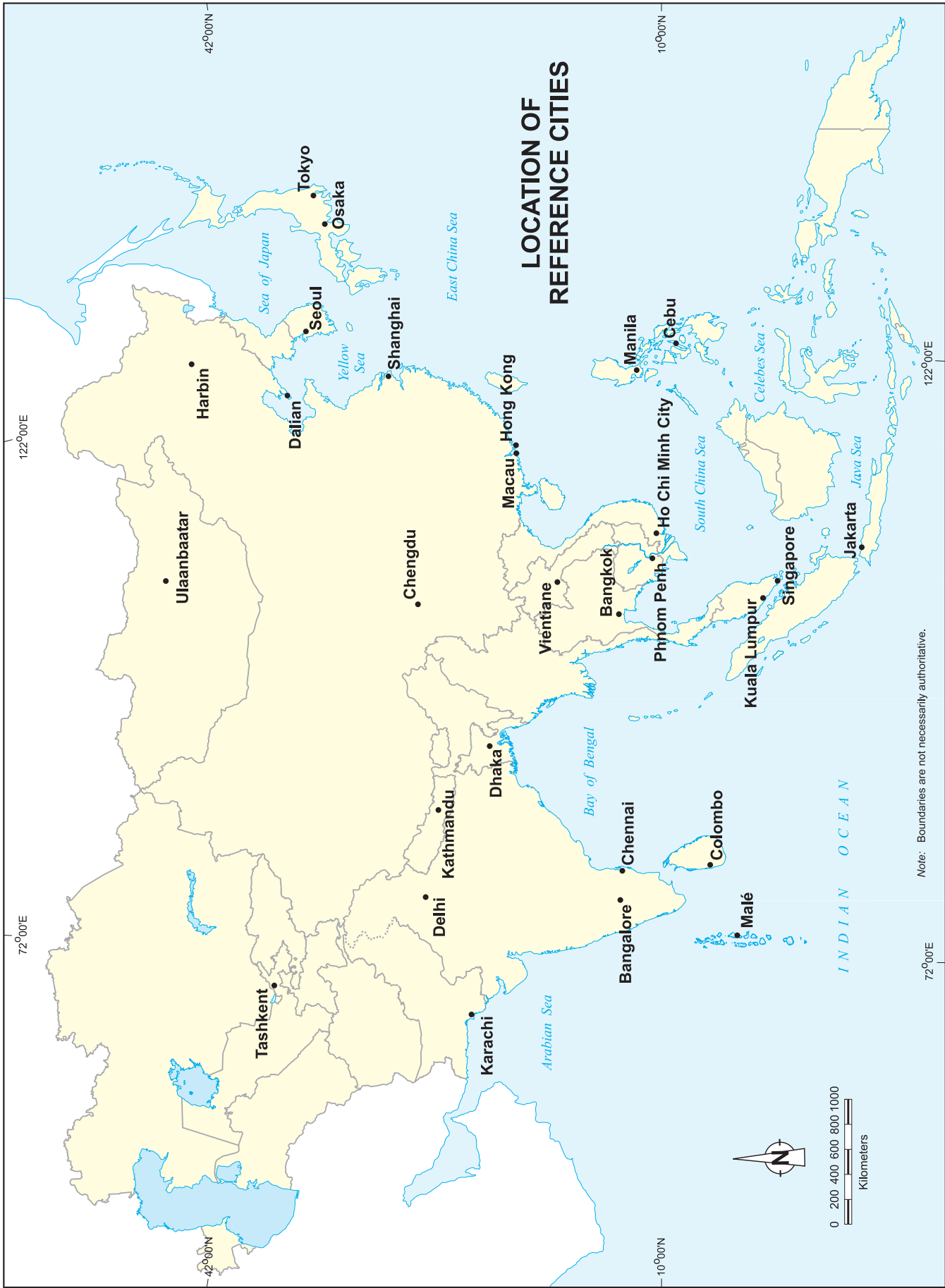
Symbols

”	inch
>	greater than
<	less than
%	percentage

Currency symbols

\$	US dollar ^a
NRs	Nepalese rupee
Rf	Maldivian rufiyaa
Rs	Indian rupee

^a “\$” is used only to refer to the US dollar.



Myths, Misconceptions, and Realities

As an introduction to this book, I would like to be provocative in identifying what I feel are myths and misconceptions and in suggesting the corresponding realities. These realities are proposed at the outset in the hope that they will be considered by each reader but not fully accepted until the ideas presented in the following chapters have been explored. My views have purposely been polarized to bring attention to these matters, but I recognize that what I am stating will not apply across the board. The lack of awareness and understanding of the subject of Asian water supplies was recently illustrated during the Asian Development Bank (ADB) regional consultation in Manila (*Water in Asian Cities—The Role of Civil Society*). This explains why there are so many interrelated problems in the sector yet to be resolved. With that in mind, let me briefly examine some of the beliefs, which I have found to be commonly held, that have shaped perceptions related to urban water supply in Asia.

- 1. Coverage with piped water requires major urban water utilities to seek funds from external sources.** I suggest that, in most cities with more than a million people, the development of urban water supplies can be funded directly through tariffs. Support for this statement comes from the millions of urban poor not being served in places like Manila (Philippines). These people pay up to \$5 per cubic meter ($/m^3$) for water bought by the container, while those served with piped water often pay only \$0.10/ m^3 . In Malé (Maldives), all people pay \$5/ m^3 for piped water. The People's Republic of China (PRC) is already heavily funding new investments directly from tariffs. Raising the tariffs of those served (most of whom are not poor) is feasible and will provide the funds needed to serve the poor, who will be happy to pay a fraction of their current costs for a reliable piped water supply. On a more practical note, I suggest that achieving this status could be a 5-year policy objective.
- 2. Shortage of water is the reason for intermittent water supply.** I suggest that sound hydraulics and demand management through pricing and strict metering can assure a 24-hour piped water supply with very little water. In Malé, they deliver 34 liters per capita per day (l/c/d) with a reliable 24-hour supply.
- 3. The poor are unwilling and cannot afford to pay the full cost of piped water.** I suggest that the poor pay many times the amount the rich pay for water, in unit rate and total cost terms. An example of this comes from Manila, where a household helper pays 900 pesos per month for vended water (water sold by itinerant vendors) while her employer pays 200 pesos per month for piped water.
- 4. It is possible to run a \$20–100 million per year commercial operation (selling water) with civil servant rules and salaries.** I suggest that management and staff must be the best available on the open market, and incentives must match performance. The Singapore Public Utilities Board, perhaps the best water utility in the world, pays its management staff more than \$150,000 per year, compared with the average of \$5,000 per year paid to managers employed by many Asian water utilities. Other good examples come from the water utilities of Malé (Maldives), Phnom Penh (Cambodia), and Bangkok (Thailand).
- 5. Reducing non-revenue water (NRW) below about 20% of production is not economically justified.** I suggest that this is influenced by developed country costs and artificially low tariffs in developing countries. The Singapore Public Utilities Board and some cities in Japan have reduced NRW to less than 10% of production. I further suggest that many systems with NRW above 40% have numerous visible leaks in service connections, high rates of estimated consumption, and thousands of illegal connections that can all be addressed to reduce NRW. In these cases, the priority should be to fix visible leaks.
- 6. The private sector will bring much needed funds for development to the table and improve water utility efficiency.** I suggest that the reality is that the private sector has brought funds to the table in areas such as water production and treatment (mostly through build-operate-transfer [BOT] contracts) but has failed to invest adequately in extending piped water supply services to those not yet served. Likewise, efficiency gains in terms of reducing NRW have generally been well below expectations. Jakarta and Manila are two examples.

7. **In answer to rapid urbanization, it is necessary to go farther and farther a field to find more water sources.** I suggest that there are simple options not yet seriously addressed, including demand management, rainwater harvesting, trading water rights, building check dams, and rehabilitating watersheds. These only require political commitment to be realized.
8. **Intermittent water supply is OK.** I suggest that people believe this because they are unaware of the coping costs and health risks tied to intermittent supply and, in many cases, do not know that 24-hour supply to the home is the norm in most countries.
9. **Appropriate legislation allows a water utility to operate with autonomy.** I suggest that legislation is a necessary but not sufficient condition for autonomy. Governments frequently do not allow corporate bodies to exercise their autonomy, especially in terms of staffing, tariffs, and investments. Examples of this come from the National Water Supply and Drainage Board in Sri Lanka and the Nepal Water Supply Corporation (see Appendix 2).
10. **Water utilities do not suffer when the money trail runs through governments.** I suggest that some elected officials are reluctant to raise tariffs, not to protect consumers but to protect their own power and access to funds. When there are major subsidies, the bulk of the money trail goes through governments. When consumers, through tariffs, pay the full cost of water supply, the money trail is direct from consumer to operator, and there is less chance for corruption because consumers will demand accountability. The latter is the case in Bangkok and Singapore.
11. **Households in Asia need at least 200 l/c/d.** The average domestic consumption in Europe is around 130 l/c/d. The average domestic consumption in Malé is 34 l/c/d. In major cities in Asia, half the people use less than 40 l/c/d. I suggest that there is a need for more equitable water use in Asian cities and that the average domestic consumption can be in the range of 100–150 l/c/d.
12. **Private operators are the cause of higher tariffs.** I suggest that, in general, higher tariffs are long overdue. It is therefore unfair to saddle private operators with this criticism. Moreover, I believe that the converse of this belief is true. In my opinion, there is no future for private operators while tariffs are kept artificially low. The reason for this is that some funds for investment will have to come from tariffs.
13. **Regulatory bodies are only needed because of private sector contracts.** I suggest that they are needed just as much for public water supplies, where accountability, efficiency, transparency, and equitability need to be monitored.
14. **Private operators are eager to serve the urban poor.** I suggest that the record shows that private sector efforts to help the poor connect to piped water are to some extent “showcased.” The increase in new domestic connections tells the real story. The private sector sells water to vendors and distribution contractors, provides connections serving multiple households, and asks those connected to share water with their neighbors. The correlation between low service coverage and high NRW is no coincidence. Those with vested interests will try to maintain the status quo.
15. **Private sector participation (PSP) brings competition.** I suggest that the bulk of private sector contracts in the water sector has gone to just a few firms from two countries and that this is because prequalification criteria have restricted bidding. A recent example was the prequalification for a lease contract for the Kathmandu Valley water supply. PSP has not brought much competition.

Realities in a Nutshell

- Coverage with piped water does not always require major urban water utilities to seek funds from external sources.
- Shortage of water is not the reason for intermittent water supply.
- The poor are willing and can afford to pay the full cost of piped water.
- It is not possible to run a \$20–100 million per year commercial operation (selling water) with civil servant rules and salaries.
- Reducing NRW below 20% of production is economically justified.
- The private sector will not always bring much needed funds for development to the table and improve water utility efficiency.
- In answer to rapid urbanization, it is not necessary to go farther and farther afield to find more water sources.
- Intermittent water supply is not OK.
- Appropriate legislation does not always allow a water utility to operate with autonomy.
- Water utilities suffer when the money trail runs through governments.
- Households in Asia do not need 200 l/c/d.
- Private operators are not always the cause of higher tariffs.
- Regulatory bodies are not only needed because of private sector contracts.
- Private operators are not always eager to serve the urban poor.
- Private sector participation does not always bring competition.

Chapter 2

Problems and Solutions

This is probably the most important chapter in this book, because it puts forward the notion that an individual problem cannot be solved in isolation. It can only be addressed after the core problems have been resolved. Although this guide deals with topics by chapters, and for ease of reading problems and solutions are discussed in the same chapter, it must be recognized that the prerequisite for any solution lies in addressing first the core problems. It should also be recognized that the solutions proposed may not be appropriate for every set of circumstances. What follows is an introduction to the main problems and solutions and the connections to the core problems and core solutions. Later in this guide, in chapters on specific topics, more justification for these connections is provided.

A. Problem Chart

Figure 2.1 identifies poor governance and low tariffs as core problems. Polluted waterways result from a failure to invest in wastewater collection and treatment and implement legislation pertaining to pollution. Degraded watersheds result from illegal logging, human occupation of catchments, and a lack of revenue that can be used to reforest the land. Overexploitation of groundwater can be traced to a lack of monitoring and control. When industry is



The objective

allowed to use this resource (which belongs to all) for free, and when tariffs for formal piped water are low, the wrong message is sent to groundwater users.

Low water supply and sanitation service coverage can be traced to low tariffs and a lack of revenue to undertake development. This in turn can be traced to a desire by governments to maintain control of the money trail by providing



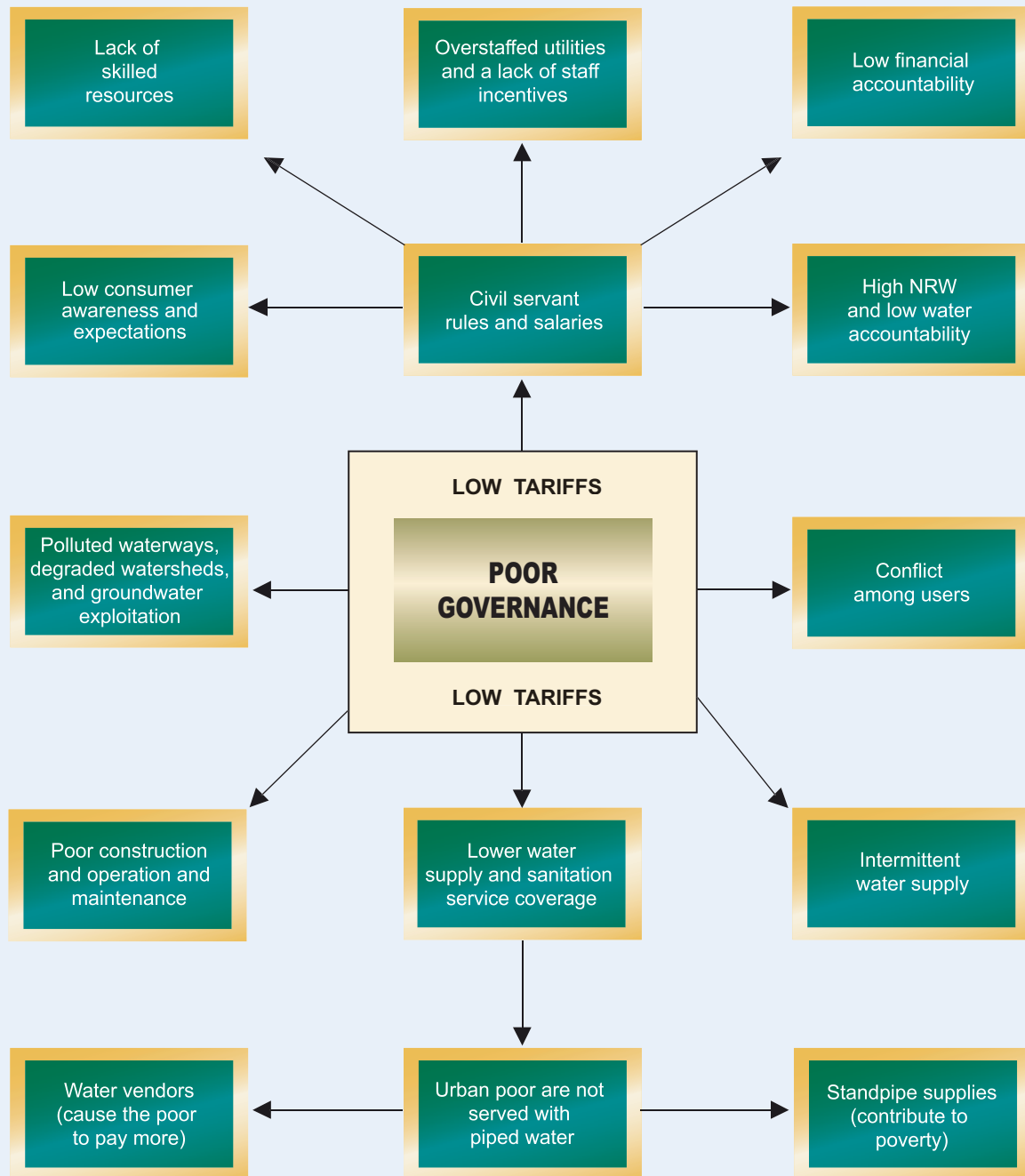
No piped water

heavy subsidies. It may also be found that there are those—including utility staff, government officials, and elected officials—with vested interests in maintaining a status quo that allows a considerable amount of informal revenue (the price paid by vendors for water at the source) to enter their pockets. Thus, there is little incentive to connect more people (especially the urban poor) to formal piped systems.

Intermittent water supply often results from elected officials insisting on extending the distribution pipework beyond its hydraulic capabilities. Low tariffs contribute to the lack of revenue available for the modification of this pipework. Strong metering, billing, and collection are needed to overcome intermittent water supply, and they, too, rely on good governance and adequate tariffs.

There is a conflict of interest between rural farmers (who want water for irrigation) and urban water users. A low tariff differential between urban and rural users exacerbates the problem. Poor governance is manifested in short-term and politically expedient development planning, which in turn leads to more frequent conflict among users. Conflict in water use is sometimes resolved in an ad hoc manner by elected officials, rather than through more institutionalized procedures for dealing with water rights.

Figure 2.1 Problem Chart





Alternative source—traditional stone tap

High NRW and low water accountability result from illegal connections, inadequate metering and meter reading, and inadequate billing on the one hand and from leakage of water on the other. As mentioned above, the illegal sale of water by vendors is another manifestation of poor governance. Civil servant rules and salaries, which are also part of poor governance, contribute to these problems. Civil servant rules are complex, outdated, and not appropriate for transparency and decision making. Civil servant salaries are so low, in some cases, that it is very difficult for employees to earn enough to support their families. This situation can result in the bending of the rules (if bribes are offered) and the performance of unauthorized services, including those that facilitate illegal connections.

Poor construction can result from consultants and contractors being squeezed of their profits after rendering special payments to government or elected officials. Moreover, low tariffs affect the quality of maintenance. In line with this, new projects are commonly proposed before the replacement of meters and old pipes can be addressed, which should not be the case.

Low consumer expectations can also result from low tariffs. Most consumers in South Asia, for example, are unaware that they are entitled to receive a 24-hour piped water supply. Poor governance ensures that consumers are unaware of government policies and that there is no one to keep governments accountable for implementing these policies. Civil servant salaries do not encourage staff to help consumers.

Indirect consequences of poor governance and low tariffs also abound. Low financial accountability is linked

to civil servant rules. The overstaffing of utilities is mostly due to nepotism and outside interference. A lack of skilled human resources is linked to civil servant salaries. Standpipe supplies (a feature of poverty) often go hand in hand with intermittent water supply. Poverty results, in part, from low water supply and sanitation service coverage. Always, it is the poor who are last served. The poor continue to pay very high prices for water purchased from vendors, and they use meager amounts of this resource as a result.

The lesson to be learned from all this is that it is indeed futile to attempt to resolve an isolated problem like high NRW without addressing first its root causes, which are poor governance (mostly corruption and outside interference) and low tariffs (which feed on poor governance).



How people cope—traditional filter

B. Solution Chart

Figure 2.2 places transparent policies, regulatory bodies, the involvement of civil society, and a paradigm shift in tariffs at the core of the new solutions.

Good governance equates to transparent policies, regulatory bodies, and civil society involvement—not necessarily to passing laws. There are examples in many countries, including the Philippines, showing that the existence of laws is no guarantee that they will be implemented. In most cases, when the public is ignorant of a law, that law cannot be implemented. What is needed is something more in the public eye, like a government policy statement on the subject (in this case on urban water supply and sanitation). An active civil society can ensure that government policies are kept in front of the public. Civil society can be assisted in monitoring the implementation of government policies by more formal and independent regulatory bodies. Civil society can also insist on being involved in consultations to formulate or change government policies. A paradigm shift in tariffs is part of the solution for three reasons. First, this will place the consumer more in the driving seat and reduce the amount of corruption. Second, it will quickly lead to improvements in coverage with piped water and a reduction in intermittent water supplies. And third, it will cause a reduction in demand and further reduce the need to fund the development of new water supplies.

Higher tariffs will automatically lead to demand management and the consideration of a range of new options for water source development, including trading water rights, rehabilitating watersheds, rainwater harvesting, and wastewater recycling. Good governance will lead to improved operation and maintenance (O&M) efficiency, pollution control, organization development, accountability, and consumer education and awareness. In combination with higher tariffs, it will provide incentives for private sector investment. Good governance will also provide incentives for improving water utility performance, including staff sourcing from the open market, and it will lead to sustainable developments, including improved coverage with water supply and sanitation facilities for the urban poor and 24-hour water supply for all. In addition, higher tariffs for water supply will allow development agency and government funds to be diverted to urban sanitation improvements.

What the solution chart highlights is that there cannot be isolated solutions. It shows that a whole range of specific solutions is possible, if the core problems of governance and tariffs are addressed first.

C. Chapters and Appendixes

The chapters that follow deal with specific topics that often attract a lot of attention by themselves. Many are interrelated, such as private sector participation and tariffs, subsidies, and development funding. A few important points will be repeated in more than one chapter, but this will allow many chapters to be read alone.

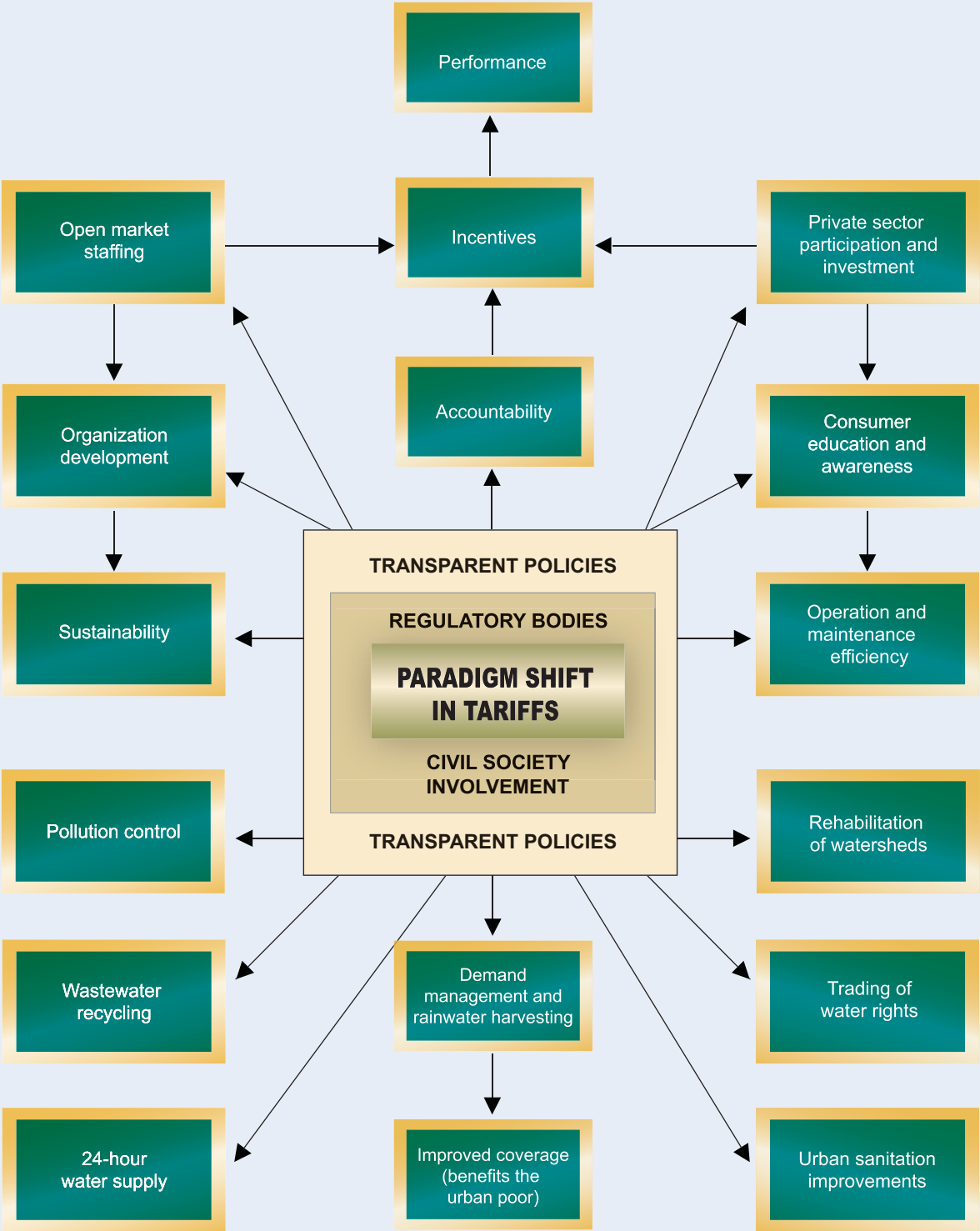
The city water profiles in **Appendix 1** provide thumbnail sketches of the situation in each city examined with respect to water resources, policies and regulations, PSP, tariffs, service levels, and sanitation. Some comments from civil society and my own remarks are added. The purpose of Appendix 1 is to tie the problems presented in this book to the reality of what is happening throughout Asia.

The six case studies presented in **Appendix 2** (Malé, Phnom Penh, Manila, Kathmandu, Colombo, and Dalian) illustrate lessons learned relating to regulation, willingness to pay for water, leadership, PSP efficiency and investment, water shortages, intermittent supply, NRW reduction, autonomy of utilities, and investments funded from tariffs. These case studies are especially important because they were written by experts closely associated with the water utilities described. In line with that fact, these studies are evidence from the field showing that many views expressed in this book are similar to views held by key stakeholders in developing countries.

In **Appendix 3** there are six studies that shed some light on the activities of small-scale water providers in Cebu, Delhi, Dhaka, Ho Chi Minh City, Kathmandu, and Manila. These illustrate the nature and extent of these operations, which should encourage others to want to learn more. They also highlight the great inequities in urban water supply in many parts of Asia.

At the end of the day, the problem and solution charts will tie this guide and sourcebook together.

Figure 2.2 Solution Chart



Problems and Solutions in a Nutshell

- An individual problem, such as NRW, cannot be solved in isolation. It can only be addressed after the core problems have been resolved.
- The core problems are poor governance (including corruption) and low tariffs.
- The core solutions include a transparent policy, an independent regulatory body, a paradigm shift in tariffs, and the involvement of civil society.

Water Resources Management

Water supply does not exist in isolation. There are many factors that affect city water supplies, including social, environmental, and economic impacts. Water resources management is one of the most important environmental dimensions. A sustainable supply of water to a city will depend on the quantity and quality of the water available and its distance from that city. Other major factors are population growth and the wise use of the water resources available. This chapter deals with the latter by considering the supply aspects, the demand aspects, and policy and management.

A. Supply Aspects

This section examines water supply by looking at sources, sustainability, and rights of users.

Groundwater Sources

Cities are usually located near adequate or once adequate water supplies—mostly near groundwater, but sometimes near surface waters. Looking around Asia, many examples (Bangkok, Jakarta, and Manila) of groundwater overexploitation can be seen. These examples show that what could have been a finite but long-term sustainable resource has been destroyed through the depletion of aquifers, which has caused salinization and land subsidence. The excessive use of groundwater has been a short-term expediency that is becoming a long-term disaster (Figure 3.1 shows the extent of surface water use in major cities in Asia). Watersheds have been allowed to become denuded, which encourages flash runoff that erodes fertile soils and results in the loss of steady water flows in the dry season. Industrial wastewater and domestic sewage have been allowed to pass untreated into major waterways, thereby endangering water supplies of downstream users. Asian cities cannot continue to go to other water catchments without first ensuring that they have optimized water availability and use within the vicinity of urban demand.

Over the last hundred years there have been two major shifts in water management. First, the people have given over their role to governments. Second,



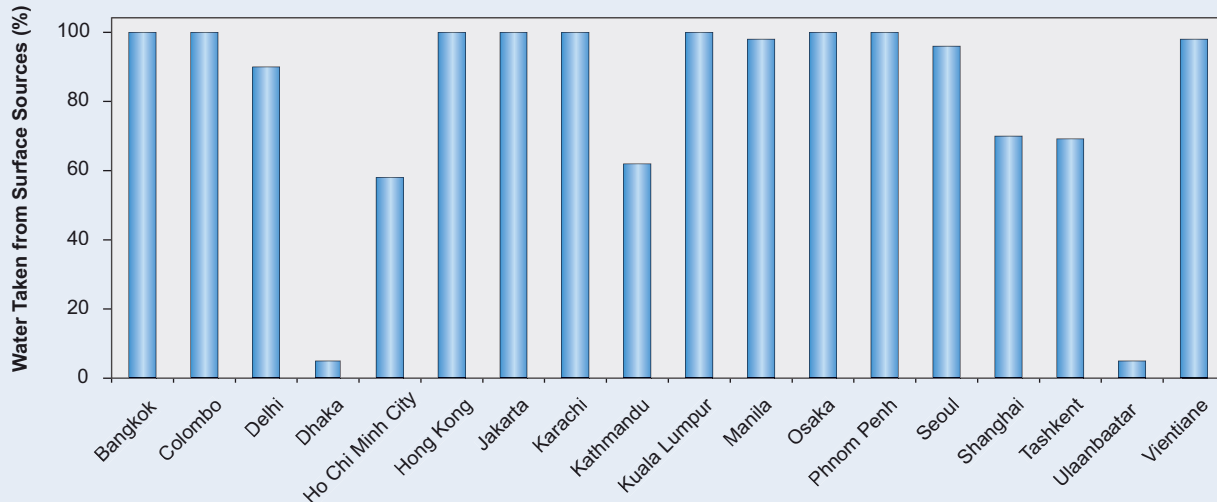
Many still rely on groundwater

people rely less on using rainwater and have instead exploited rivers and groundwater through the use of dams and tubewells. This second fact has led to a growing and in some places unbearable stress on water from these sources. In India, the exploitation of groundwater has been encouraged, but little has been done to recharge it. As a result, groundwater tables nationwide are falling. In years when rains are low, this problem becomes an emergency. The poor, who depend on dug wells (which dry off first), are the first to suffer. (Agarwal, 2001)

Watershed Rehabilitation

One difference between developed and developing countries is that catchments for water supplies in developed countries are strongly protected. They have good vegetation cover, and human, animal, or agricultural uses of that land are prohibited. In developing countries, especially those with large populations, the governance associated with the use of watersheds for

Figure 3.1 Surface Water Sources (2001)
[piped supplies only]



other purposes is invariably quite weak. Furthermore, the rehabilitation of watersheds is a long-term undertaking that does not find much support when measured against the need for short-term political gains.

When watersheds are denuded of trees, through logging and cutting for firewood, rainfall rapidly becomes runoff, which causes the erosion of fertile land and reduces the time during which this water can be used, unless it is stored using dams. This situation is of course exacerbated by the wet and dry seasons that dominate the climates of many Asian countries. Watershed rehabilitation will facilitate the retention of rainwater, which will help river flows become perennial. The

National Water Supply and Drainage Board (Sri Lanka) has been experimenting with watershed rehabilitation in different topographical and soil regions with a view to determining in each region the appropriate amount of integrated ground cover that would also give farmers the potential for revenue generation.

It is possible to reforest more than 100 million hectares of degraded and unproductive land in India. Watershed development of 100 million hectares at the present norm would cost about \$10 billion. At \$1 billion per year, assuming a 10-year completion period, the cost is insignificant compared with the enormous benefits that would be derived. In terms of water storage, flood control, reduced soil erosion and loss of nutrients, and additional agricultural crops, fuel, timber, and other produce, the value of India's reforestation in monetary terms would be much more than the total value of all the country's current industrial assets.¹ If even a tiny fraction of the value of this great asset was spent on its upkeep, and if traditional (village) rainwater storage systems are revived, India's economy would improve more rapidly than by any other means. (IEI News, 2000)



Promotion of rainwater harvesting

¹ This may be a matter of opinion, rather than fact, but it is worth careful consideration.



Potential for rainwater harvesting

Rainwater Harvesting

Why is rainwater harvesting important? It is often said that water should be free, because it is a gift from nature. That is true if the user of that water collects it as it falls from the sky or draws it from a spring, before it has been treated or delivered, because it is the treatment and transport of water that have associated costs. Water tariffs must be raised to meet the costs of water supply, which continue to increase due to more advanced treatment, greater distances to be traveled, lower groundwater tables, and more costly distribution in densely populated areas. As tariffs rise, rainwater harvesting and other options become attractive.² To collect water off the roof of a home or office and store it for future use is efficient. While there are some constraints, such as the room for storage in very densely populated areas, there is tremendous potential not yet

² I once had a conversation with a man from Frankfurt, Germany. The cost of water was discussed, and the man said water cost \$2/m³ and sewerage cost \$3/m³ in his home city. Then he said, "but I don't pay that—I collect rainwater off my roof." These days, Frankfurt is well known as a city that uses rainwater harvesting.

harnessed. What is required is for local authorities to amend the bylaws so that no new home is built that does not have rainwater collection from the full roof area and storage for that water on-site. In addition, for the owners of existing houses to also comply with these bylaws, time frames of 5–10 years can be given for the modification of the roofs and grounds of all existing homes. Chennai (India) is an example of a city making good progress in rainwater harvesting (see www.geocities.com on the Internet). Once again, governance is important.

It does not matter how much rain you get, if it is not captured you can still be short of water. India receives most of its annual rainfall in just 100 hours. If this water is not captured, there will be shortages. When water harvesting and watershed development programs are handled well, it has been shown that rainwater harvesting is the starting point for meeting drinking water needs, eradicating rural poverty, generating massive rural employment, and reducing distress migration from rural areas to urban areas. Because smaller catchments give much more water than larger catchments, one state is planning to construct 10,000 check dams (one dam with a catchment of 10 hectares will collect much less water than 10 smaller dams, each with a catchment of 1 hectare). If the Government puts its mind to it, drought can be banished completely in a maximum of 10 years. The problem is one of mindsets. Rainwater harvesting demands a new approach to governance, a participatory form of governance instead of a top-down bureaucratic one. (Agarwal, 2001)

Check Dams and Wetlands

There is no doubt that one major frustration of water resources management in Asia is the failure to capture the wet season runoff so that it can be used throughout the dry season. In the past, too much attention was given to building large dams. Now, more attention is being turned to small (check) dams. Kathmandu Valley in Nepal is an example of a location where many check dams might be used to store water during the wet season. When urban water supply tariffs are raised to around \$0.40–0.50/m³, it may become attractive for the private sector to build check dams that would divert wet season flows into Sri Lankan style "tanks," or even artificially constructed underground storage, so that the water collected can be sold to the utility for urban supply purposes in the dry season.

The dams of the estimated 200 million beavers that once lived in the continental United States made meadows out of forests, as wetlands slowly captured silt.

These dams resulted in a remarkable and uniform buildup of organic material in valleys, a checkerboard of meadows throughout the woodlands, and a great deal of edge (the fruitful zone where natural communities meet). Beavers are a keystone species. Their dams create wetlands that provide homes and food for dozens of other species, including ducks, moose, fish, frogs, and great blue herons. Wetlands clarify water and prevent soil from washing downstream. When beavers make a series of dams and ponds within a drainage basin, the water cycle in an entire watershed is affected. Wetlands are like sponges. They soak up water during storms and release it slowly in drier times. Water detained in wetlands behind beaver dams is more likely to percolate down to groundwater, raising the water table and creating springs and small streams throughout a watershed. A tenth of the total land of the United States was once beaver built wetland. Now the beavers and these wetlands are gone. (Outwater, 1996)

Pollution Control

Water availability can drive economic growth. And, along with a ready source of labor and ready markets or transport to markets, water availability has encouraged industries to spring up in cities. Industries, however, damage waterways through pollution, discharge of raw sewage, and disposal of garbage. Incentives must be created for the relocation of industries to industrial estates, preferably downstream of cities, where their effluents can be treated before they are discharged. Town planning rules must be transparent to the public and implemented. Industries that are water intensive should be closely monitored, like they are in Singapore, not only for pollution but also for their conservation measures. In line with this, relatively high tariffs can encourage conservation. **The "polluter pays" principle can be applied in urban areas, and this can be regarded as trading for the right to restrict other uses.** This more than anything is a question of governance. Others may argue that one could also consider a "beneficiary pays" principle. Perhaps there is room for both. As noted at the Third World Water Forum, which was held in Japan in March 2003, national actions should be more focused on pollution control at the source instead of simply building more and more advanced water treatment plants at high cost.

Trading Water Rights

While there have been many advocates of trading water rights (mostly on economic grounds), the expected advantages of allowing the market to determine

water resources management have not always resulted. The following learning experience from Australia is a timely warning that theory is not always manifested in practice.

The legislative basis for water markets in Australia is almost complete, and water trading for irrigation is now possible in 87% of its river systems. It was expected that managing water demand, including environmental needs, would lead to a reduction in water usage and increase efficiency as water moved (via trade) from low value to high value users. Contrary to expectations, increased prices have increased water usage overall. And most of the water sold interstate was not originally used by the sellers. Moreover, this water is being transferred to land that was not previously irrigated (leading to increased risks of salinity). One outcome of the operation of water markets is that rice and cotton crops, those that have the greatest impact on Australian rivers, are showing no signs of decline. Instead, rice is on track to break production levels, and the top nine private water holders are in the cotton trade. (Isaac, 2002)

Current conflicts among water users are governed mostly by ad hoc political decisions. If, however, they were governed by the free market value of water, and if customary and legal water rights were freely traded, then such conflicts could result in win-win situations freely chosen by all parties. **What we need to precipitate this is a paradigm shift in urban water supply tariffs.** The options for the farmers are then considerable. They can sell the whole of their customary water rights. They can improve irrigation efficiency or plant crops that are less water intensive and sell the water saved. Or, they can sell their water rights only for the dry season. While it is important to secure economic gains for farmers, the question of job losses cannot be ignored, so alternative employment should be secured as part of the solution.

Subsidies and having the money trail run through governments are impeding the trading of water rights. More effort must be made to recognize the customary water rights of farmers and others. More awareness of this matter needs to be developed through the Internet and other media outlets. Records and documentation related to trading water rights should be more transparent for the public. **We must explore, through surveys, the willingness of farmers to trade water rights.** It is quite possible that more private sector development and management of water would result from freely trading these rights.

It is an unreasonable situation that Asia is now facing, one in which new water sources to satisfy increased demands—resulting from rapid urbanization—are now often secured on the basis of a 10-year design horizon, instead of design horizons of 50 or 100 years, which would be acceptable to secure water for basic human needs. The problems must be sorted out now, before they become even more acute and civil conflicts and wars emerge over water use. Two keys to resolving these issues are recognizing water as an economic good and trading water rights. For example, Angat Dam in the Philippines represents the next major source of water for Manila, but only if the water rights can be traded (see Box 3.1). When water supply tariffs rise to approximate the real cost of water, that is to say in the \$0.30–0.40/m³ range for many Asian utilities, other options for water security present themselves, such as trading water rights.

B. Demand Aspects

This section examines demand by looking at water use and access to this resource.

Irrigation

About 90% of all water use in Asia is for irrigation. Yet, when we talk of a "water crisis," it seems that the gains that can be made from this sector in terms of efficiencies and recognizing water as an economic good have to a large extent been ignored. Low efficiencies result from water losses in canals through evaporation, leakage, and pilferage. They come from irrigation methods that waste water. They come from growing crops that are heavy water users, such as paddy crops, when

Box 3.1 Trading Water Rights—Angat Dam Irrigation versus Manila Water Supply

Economic Justification

- Five million of the 12 million people in Manila are not connected to piped water, 5 years after PSP in water supply.
- Two reasons for the high number of people not connected are given. First, the tariff is too low to allow concessionaires to invest. Second, there is an inadequate water source.
- The farming population of 22,000 also relies on water from Angat Dam to irrigate (mostly paddy) crops. Yet, in times of drought, they can lose all water to Manila.
- Most of the land being irrigated from Angat Dam will in all likelihood become urbanized within the next 20 years.
- There can be a win-win situation for the urban poor in Manila not connected to piped water and the farmers, if the whole of the water rights of the farmers are traded to the urban dwellers over time (say, for example, 10 years).
- If a price of \$0.03/m³ is paid to farmers, they have the potential to triple their current income, as long as they also plant new crops (like potatoes) that do not need irrigated water.
- When compared with developing a new source, payment of \$0.03/m³ by the water

utility for a guaranteed source of 21 m³ per second represents a much cheaper and faster solution to providing piped water to the 5 million people in Manila without access to piped supplies. This should translate into an increase in the water tariff of no more than \$0.06/m³.

- An average domestic tariff of \$0.40/m³ in Manila is clearly feasible and affordable and should ensure that all the urban poor not connected to piped water get connected as quickly as possible.

Political Reality

- Water rights are held by the National Irrigation Administration. And this organization, in response to rapid urbanization, encourages irrigation of more land.
- Owners of the land have no water rights.
- Tillers of the land (farmers) have no water rights.

Government Options

- Produce a transparent policy or plan for land and water use in the future.
- Buy the land or require private developers to buy the land for controlled urban development and lease back to farmers in the interim.

for the purpose of generating income other crops will do just as well on much less water. They come from the salinization of soils caused by the use of too much water. They come from the lack of mechanisms to trade customary water rights in a free market. And they come from national policies on subsidies and food security that are often in conflict.

Continuous irrigation, without proper drainage, gradually destroys land and nearby streams and rivers through salinization. The sun's heat evaporates irrigation water, leaving salts behind. This water also flushes salts out of mineral rich soil, leaving these to dry on the surface or dissolve in groundwater and poison plant roots. Furthermore, where rainfall is limited, crops must be carefully chosen. Sugarcane is just about the worst crop choice in terms of water needed—whereas potatoes would be much more beneficial. (Time International, 1990)

Subsidized irrigation is one reason for waste. Farmers rarely pay more than one fifth of the cost of operating public irrigation schemes, let alone capital costs. In most cases, farmers can cut their water use by 10–50%. It has been shown that an investment in irrigation efficiency is usually an investment in crop and soil productivity. Better water management often leads to increased yields, a reduction in erosion, and a reduction in the amount of fertile cropland that becomes water logged, salted, or sapped of nutrients. (Postel, 1997)

Demand Management and Water Conservation

Although average domestic water consumption in European cities is only 130 liters per capita, many cities in Asia use around 200 liters per capita (for those connected to piped water). This can be traced primarily to low tariffs and a lack of public awareness concerning the importance of conserving water as a scarce resource. When tariffs are raised in many Asian cities (Chennai, Colombo, and Manila are examples) there is no drop in demand, indicating that there is no price elasticity of demand at these levels. Standpipe water is in many cases free to users, and it is common to see water being wasted at standpipes in South Asian countries. Water is also wasted through poor plumbing in homes, leaks in distribution systems, and overstorage on a 24-hour basis, which is related to users' attempts to adjust to intermittent water supplies. In Asia, unlike Europe, there is little attempt to conserve water through toilet or shower retrofitting. Singapore is an exception, and the PRC offers some good examples of industrial and domestic water conservation. The block tariff systems employed by Asian utilities invariably have large

volumes at lifeline rates, thereby providing subsidies to all, including the rich.

Little effort is going into rehabilitating watersheds to secure future supplies. It is a waste of funds to treat and distribute water if it is lost or wasted. As urban populations continue to expand, there is sometimes a need to go farther afield (more than 100 kilometers) to harness new water sources, and this is becoming very costly, not only in capital costs but also in operating (pumping) costs. Unfortunately, this fact is seldom reflected in tariffs. Much can be done to have more efficient use of water in the urban context. In some cities, including Bangkok, Jakarta, Kathmandu, and Manila, NRW is around 40% of production or more. **The tariffs for piped water are so low that there is little demand management.**

Water Scarcity

Water scarcity is a relative term. It depends on location, climate, season, and potential use by humans. The scarcity value of water is determined by the quality of water, the quantity of water, and the number and type of water users. It is greatly influenced, therefore, by the integrity of watersheds, overexploitation of groundwater, cost of water transport and distribution, density of populations, and water pollution levels. What is being seen (and is clearly demonstrated by the rapid rise of bottled water use) is that the urban issue is one of scarcity of clean and potable water, which is also a reason behind rainwater harvesting becoming more and more relevant for cities. **But water scarcity in Asia is not manifested across the board. It is characterized more by unequal access to water. For example, half the population in a city might get piped water and half might rely on vended water. Another example, involving irrigation, is where farmers at the head of a system might get plenty of water and farmers at the bottom of a system might miss out altogether on water for their crops. The challenge, then, is to overcome this lack of equality.**

Grossly underpricing water perpetuates the illusion that it is plentiful and nothing is lost when it is wasted. Many of the world's water shortages stem from failing to value water at anything close to its true worth. (Postel, 1997)

Most of the world does not treat water as a scarce resource. The foremost challenge related to water scarcity in developing countries involves inefficient water use in agriculture and urban areas and by industry. Inefficient use is linked to subsidized rural and urban water use. In line with this, irrigation water is essentially

not priced. The price of water in cities does not cover the cost of delivery. And capital investment decisions in all sectors are divorced from the management of this resource. It is not uncommon for water subsidies to go disproportionately to the better off (irrigation farmers and urban water users connected to public systems). (Rosegrant, 1995)

Industrial Water Use

Water utilities in cities often rely heavily on revenue from industrial users to stay financially viable. In Greater Colombo, for example, the average industrial tariff is six times the average domestic tariff. Yet industry is invariably not controlled in terms of location and type, so polluting industries, like carpet factories, are located upstream from domestic water users. There are very few industrial estates (where some collective treatment of effluents can be made). There are almost no incentives for industries to relocate to areas where they will have less effect on residential zones. There is heavy exploitation of groundwater (normally without charge) by industry, and there is little knowledge of or control over water use by industry in terms of water needs and conservation measures. In addition, it has been noted that some major industrial users of public piped water are using armed personnel to guard illegal connections. Moreover, in Sri Lanka, the sand mining of rivers—a livelihood for many and a cheap resource for construction—is allowing seawater to move far inland, which is upsetting the water supply intakes for several towns. In short, governance is a real issue in the industrial use of water in Asian cities.

Water for the Environment

The need for minimal "environmental flows" for water left in rivers during the dry season is now beginning to be recognized. These flows are still very low and probably inadequate, but recognition is at least a start. There is a need to consider the whole ecological regime of rivers, including fishing as a livelihood; fishing as a sport; recreational needs, such as swimming, sailing, and white-water rafting; flood and fertility regimes; artificial lakes with tourism potential; garbage control; and storage of wet season flows.

C. Policy and Management

This section examines policy and management by looking at different approaches and challenges.

ADB'S Water Policy

ADB's water policy (see Box 3.2) addresses approaches to water management and development. It seeks to promote the concept of water as a socially vital economic good that needs increasingly careful management to sustain equitable economic growth and reduce poverty. The conservation and protection of water resources in the region through a participatory approach are at the heart of the policy. References are made to specifics of the water policy throughout this book.

Management Principles

The following ideas reflect some of the latest thinking from South Asia.

- *Three sets of stakeholders—managers, users, and social auditors—need to interact.*
- *Society's ability to respond to local water management needs is primarily an issue concerning information, governance processes, and the structure of civil society.*
- *Watershed management has to do with afforestation and check dams as much as with livelihood issues concerned with irrigated agriculture.*
- *History suggests that an effective approach to water management may be to allocate equitable shares among stakeholders.*
- *Absence of clear water rights results in inequitable access to water resources, and the establishment of water markets and rights will create incentives for users to make efficient use of their water entitlements.*
- *The most effective instruments to reduce water demand may be agricultural price policies and subsidies.*
- *Management issues are rooted in interactions between complex and interdependent water resources and economic, environmental, cultural, institutional, and social systems. (Moench et al, 1999)*

Box 3.2 The Water Policy of the Asian Development Bank (in a Nutshell)

Promote a national focus on water sector reform. Developing member countries (DMCs) will be supported to adopt effective national water policies, water laws, and sector coordination arrangements; improve institutional capacities and information management; and develop a national action agenda for the water sector. Throughout, the needs of the poor will be specifically factored into legal, institutional, and administrative frameworks.

Foster the integrated management of water resources. Integrated management will be based on conducting comprehensive water resources assessments and concentrating interlinked water investments in river basins.

Improve and expand the delivery of water services. Focusing on water supply and sanitation (rural and urban), irrigation and drainage, and other subsectors, support will be provided for autonomous and accountable service providers, PSP, and public-private partnerships emphasizing equity in access to water for the poor and underserved.

Foster the conservation of water and increase system efficiencies. Packages that combine water use and resources management charges to recover costs, improved regulation and

increased public awareness, and provisions to ensure that the poor are not excluded will be supported.

Promote regional cooperation and increase the mutually beneficial use of shared water resources within and between countries. The primary focus will be on the exchange of information and experiences in water sector reform. Support will be provided to enhance awareness of the benefits of shared water resources, create sound hydrologic and socio-environmental databases relevant to the management of transboundary water resources, and implement joint projects between riparian countries.

Facilitate the exchange of water sector information and experiences. Socially inclusive development principles will be supported to promote stakeholder consultation and participation at all levels, increase the access of poor consumers to basic water services, and enhance water investments in DMCs through public-private and community-nongovernment organization (NGO) partnerships.

Improve governance. This will be accomplished by promoting decentralization; strengthening monitoring, evaluation, research, and learning at all levels, particularly in public sector institutions; and building capacity. (ADB, 2001a)

River Basin versus Local Management

On the one hand we learned at Dublin³ that water should be managed at its lowest practicable level, but on the other hand we are now told that comprehensive water resources management on a river basin basis⁴ is best. There is potential for conflict. This has to do as much with local versus national politics as with anything. We are seeing (in Sri Lanka) how it is very difficult to get various water users to agree on development and management on a more comprehensive basis. Allocation of water rights is still an issue. In many countries, irrigation authorities do not

willingly share information with water supply authorities. In default of the desired trading of water rights, however, we see other mechanisms, such as compensation and water levy payments, that mimic this type of trading. The Melamchi Water Supply Project in Nepal provides such an example (see Appendix 2, Kathmandu case study).

Managing Water Resources to Meet Megacity Needs

Some findings of a regional study and consultation on this subject—in the cities of Bangkok, Beijing, Delhi, Dhaka, Jakarta, Karachi, London, Manila, Seoul, Singapore, and Tokyo (ADB, 1993)—are presented. Ten years later the findings are still valid.

³ International Conference on Water and Environment held in Dublin, Ireland, in January 1992.

⁴ Management on a river basin basis is the management of water from the top to the bottom of its catchment of rainfall in an integrated manner, rather than the management of water within the confines of local authorities.

Problems

- Growth rates are explosive.
- The use of resources causes conflicts.
- Rivers and the living environment are polluted.
- The urban poor are marginalized.

Main Findings

- Controlling pollution is the top priority.
- Demand management by pricing is needed.
- Water must be treated as an economic as well as social good.
- Scope for recycling and reuse in industry and agriculture must be identified.
- Water is a priority need of the poor, and they are willing to pay.

Urban Planning

- Development strategies should have a horizon of 15–25 years.
- Urban zoning with industrial estates is needed.
- Development in flood plains should be avoided.
- Urban planning should integrate water planning with land use, housing, drainage, and environmental protection.
- Equitable sharing of water resources can be based on a basin development plan addressing social, political, and economic aspects of various options.
- Water resources planning and management should include monitoring the quantity and quality of sources.
- Investment cost analyses should include public and private expenditures, as the latter can be very high if the supply is intermittent.

Wastewater Disposal

- In dense areas of megacities, the long-term solution to wastewater disposal is piped sewerage and treatment with separate sewage and drainage pipes.
- Effluent discharges should be downstream from water supply intakes. Discharge standards should be consistent with water uses in catchments.
- Sanitation schemes that achieve local improvements in one area at the expense of others are not appropriate in megacities.

- Wastewater should be regarded as potentially having value for reuse in agriculture, maintaining surface water flows, and groundwater recharge.

Institutions

- Roles of agencies should be carefully defined.
- Water and sanitation utilities in megacities should be able to act as bulk suppliers to urban poor areas. Utilities and local governments should adopt flexible approaches to the provision of water to unauthorized settlements and base their decisions on commitments to pay for services.

Economic and Financial Aspects

- Demand side should receive more attention, and increased efforts need to be made to estimate demand and understand its determinants in an economic sense. Financial revenue estimation should increasingly be made on demand information, rather than simply estimating required revenues based on future financial costs.
- Subsidies, when used, should be explicit and transparent and target the urban poor. They should be directed at the demand side rather than the supply side.

Conflict of Water Users

The main users of freshwater in Asia are farmers (through irrigation), next come the urban water utilities that serve domestic, commercial, industrial, and some gardening and stock raising needs. Hydropower facilities are, strictly speaking, not consumptive users, but their activities do influence others. The environment needs a certain amount of water to be reasonably well maintained. And recreation and tourism also rely on freshwater.

By far the greatest potential for conflict among users involves irrigators and urban water utilities, as urbanization continues to grow at rates of around 5% per annum. First comes the desire to take over the water used by the irrigators, as it is the next nearest source of water to develop. Next comes the sale of farmland for subdivision and estate construction. But there is also great conflict between farmers for water. Those at the bottom end of the irrigation network invariably miss out in times of drought. Then there is the conflict that arises when water is taken from one locality or river basin and transferred to another for irrigation or water supply. Certainly the environment is greatly altered. Livelihoods (water wheels, irrigation, and fishing) are affected, and

aesthetics are impaired. Hydropower often involves dams for storage of potential energy, and these dams severely alter the regime of rivers for other users. When industrial and domestic water users mine groundwater, they are in conflict with future users, because access will be deeper and more costly, and the risk of saline intrusion will often be ignored until the damage has been done. Pollution of waters, especially by industrial users, affects other users of the water downstream as well as groundwater users. Religious use of water is greatly impaired by such activity. Finally, there is the potential conflict of use that results from local management of water versus comprehensive water resources management on a river basin scale. Watersheds involve the conflict between urban water users and inhabitants who live in or near watersheds and cut down trees for much needed fuel for cooking. When it comes to interbasin transfer, governments often state that water belongs to the nation, but more and more now the customary rights of the settled people are being observed. In line with this, their past and future use of water must be considered.

Unfortunately, where these uses conflict, it is not easy to compare apples with apples. The nearest we can come to that is (sadly) to put a monetary value on such uses and allow market forces to determine proper rewards and penalties. This means that we must recognize customary use now and in the future and allow current and future beneficiaries to participate in determining equitable sharing. Once trading water rights becomes a reality, conflict resolution by politics can be eliminated. But the impetus for trading water rights must come from domestic urban water users. When they pay tariffs of around \$0.40/m³, instead of roughly \$0.05/m³, there will be something with a realistic value to trade. But as long as domestic tariffs remain low, there will be little incentive to transfer water rights.

The case of water transfer from Melamchi Valley to Kathmandu Valley for domestic water supply is interesting, as the water levy is to be charged to consumers in Kathmandu Valley and paid to the people living in Melamchi Valley. In essence this is trading water rights, but it does not go under that name because legally the people of Melamchi Valley do not own the rights to that water, the nation holds the rights.

Chile has been a pioneer in introducing tradable water rights. In 1981, Chile's water code allocated (without charge) property rights to existing users of water. Property rights for new users were sold by auction. Property rights can be used for loan collateral and are assigned for consumptive and nonconsumptive uses.

Agriculture was and remains the largest consumptive use. The city of La Serena initially planned to construct the Puclara Dam to satisfy its rapidly growing water requirements. With the introduction of a water code, many farmers in the region recognized that the water rights they held had a higher value than their water's current agricultural use. Farmers put in place more efficient irrigation systems requiring lower water volumes and sold all or part of their water rights to the city at good prices. The transfer of the agricultural water rights to La Serena has led to the indefinite postponement of the dam's construction. The reduction in water use in the agriculture sector has helped control salinity, which was primarily caused by excessive use of water. Introducing an economic value for water rights has also had positive impacts on water utilities. For example, Chile's main water company chose to invest in the reduction of NRW rather than pay for additional water rights to meet its customers' growing demand.

Groundwater use by industries should first be examined to decide whether it is in the best interest of cities and their environments to relocate these industries. However, if it is found that these industries provide essential services, like the services provided by tourist hotels, their use of groundwater should be monitored in an effort to control extraction, and they should pay for the water used, as the water belongs to the nation and industrial use prevents or restricts other uses.

D. Conclusion

In most cases, but especially in South Asia, water is treated as a social rather than an economic good. The most pressing need is to get entire populations in urban areas connected to 24-hour supplies of potable piped water. Without tariff levels being appreciably raised, however, this is unlikely to happen. Yet affordability is not preventing such increases, as there are very few cases in which those connected to piped water pay more than 3% of their household income for the service.

Just as the past 20 years has shown that NRW cannot be reduced by dealing with this problem in isolation, it can be seen that water conservation and demand management cannot be introduced in the same way. They are part of the bigger picture of governance, policy, regulation, accountability, and transparency (see Figure 2.2). Conflict between water users is as much about governance as anything else. In the absence of clearly defined and transparent policies, ad hoc interventions or prevention by elected officials will continue to promote this kind of conflict. We need transparent

government policies covering watershed rehabilitation and protection; reduction of NRW; the increase of tariff levels, so that these curtail excessive demand; and regulatory bodies to see that policies are implemented. Such policies should include measures designed to educate schoolchildren on the need for and the ways and means of water conservation. And they should include provisions stating that utilities and regulators must create, through media, public awareness on these matters so that to some extent positive peer pressure can come into play.

Computerization will help everyone involved analyze the effects of tariff increases on demand and fine-tune this relationship over time. Carefully structured block tariff systems can ensure that the poor are not penalized and that demand is controlled. Gradual tariff increases matching service improvements are best.

In the end, it will be relatively high urban water supply tariffs that put pressure on nearby irrigation systems to either greatly improve efficiencies in water use or trade their water rights to cities.

The recent modeling of water demand and supply in Kathmandu Valley shows the value of comprehensive water resources management, which is not an exact science. Balancing economic, social, and environmental concerns is very much time dependent and influenced by outside considerations. Creating the Kathmandu Valley Water Authority, however, will give local governments some control over their environment and at the same time facilitate comprehensive water resources management at arm's length from these considerations. This study has highlighted the need for constructing good databases and maintaining them over many years.

More recently, the concept of managing water where it falls is being emphasized around the world, especially in regard to rainwater harvesting, control of storm-water runoff, and wastewater management. There are good lessons to learn from the beavers who gave America their wetlands by creating millions of small dams. We should think about floods and fertility. We need to think more about the morality of transferring water from one river basin to another. We should share good case studies through the Internet. We should learn from history. And we should learn to be proactive and not reactive in managing water.

In the years ahead we may come to judge our success at water management by our ability to share water equitably, to do more with less of it, and to restore life and integrity to the earth's rivers. (Postel, 1997)

Water Resources Management (Problems) in a Nutshell

- Watersheds are degraded—the trees have been felled and wet season rains are lost.
- Groundwater is overexploited because it is free.
- Irrigation is often a wasteful use of water—both in terms of crop types chosen and poor water delivery mechanisms.
- Urban water supplies have high rates of NRW.
- Underpricing water does not help conservation.
- There is conflict between urban and rural water users.
- Water pollution results from ineffective governance.

Water Resources Management (Solutions) in a Nutshell

- Water policies and social auditing are needed.
- Have long-term planning horizons.
- Introduce demand management through awareness and pricing.
- Plant more trees to rehabilitate watersheds.
- Plant crops that use much less water than do rice, cotton, and sugarcane.
- Do not subsidize water management.
- Remember the triple bottom line: environmental, social, and economic development.
- Develop rainwater harvesting in cities.
- Remember the beavers—build check dams.
- Trade customary water rights.

Chapter 4

Water and Sanitation Service Coverage



No piped water



Not enough of this

It is reported that coverage with improved water supply in urban Asia is 93%.⁵ But what does “coverage” mean? In Manila, coverage is calculated on 9.2 persons per connection, yet the 2000 census states that there is an average of 4.6 persons per household. In many cities in South Asia, more than half the people rely on standpipe supplies. Is that considered coverage? Likewise, intermittent water supply is considered the norm in many South Asian cities, and this type of service is classified under coverage. This chapter explores the real levels of water supply and sanitation service in Asian cities. For greater insight, the city water supply profiles in Appendix 1 may be reviewed.

A. Water Supply

The best measure of good water supply service in a city is 24-hour piped supply to the home. This is because 24-hour piped supply is linked to water quality and quantity, as well as to price, reliability, and convenience. Why is the percentage of people receiving piped water supply in many of Asia’s major cities (see Figure 4.1) so low? First, in some of these cities there are domestic wells—dug wells, shallow tubewells, and

deep tubewells)⁶—but as groundwater levels fall from overextraction, and the groundwater becomes either salinized from overpumping or contaminated by polluted surface water, this water use will be threatened. Second, there are, especially in South Asia, extensive intermittent water supplies due to low tariffs, low metering, and the extension of distribution systems beyond their 24-hour hydraulic capabilities (see Figure 4.2). Third, there are many people in areas of cities where there is no piped water. There is a failure of water resources and water distribution to keep up with demand. It is the people living in areas of cities where there is no piped water who deserve the most attention, because they are forced to pay the vended price for water. Most say a lack of funds has caused this situation. But in most of these cities, tariffs are low and well below affordable limits (5% of household income). If tariffs were raised, there would be money available to extend services to the urban poor who are not being served. It is all a matter of equity of services and good governance.

During the Indonesian Water Sector Reforms Seminar in 2001, the Government identified problems, which included low urban coverage, low tariffs, high debt service, low development agency support, and a lack of

⁵ (World Health Organization et al, 2000).

⁶ Postevaluation findings of World Bank and ADB projects over the last 20 years have shown that water demand is invariably overestimated. Mostly this is because people already have access to alternate water supplies, such as wells, and this has not been properly factored into designs.

Figure 4.1 Access to Sewerage and Piped Water Systems (2001)

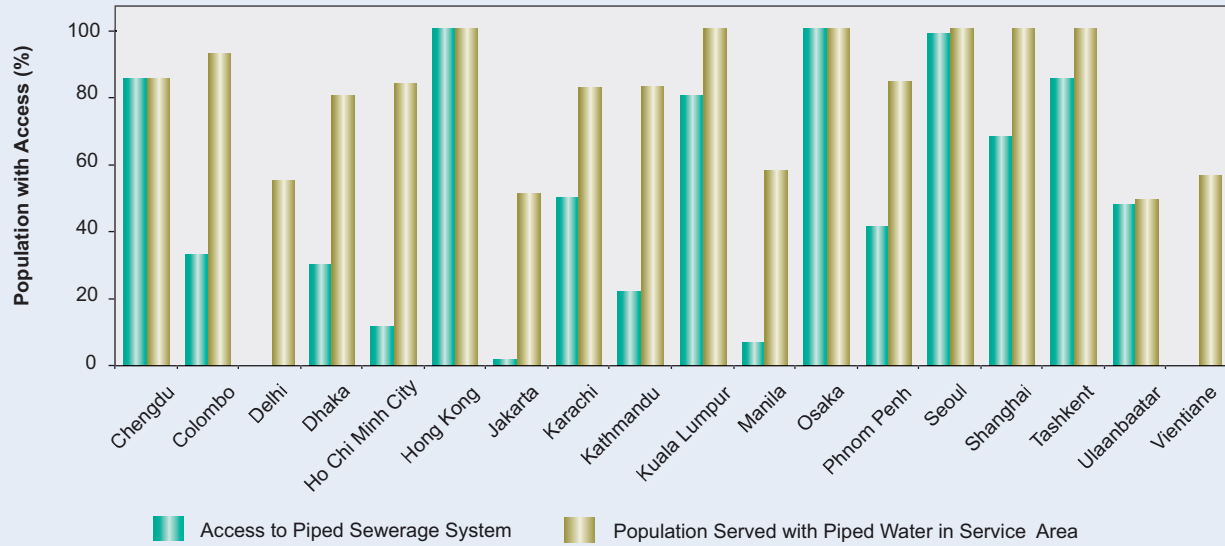
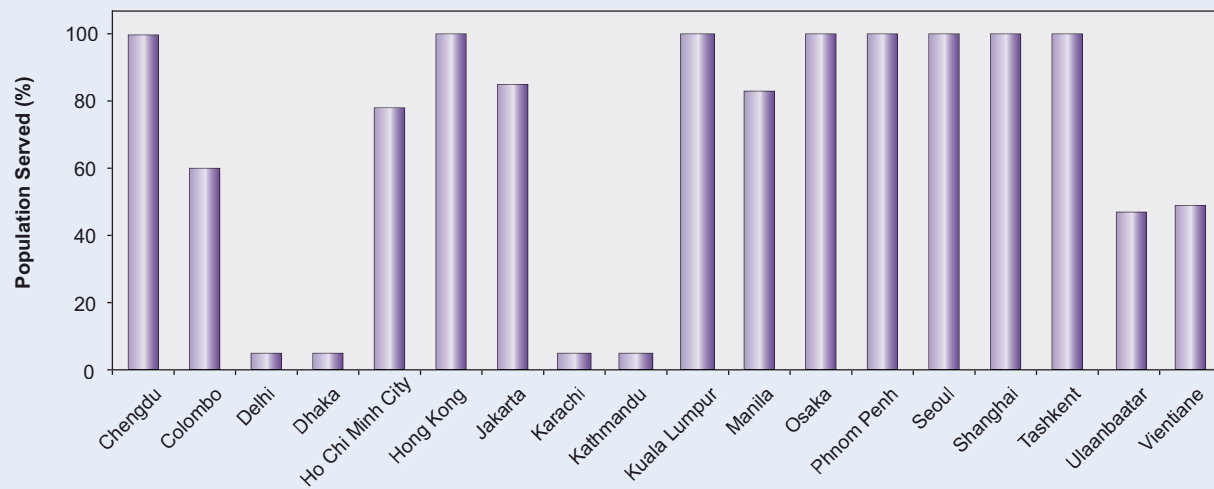


Figure 4.2 24-Hour Water Availability (2001)
[among population served]



coordination. Per capita consumption varies enormously (see Figure 4.3). What needs to be examined is the equity of supply. For example, some households get 6 m³ per month and others get 30 m³ per month. Appendix 1 gives more specific figures for per capita consumption from house connections.

A more objective way to look at coverage with piped water is to evaluate the population per connection for a given city. Table 4.1 examines this situation for some

Asian cities and shows the increase in the number of connections from 1996 to 2001. Some disturbing results surface: In Delhi, Dhaka, and Manila the increase in connections over these 5 years is 15%, 11%, and 10%, respectively. It is apparent that the rate of increase in connections to piped water does not match the population increase in these cities, which would be at least 2.5% per annum. The other disturbing result is that the “effective coverage,” using five persons per household, is close to 30% or below in 5 of 11 cities

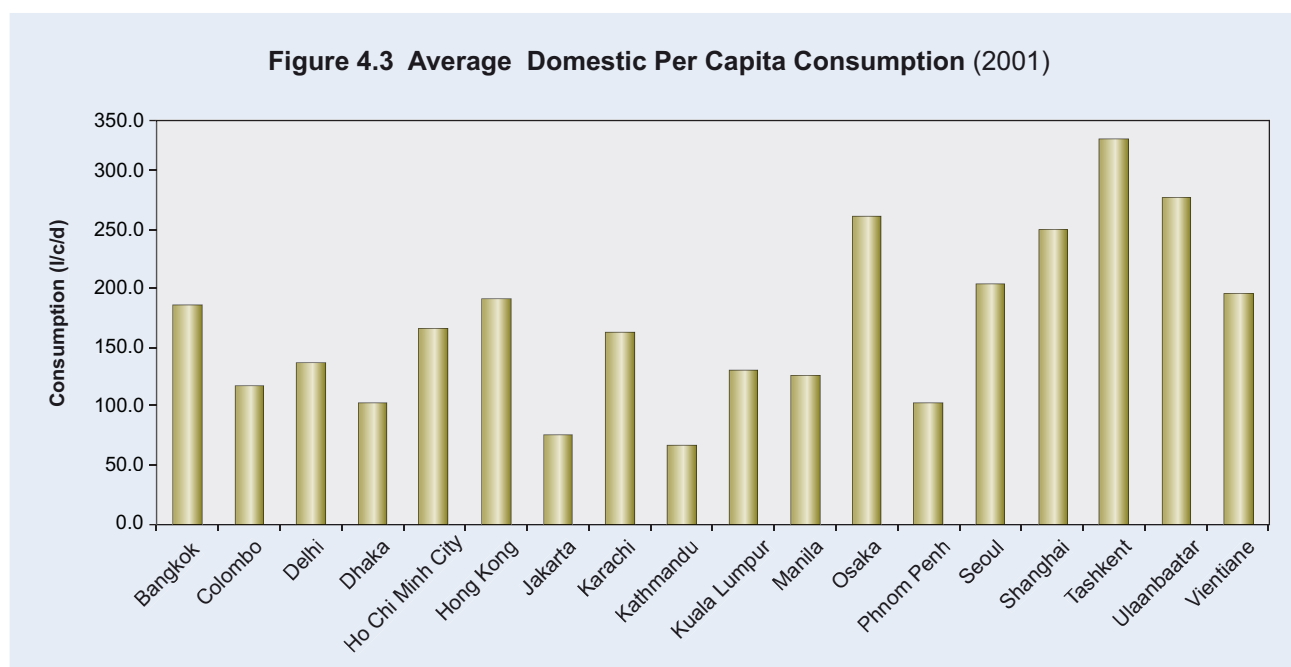
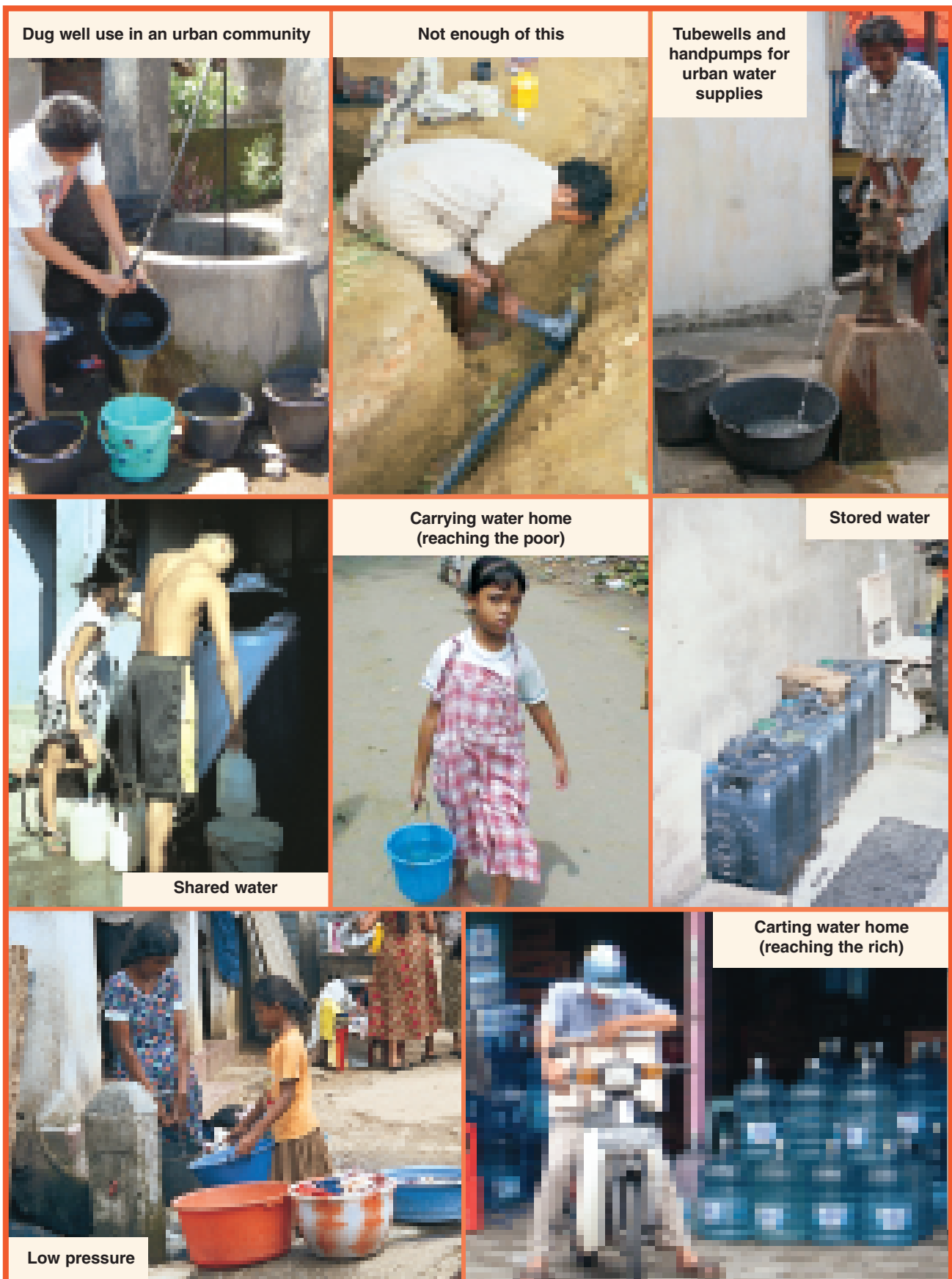


Table 4.1 Effective Coverage with Piped Water (based on connections)

City	Domestic Connections (1996)	Domestic Connections (2001)	Increase (%)	Population (2001)	People per Connection (2001)	Coverage ^a (%)
Bangkok	951,543	1,090,786	15	7.6 million	7.0	72
Delhi	1,096,916	1,266,303	15	13.8 million	10.9	46
Dhaka	160,000	176,823	11	9.0 million	50.9	10
Ho Chi Minh City	236,433	337,500	43	5.3 million	15.7	32
Jakarta	312,168	564,527	81	9.0 million	15.9	31
Karachi	830,366	1,280,000	54	13.5 million	10.5	47
Kathmandu	92,600	119,891	29	1.1 million	9.2	54
Manila	719,878	794,827	10	12.4 million	15.6	32
Phnom Penh	27,387	62,970	130	1.0 million	15.9	31
Shanghai	1,753,190	2,909,053	66	10.5 million	3.6	100
Vientiane	22,273	36,121	62	0.4 million	11.1	45

^a Based on five persons per household.



and is under 50% in 8 of 11 cities. It is time for all concerned to have a good look at what is going on. Shared connections, neighborhood resale of water, vended supply of water, standpipes, and intermittent supply are not good enough. It is time for Asia to set its sights on 24-hour piped water in all homes and design a road map to get there. The first step will of course be to more accurately determine the facts from the field, preferably through an independent public audit of water sources, levels of service, and the number of people not served with piped water.

B. Sanitation

In the 1980s, the focus was on sewage treatment. More recently, it has turned to wastewater treatment. Everyone would agree, however, that too little is being done to improve urban environmental sanitation, especially considering the rapid urbanization that is taking place in Asia's developing countries. The poor who are living in unauthorized settlements, located on generally low-lying land that is subject to flooding, are the most vulnerable. Hygiene education is needed, but water without sanitation still leaves the poor vulnerable to waterborne diseases. With good water supply as the top priority, there are just not enough funds left for major investments in sanitation. Catch-up is being played in water supply. So, when will attention be turned to sanitation? That question has been asked for the last 10 years and nothing much has happened. Without a doubt sanitation needs more advocacy. Does another epidemic like the cholera epidemic that hit Peru in the early 1990s have to occur before action is taken? When disease strikes, the cost can dwarf the amount that should have been spent on prevention. In Peru, in the first 10 weeks of the epidemic, losses in agricultural exports and revenue from tourism were greater than three times the amount spent on sanitation in the whole of the 1980s. Cities need to provide sanitation services to the entire population. Figure 4.2 shows that on average only 30% of the people in Asian cities have access to sewerage.

There are many factors to consider in sanitation: these include the needs of people (privacy, convenience, health, etc.), available resources (space, skills, financing, responsible agencies, etc.), and the local situation (climate, soil, surface water and groundwater, traditions, culture, religion, hygiene awareness, proximity of other people, leadership, and institutions). (Pickford, 1995)

Water and Sanitation Service Coverage (Problems) in a Nutshell

- There is inadequate reporting of service levels.
- Coverage in terms of 24-hour access to piped water in homes is very low.
- Alternate sources (especially groundwater) are often ignored.
- Intermittent water supplies are the norm in South Asia
- Standpipe water supplies are prevalent in South Asia.
- Little attention is paid to sanitation.
- The urban poor not being served are the main victims.

Water and Sanitation Service Coverage (Solutions) in a Nutshell

- Compare the number of connections with the number of people.
- Examine the extent of intermittent water supply.
- Examine the extent of standpipe supply.
- Examine on-site sanitation versus sewerage versus treatment.
- Undertake independent professional audits of service levels.
- Analyze root causes of inadequate coverage.
- Promote awareness of the situation among civil society.
- Address as a priority the needs of those with no access to piped water.

Chapter 5

Intermittent Water Supply

Intermittent water supply may be defined as a piped water supply service that delivers water to users for less than 24 hours in 1 day. It is a type of service that, although little found in developed countries, is very common in developing countries, especially in South Asia. Changes in water supply can be effected by Asia's growing middle class and its small but very powerful rich group, if they use their influence, but they do not do this because they secure their water supply as individuals through the use of tanks, pumps, and in many cases private wells. This chapter examines the consequences of intermittent water supply and suggests how this problem can be tackled.

A. Prevalence

Many South Asian cities provide less than 10% of the people in their service areas with 24-hour piped supply. In contrast, most Southeast Asian cities provide 80% or more of the people in their service areas with 24-hour piped water supply, but often large proportions of their populations are not served. Neither of these situations is satisfactory. In South Asia, the prevalence of intermittent water supply is so high that most people regard it as normal and are therefore not greatly motivated to do anything about it. In Kathmandu, in the dry season, most people get water for about one hour every other day. In Indian cities, two or three hours of water a day is considered good. See Figure 4.2 in Chapter 4 for the prevalence of 24-hour supply in some Asian cities.



One hour a day—no tap

B. Causes

The primary cause of intermittent water supply is extending distribution systems beyond their hydraulic capacities to provide 24-hour service. This is usually done at the behest of elected officials. In Kathmandu, for example, they continue to add 5,000 new connections a year, despite an inadequate distribution system. Other causes of intermittent supply are a failure to meter completely and accurately and a failure to charge and collect on sufficiently high tariffs. It is often said that there is not enough water for 24-hour supply. This is not valid, because much of the water available is wasted. What is needed is demand management. One city where this practice has been successful is Malé, where people get about 34 l/c/d and have a 24-hour piped supply. What determines their consumption is a high tariff (\$5/m³) and strict metering, billing, and collection (see Malé case study in Appendix 2). NRW, in terms of leakage and illegal connections, contributes to intermittent water supply by lowering water pressure in the distribution system. One reason given for designing systems to provide water intermittently is the high cost of pumping for 20–24 hours. What is probably not understood is that pumping times are drastically reduced when balance storage is constructed and metering, billing, and collection controls are set. Very low tariffs add to problems related to excessive pumping, since utilities that lack funds struggle to meet O&M costs if there are long pumping hours.



Diverting supply to one location

Coping Costs of Intermittent Water Supply



Queuing for water



Underground storage



Rooftop storage



Buying bottled drinking water



Booster pumping

C. Consequences

Households with intermittent water supply must invest extra money in pumping, storing, and treating this resource. In Kathmandu, for example, as much as one half of an average power bill can be attributed to the operation of a pump. Consumers without access to a 24-hour supply tend to use more water than others. Because they are never certain when they will next be served, they throw away the surplus “old” water from yesterday to make way for “fresh” new water today. Intermittent supply causes anxiety, and generally one person from each residence has to devote time to ensuring that water is received when it comes. Valve operators can extract bribes from consumers who wish to ensure that they will receive adequate service. Sometimes females must venture out into the dark at 2:00 a.m. to retrieve water from standpipes, which can make them vulnerable to assault. No water from an intermittent water supply system is safe to drink, because under vacuum conditions foul water can be drawn into the pipes. Certainly hygiene education is important under these conditions, which put at risk people connected to an intermittent supply. Most meters do not register accurately under intermittent supply conditions, raising doubts as to the validity of metering at all. Constant valve manipulation increases the need for more frequent valve maintenance and replacement. Another consequence of intermittent supply is overexploitation of groundwater, particularly by industries (see the Kathmandu case study in Appendix 2). Last, the quantity of water to be made available over 24 hours has to be made available in fewer hours in an intermittent system, which requires distribution pipes with larger diameters. The findings of a conference on intermittent water supply held recently in Mumbai (India) are shown in Box 5.1.

Experience has shown that, once intermittent service becomes the norm, the hours of service continue to decline. The high costs of intermittent supply are paid by the utility, which incurs higher investment and operating costs; the customers, who pay to cope with unsatisfactory service and to protect themselves against unsafe water; and the population as a whole, as the risk of epidemics increases due to the consumption of contaminated water. (Yepes, et al, 2001)

Box 5.1 Intermittent Water Supply (Mumbai Conference, January 2000)

Advantages (perceived)

- *Leakage of water is reduced.*
- *Available water is distributed equally.*
- *There is time for repairs and maintenance.*

Disadvantages

- *Systems do not operate as designed.*
- *Reservoir capacities are underutilized.*
- *There is frequent wear and tear on valves.*
- *More manpower is needed.*
- *Contaminated water requires consumer treatment or the use of bottled water.*
- *Higher doses of chlorine are needed.*
- *Oversizing of networks is needed to supply the necessary quantities in a shorter time.*
- *Inconvenient supply times mostly affect the poor.*
- *Consumers have to pay for storage and pumping.*
- *Water meters malfunction, which can lead to a loss of revenue and customer disputes.*
- *Accountability per subzone is not provided.*
- *In case of fire, immediate supply is unavailable.*

(Indian Water Works Association, 2000)

D. From Intermittent to 24-Hour Supply

To move from an intermittent to a 24-hour supply, it must be accepted that governance and tariffs are at the core of the problem, and those issues must be addressed first. Then it will be necessary to embark on extensive stakeholder awareness programs to convince people that 24-hour access to piped water in the home is possible for all. For this type of service to become standard, moratoriums must be imposed on new connections while distribution systems are

being hydraulically improved. This is best done by starting with 24-hour supply zones and gradually expanding these. Higher tariffs can be imposed on those with 24-hour supply, and the extra funds can be used to improve systems. When tariffs are sufficiently high, there will also be less water used in 24-hour zones, making more water available for use when these

zones are extended. Twenty-four-hour zones must be 100% metered, and meters must be accurate (if they are found to be inaccurate, they must be replaced). District metering can be installed to pursue NRW goals, and full computerization of accounts in 24-hour zones should be accomplished. Illegal connections must be pursued in the field—this is a fundamental governance issue.

Intermittent Water Supply (Problems) in a Nutshell

- There is a high prevalence of intermittent supply in South Asia.
- Intermittent supply is caused by extending distribution networks beyond their hydraulic capacities, often at the behest of elected officials.
- Low tariffs and poor collection contribute to intermittent supply.
- Compared with 24-hour supply, intermittent supply uses more water.
- Intermittent supply leads to higher costs and greater inconvenience for consumers and utilities.
- When the supply is intermittent, consumers risk contracting diseases from using water that is not potable.
- Intermittent supply can lead to the exploitation of the poor (who often have to use bribes to get adequate service).
- Expectations of consumers (due to a lack of awareness) are low.

Intermittent Water Supply (Solutions) in a Nutshell

- Promote awareness among stakeholders.
- Address governance issues related to the autonomy of utilities.
- Introduce higher tariffs for 24-hour zones.
- Place moratoriums on new connections.
- Invest in hydraulic modification of distribution systems.
- Start with 24-hour zones, and then expand these.
- Enforce strict metering and collection.
- Reduce NRW.

Water and Poverty

There are many links between water and poverty, and some of these are identified at the start of this chapter. One of these links—the economic link—is best illustrated by the dramatic effect it has on the poor getting connected to piped water. Disposable income can increase by up to 20% as a result of moving from vended water to piped water. This chapter discusses the access of the urban poor to piped water, how connection fees act as a constraint, and affordability and willingness to pay. The issue of environmental sanitation and how it affects the poor is also discussed. Comparisons are made between those connected and those not connected in terms of the volume of water used and its cost.

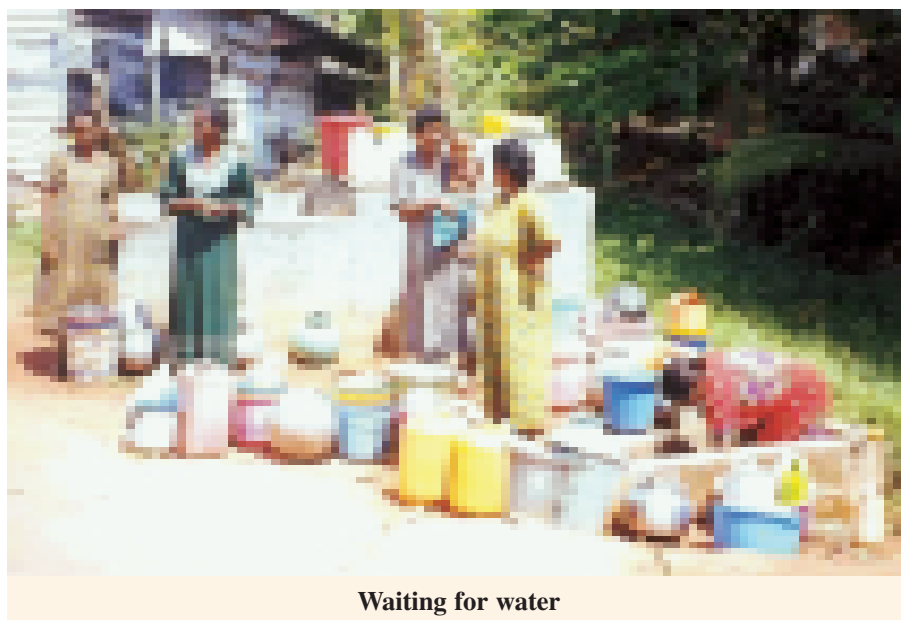
A. Links

There are many links between water and poverty.

- (1) Water and poverty are linked by access to potable piped water. There are two parts to this. The objective is 24-hour access to potable piped water in every home. **Poor people either have no access to piped water and must buy water from vendors or they have access but service is very poor** (like standpipe water that is 500 meters away from the home and available for one hour each day).
- (2) Water and poverty are linked by **the economic effects of inadequate service**. If a poor family in Manila pays 900 pesos each month for vended water, but would only be paying 100 pesos each month if connected to piped water, that family is greatly affected economically. That extra 800 pesos each month, out of a total monthly household income of 6,000 pesos, could be the difference

between a family of six living in a building made of temporary materials (without windows) that rents for 1,000 pesos per month and living in a house made of permanent materials (with windows) that rents for 1,500 pesos per month. It could be the difference between buying rice or electricity on credit with effective interest rates of 20% per month or buying those commodities at normal prices.

- (3) Water and poverty are linked by the people who are **last in line to get piped water**. Private concessionaires are not too eager to connect the poor because they do not buy much water, cannot pay for connection fees up front, and often lack the security of land tenure (see Box 6.1). Concessionaires fear that the poor will not pay and that they will not be able to afford to connect properly in unauthorized settlements. Elected officials often tell these families that “piped water will be available next year,” but often nothing happens. The poor do not have access to reliable information.
- (4) Water and poverty are linked by the **quality of water that the poor receive**. The cheaper vended water cannot be used for drinking, and it



Waiting for water

Box 6.1 Difficulties Encountered in Serving the Urban Poor

It was realized that land tenure is complex and an issue. The reason for this is that supplying water will alter the status of the land. Moreover, regularization of land tenure before introducing water and sanitation is important. Tap water in every home cannot be seen as an aim in itself. A transition period will be required to achieve this goal.

- **Problems in equipping poor neighborhoods:**
 - (a) Connection costs are too high.
 - (b) There are high percentages of unpaid bills.
 - (c) There are high rates of unbilled or fraudulent consumption.
 - (d) There are low levels of individual consumption.
 - (e) Network maintenance costs are high.
- **Problems related to equipping areas of spontaneous and temporary housing:**
 - (a) Authorities will not legalize/recognize settlements.
 - (b) Crime and vandalism are rampant.
 - (c) It is impossible to draw up a customer file.
 - (d) Billing methods are inappropriate.
 - (e) The situation is precarious.
- **Solutions regarding connection fees:**
 - (a) Spread out payments over several months.
- (b) Labor participation.
- (c) Extend grants where town councils supply materials.
- (d) Welfare connections.
- (e) Microloans.
- (f) Pooled investments.
- (g) Municipal tax compensation.
- **Neighborhood resale:**
 - (a) A person connected to a network sells water to a person who is not connected (this is regularized in Jakarta, Phnom Penh, and Ho Chi Minh City).
 - (b) In Jakarta, 30% of the people buy water from street hawkers.
 - (c) Is believed to make a considerable contribution to making potable water more widely accessible in disadvantaged areas, which justifies its gradual regularization in developing countries.
- **Conclusion:**

Disadvantaged areas need a special approach that leaves concessionaires some flexibility.

It is best to spread the cost of the work in disadvantaged areas among customers who are already connected, municipalities, developers, future customers, and any donor institutions. (Lyonnaise des Eaux, 1998)

often stains clothes during washing. The **reliability** of supply is not good, and new sources sometimes must be found at a day's notice.

- (5) Water and poverty are linked by **intermittent supply**. The extra costs related to this type of service can be seen in terms of **distance to access**; **inconvenient** times of supply (in Kathmandu water could arrive at 2:00 a.m.); uncertainty and **anxiety** over when water will come; **bribes** to ensure that water will come; **sleep disorders**; waiting in **queues**; **conflicts** with neigh-

bors; the **burdens** of carting water, in-house storage, and boiling and filtering water for drinking and cooking; and finally the **security** risk for women sent to retrieve water at night (see Box 6.2).

- (6) Water and poverty are linked by the poor who rely on groundwater and household or community wells. Water and poverty are also linked by the always increasing and real threat of **falling groundwater tables**, which require water to be pumped or the unaffordable deepening of wells. Saline intrusion, caused by overextraction of

Box 6.2 Poor Water Supply Service in Kathmandu

In a letter published in the Kathmandu Post on 17 June 2002, Paliza Shrestha stated the following.

The supply of water in Kathmandu city is grossly irregular. There's literally no schedule, whatsoever, for when the water comes and goes, and on several occasions we (Bansbari tole) have no supply of water. Water is a daily necessity. It is impossible to carry out household activities without water. Also, it becomes very annoying to get up early in the morning every time to check whether water has come or not. Due to this we have had to put up with sleep disorder. Almost every day the issue worries us. Most of the time since there is no water supplied to our taps, we have to walk long distance to collect water from waterspouts and at other times from the neighborhood. We use our store of water cautiously as we are afraid there won't be enough water for the next day. Add to this the pain of going to a Dhungedhara (waterspout) waiting in long queues, washing clothes, and bringing them back to our houses. Sometimes there are conflicts between landlords and tenants over sharing water. I see many people at Dhungedharas fighting.

It is the responsibility of the Government to provide a reliable water supply. The Government should take our plight seriously. Why on earth can't they just provide a regular supply of water? I don't think we are asking too much. A fixed timing of water should be printed in the newspapers (both in English and Nepali) as well as posted on radios and TVs. Perhaps this will make the life of the urbanites a bit easier.

groundwater by industries, can also wipe out a cheap source of water for the poor.

- (7) Water and poverty are linked by the possibility that the poor connected to piped supplies can be exploited. If one family manages to get a connection and shares the water received with several neighbors, all are charged at high consumption penalty rates, because of **block rates** tied to consumption.
- (8) Water and poverty are linked by the whole **inequity** of a situation in which the poor get the worst service—intermittent water supply through standpipes, no service at all, or vended water in lieu of piped water—while the rich or better off get relatively inexpensive piped water. Invariably, the poor consume around one fifth (6 m³ per month) of what those directly connected to piped water consume and pay five times the amount the rich pay. Subsidies benefit the rich more than the poor.
- (9) Water and poverty are linked by private sector contracts not being based on a policy of connecting the poor, which leads to **regulation by contract**. This situation has made it necessary for concessionaires to increase tariffs to invest in connections to the poor, and this has proved hard to do.
- (10) Water and poverty are linked by **private operators** with concessions promising to bring investment funds to the table to improve coverage, which they have not done, and water and poverty are linked by the poor suffering as a consequence.
- (11) Water and poverty are linked by the status quo and vested interests working against the poor. **Water vending** is a very big business, and elected officials and utility staff have been



Even the water vendor is poor

known to receive a share of the profits. It is not in the interests of such persons to help the poor get connected to piped water. Some of the so-called NRW can be bought by water vendors with the permission of certain authorities, and these authorities would then collect money from its distribution.

- (12) Water and poverty are linked by the **poor suffering more than others from corruption**. In Bangalore (India), a study on governance (Paul and Sekhar, 1999) concluded that one poor household in four pays bribes for getting its problems solved at public agencies. Moreover, evidence indicated that the poor pay a higher price for corruption than others. While government subsidies are high and the money trail runs through governments, the poor will remain underserved or not served with piped water, because there are not enough funds to invest.
- (13) Water and poverty are linked by the **lack of transparent government policies** that target water service to the poor. Sometimes these policies are made for development agencies but are later ignored or forgotten.
- (14) Water and poverty are linked by the rich being able to afford to protect themselves from disease by buying **bottled drinking water** and the poor not being able to afford this luxury.
- (15) Water and poverty are linked by the poor being made to suffer in regard to sanitation as well as water service. Many underprivileged citizens have no access to **formal sanitation facilities** and must defecate in the open or in hanging latrines. Women in particular suffer ill health as a result of not being able to use public sanitation facilities.
- (16) Water and poverty are linked by **very low consumer expectations** in regard to water services. In parts of South Asia, people are happy to get water from standpipes for one hour every day. They do not know that they are entitled to a 24-hour piped supply in their homes, like that enjoyed by others elsewhere in the world.
- (17) Water and poverty are linked by the rich being able to afford to pay bribes to get **illegal connections** and the poor not being able to do the same.
- (18) Water and poverty are linked by **connection fees** being often over \$100 and the need to pay these up front. The poor cannot save that amount of money, especially when paying for expensive vended water.

- (19) Water and poverty are linked by connected consumers having a collective voice and **the poor who are not connected having no voice**.

B. Water Policy

ADB's water policy is linked to its poverty reduction strategy. The policy specifically provides for the involvement of the poor in water conservation and management. It recognizes that the specific needs and vulnerabilities of the poor are central in formulating sound and equitable water strategies. The poor must be enabled to influence decisions that affect their access to water for both consumptive and productive uses. The policy also reflects the considerable potential that exists for mobilizing community efforts to directly contribute to pro-poor water development, and it requires the development of knowledge bases related to the water needs of the poor.

C. Connection Fees

Connection fees in many Asian countries can be as high as one fifth of a poor household's annual income, thereby making it difficult if not impossible for



Burden of carrying water



Should be in school

the poor to connect. In most cities there is no option apart from up-front lump sum payment. A survey of 20 Asian cities revealed that half require the connection fee to be paid up-front in a lump sum.⁷ Phnom Penh officials say that the problem the urban poor face is the connection fee being too high, which inhibits connection and therefore demand. Formal water supply is one fourth the informal cost in terms of the tariff but higher in terms of the connection fee. In Andhra Pradesh (India), when the Government dropped the connection fee from 4,000 to 2,000 rupees, more than 5,000 households registered. Using the cash inflow, the municipality extended its distribution lines to other areas that were not served. **One-off connection charges may impede access, so these costs should be recovered by monthly charges over a period of up to 5 years. In the case of new development, these charges can be included in financing the total cost of the undertaking.**

⁷ I have found from field experience that, even if the official policy is to allow connection fees to be paid in installments with the tariff, often the people are unaware of that policy.

D. Low Coverage and Low Service Levels

Notwithstanding PSP in water supply in Manila, there are still about 5 million people in the city who do not have direct access to piped water. This would be reasonable if they have an acceptable alternative supply, such as tubewells with handpumps or dug wells, but in most cases they do not. Instead, many pay up to 20% of their household income to buy water from vendors. A typical example would be one quarter of a family's water (sourced from the utility) purchased at high cost for drinking and cooking and three quarters of its water (sourced from groundwater) purchased at lower cost for washing and bathing. The situation that pertains to Manila is repeated in other cities in Southeast Asia. In South Asia, the situation is somewhat different. In general, coverage with piped water is more complete, but the service levels are lower than in Southeast Asia. Intermittent water supply is the norm, with many people receiving water for only one hour every other day in the dry season. Furthermore, there are many people served only by standpipes, which results in queues for water and the burden of carting it home, when and if it comes. It is important to note that it is mostly the urban poor who do not have 24-hour access to supplies of piped water. The more fortunate rich often enjoy 24-hour piped supplies. The experience of a standpipe user in Delhi is described in Box 6.3. This illustrates that, even though standpipe water may be nominally free, the cost of transport to get this water home makes it effectively very expensive (\$2.50/m³).

It seems that increased scarcity of water results in those who control it taking advantage of the poor. For example, a valve operator in Kathmandu once confessed (with a grin on his face) that he worked 18 hours per day, 7 days per week, because the bribes he received paid him to do so.

The cost of intermittent water supply to the consumer is considerable. A group of consumers in Kathmandu was asked to compare what they paid for water with what they paid for electricity. The finding was that their electricity bills were almost 20 times higher than their water bills. This was unusual, because the average ratio in Asia is around 4:1. Upon further discussion, however, it was revealed that half of the cost of the electricity bills resulted from pumping water. So, from this example, it can be seen that pumping can be a major cost associated with intermittent water supply. Storage and treatment (boiling and filtering) costs are also appreciable.

Box 6.3 Standpipe Supply in Delhi

A family of five people living in an unauthorized settlement uses groundwater for washing, bathing, and cleaning, but travels 1,500 meters to a standpipe each day to get 40 liters of water for drinking and cooking. The water is available at the standpipe for just six hours each day and is free. The journey on foot takes about 25 minutes, and depending on the season (summer or winter) it may be necessary after arrival to queue for water for 15–60 minutes. The journey home is by rickshaw and costs \$0.10 per day (this equates to buying water at \$2.50/m³ or a monthly water bill of \$3). At home the family has 500 liters of storage, which is used mostly for groundwater. The standpipe water is used for drinking without boiling or filtering. The family members are happy enough with the water utility, because they can access good water. But they say nothing can be done to get them a house connection to piped water, as the utility has not planned to provide water to this unauthorized settlement. When asked about the worst thing related to collecting water, the answer was “the long distance to be traveled and the long queue.”

The unsatisfactory state of water supply in Asia (many people not served or poorly served) is the consequence of numerous forces interacting to reach a comfortable situation for the controlling stakeholders. The status quo is a natural state and has its own inertia. Moving from that state requires considerable new forces to overcome that inertia.

E. Affordability

People often hear that the poor cannot afford to pay water tariffs. This is not the case, and proof of this comes from Manila, where a typical household connected to a piped supply pays around \$4 each month for water and uses 30 m³ per month, while the urban poor not being served pay around \$20 each month for their water and use 6 m³ per month. Having to pay an up-front lump sum of around \$100 for connection fees, however, is more than can be expected of the poor. Other arrangements are needed.

If a ceiling of 5% of household income is imposed for combined water supply and sanitation affordability,

there will be plenty of revenue. In cities like Manila the income profile is wide ranging, so the tariff structure can be fine-tuned to optimize this state. Utilities must, however, become better informed about that profile before they do the fine-tuning. They must also not ignore alternative water sources and services.

It was recently found in India that households in Dehradun receiving the existing intermittent water supply were willing to pay more than twice the prevailing rate to receive a continuous water supply. It was further discovered that, on average, households were paying up to five times the prevailing rate in coping costs, which arise from the existing irregular and unreliable supply. In Delhi, in 1998, households paid up to 2,000 rupees per year in direct and indirect coping costs resulting from existing intermittent supply. This revenue source was not tapped by formal providers, as it was paid directly to smaller and unregulated private sector interests. It was also found that if tariff increases are implemented without increases in service, consumers are not likely to be convinced to accept future proposed increases. (Water and Sanitation Program, 2001)

F. Environmental Sanitation

City slums are often located in areas where the installation of water systems presents engineering problems. For example, several such areas are on steep slopes and at higher elevations than storage reservoirs. Water must therefore be pumped, resulting in additional costs. Invariably it is the poor who live on marginal lands



Health risk



Unsanitary conditions

that suffer from flooding one time and poor drainage the next. Land tenure has been an issue, so the poor are often forced to be unauthorized settlers and still pay an informal rent to those who control even public lands. Toilets are often hanging latrines. Hygiene education is lacking for many of the poor, so they suffer from bad hygiene as well as bad water service. The matter of the right of the poor to live and work in our cities is addressed in Box 6.4.

G. Government Policy and Governance

The issue of water and poverty is about governance, including the lack of transparent and implemented policies directed at getting the poor 24-hour access to piped water. The poor are willing and able to pay for piped water, but governments are in general unwilling to increase tariffs to a level that would provide the funds needed to invest in connecting the poor. A large underground economy involving water vendors is flourishing, but vested interests (including governments, utility staff, and the private sector) are not eager to change the status quo.

Everything begins with policy—let us not forget that.

But policies must be developed after consulting with stakeholders, and the policies must address the main issues. Most of all, policies must be transparent and kept in the public eye. They must specifically target the urban poor in terms of (i) piped water access in homes; (ii) 24-hour supply; (iii) affordability, willingness to pay, tariffs, and tariff structure; (iv) priority of service; (v) water quality; (vi) alternative sources; (vii) water quantity; (viii) private sector obligations; (ix) sanitation facilities; (x) information; (xi) water vending; (xii) bottled

Box 6.4 Mega Slums—The Coming Sanitary Crisis

Too often in the past development policies have failed because those whose lives were supposed to be transformed were not consulted, and their views and wishes were not heard. Policy makers must therefore recognize that the energies of the poor are a resource that can be tapped to help find solutions to the problem of squalor. A fundamental change in public attitudes is needed. Instead of simply using the poor as a source of cheap labor, the right of the poor to belong to a city, and to become permanent residents in every meaning of the term, must also be acknowledged. In line with this, more modest types of urban settlements and amenities, within the scope of building and other municipal regulations, must be accommodated. And it must be recognized that appropriate service delivery systems need to belong to their own consumer context, not to standards of technological excellence set in Europe that come with a corresponding price tag. What poor communities need is freedom from extreme commercialization generated by water scarcity in their neglected and underserved localities. They also need help in overcoming the many disadvantages they experience due to their relative lack of socioeconomic and political clout. NGOs have a special role to play in facilitating change. (Black, 1994)

water; (xiii) connection fees; and (xiv) the right of access to water. In line with this, policy makers may want or need to do the following.

- Look at how water vendors can be turned into distribution caretakers.
- Require an assessment of subsidies to determine tariff policies.
- Consider the income profile of a city first.
- Consider a ceiling on affordability set at 5% of household income.
- Consider that hiking tariffs helps the poor, not only by having the funds to invest in connecting them to piped water but also through reducing water demand and releasing the water to serve them without the extra costs of source development.

- Consider that those with piped water should be obliged to pay a little more, so that those without piped water can get connected.
- Encourage NGOs to form consumer societies that look after the interests of the poor, especially those not connected to piped water.
- Consider direct subsidies to the poor, such as those subsidies introduced in Chile (see Box 6.5).
- Consider installing public toilets, such as those used in Pune (India).
- Consider recognizing water vendors and other small-scale water providers.
- Look at rainwater harvesting as a way of helping the poor.
- Encourage the media to bring information to the urban poor.
- Encourage a consumer service targeted at the urban poor.
- Require that the plight of the urban poor is benchmarked, monitored, and published regularly through a public audit of water service levels.
- Insist that policies for the poor are regulated and that social auditors are appointed.
- Consider whether bulk sales of water to the poor and neighborhood resale comply with policies.
- Consider hygiene education for the urban poor.
- Target the schools first.
- Look at how one connection can equitably serve several families.

The PRC has some good (safety net) policies related to water and poverty. For example, in the city of Zhangjiakou, Hebei Province, poor families (those that receive welfare from the Civil Affairs Bureau) are entitled to receive a cash rebate on 5 m³ of consumption per month.

Civil society can help create the necessary public awareness to pressure governments into enacting the right policies (those that will ensure equitable water service for all) and the proper strategy (increase tariffs significantly) to achieve this. Civil society should include all stakeholders, including served consumers, the urban poor not being served, utilities, the private sector, unions, government officials, elected officials, NGOs, journalists, and academics.

H. Raise the Tariff to Help the Poor

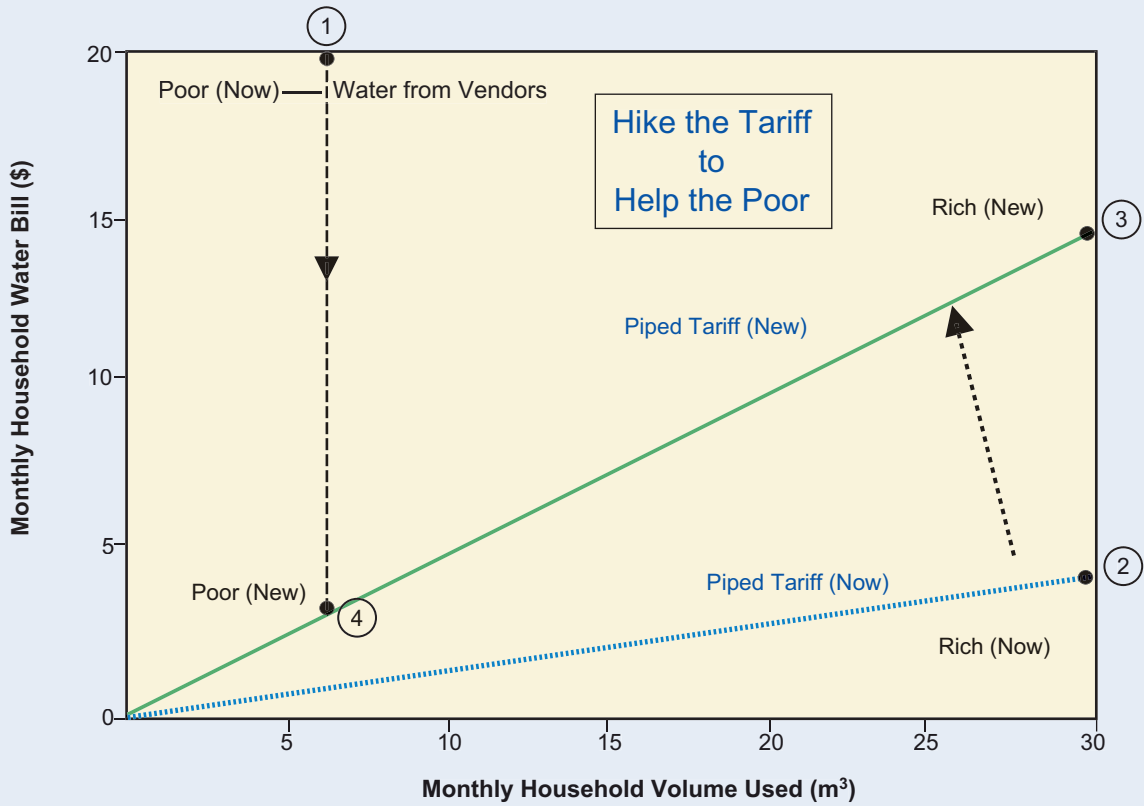
The irony of the situation is that the main way to help the poor is to substantially raise tariffs. This will free up funds for investments designed to connect the poor and turn intermittent water supply into 24-hour supply (without standpipes). A hypothetical example is shown in Figure 6.1, and an actual example is related in Box 6.6 (see also the Colombo and Phnom Penh case studies in Appendix 2, which illustrate the ability of consumers to pay for water).

Box 6.5 Output-Based Subsidies for Water Consumption

- *Chile introduced an individual means-tested consumption subsidy a decade ago. Although the public authorities determine how the subsidy is applied, the mostly private companies deliver the service.*
- *An important part of the reform was a new tariff setting methodology aimed at raising water prices to the true economic cost of the service.*
- *The Government reimburses the companies for the subsidies based on the actual amount of water consumed by each beneficiary.*
- *By law the subsidy can cover 25–85% of a household's water and sewerage bill for consumption of up to 15 m³ per month, with the client paying the rest. All consumption above that limit is charged at the full tariff.*
- *An eligibility scoring system is the main instrument used in Chile for distributing means-tested subsidies. It produces a score for each household wishing to be evaluated, which is based on a personal interview and the answers to 50 questions. The score is valid for 2 years and can be used to avail of other subsidies, including pensions, family benefits, and health benefits.*
- *Metering is essential, and it requires a strong institutional capacity at the municipal level. It is expensive to apply output-based subsidies just for water, but when combined with other benefits it is more cost-effective.*

(World Bank, 1999)

Figure 6.1 Effect of Tariff Increase on Rich and Poor



- For the Poor ① \$20 → ④ \$3 (6 m³) Average Tariff (Now) = \$0.13/m³
- For the Rich ② \$4 → ③ \$15 (30 m³) Average Tariff (New) = \$0.50/m³



Water queue for the poor



Bottled water for the rich

Box 6.6 Hiking Tariffs to Help the Poor

Winnie Flores (shown on front cover) lives at the Manggahan floodway in Metro Manila. She is one of about 5 million people who still have no access to piped water. She pays almost as much for water as she does for rent. Winnie could greatly improve her quality of life if she could get connected to piped water. "It's coming next year," she has been told. But she has listened to that line for the last 5 years.

Recently, when her husband lost his job, they and their four children had to move to cheaper accommodations, costing 1,000 pesos a month. Yet Winnie pays 900 pesos a month for 6 m³ of water, while many connected to piped water pay about 160 pesos a month for 30 m³. She gets her water from two sources: the first is an entrepreneur who drilled a well to pipe water to some families in the neighborhood. Winnie buys eight 16-liter jerry cans per day from this vendor for 10 pesos. The water is of poor quality. Her second source of water is another vendor, who comes twice a day to deliver 16-liter jerry cans of drinking water sourced from a water main about 2 kilometers away. She buys four containers a day at 5 pesos a container.

Why are Winnie and so many others in this deplorable situation? It is not a question of land tenure—the neighborhood has concrete streets and many homes built with permanent materials. It is all about where the funds are to bring the urban poor piped water. When PSP was introduced, many said that the private sector would invest funds in water supply and improve efficiency by reducing NRW, etc. In reality, after almost 5 years, NRW has not been reduced greatly and new funding has been much less than expected. What happened?

The "water crisis" in Manila in 1996 was the rationale for the introduction of PSP, which was completed in just 18 months. Unfortunately, two mistakes were made. First, the contracts with two different concessionaires were not based on a formal and publicized government policy that might have included serving the urban poor. There was no independent regulator to monitor the implementation of the policies and to see that the contract conformed to these. Instead, the former Metropolitan Waterworks and Sewerage System was appointed as a regulator, but it ended up acting as a contract administrator. The second mistake was having

concessionaires compete to provide water based on the lowest tariff. The winning bids were 57% and 26% of the pre-bid MWSS tariff. The signal most likely sent to consumers was that water was very plentiful and ready to be used. It lulled consumers into a false sense of security.

When El Niño and the Asian currency crisis came along, one of the concessionaires started asking for a major tariff adjustment. When would they get the money to get on with the efficiency measures and connect the millions without access to piped water? The answer was, "Sorry, it is not in your contract." Of course, had the contract been based on a policy of connecting the poor, it would have been easy for the two parties to get together to amend the contract and align it with the policy and agree on a tariff hike. After all, both concessionaires are guaranteed a certain rate of return based on the whole contract. But there was no policy, only a constricting and restrictive contract. So, for a couple of years, the Government (not the regulator!) fought to resist the tariff increase. Who was this hurting? Without a doubt the poor, like Winnie, who are still not connected.

One of the mysteries is why NGOs did not assist the poor by demanding a tariff increase. In the end, the poor asked for the tariff increase themselves. The logic was simple: If the tariff for those people connected was raised from an average of 5 pesos/m³ to 10 pesos/m³, and if that allowed the concessionaires to connect the poor, the poor would go from paying 150 pesos/m³ to 10 pesos/m³ and be much better off. Is it too much to ask those connected to piped water to help pay for those not connected to get the same access? The Government finally capitulated and gave the tariff adjustment to both concessionaires.

What are the lessons to be learned? First, policy is everything, but it must be in front of the public at all times. Second, counter intuitively, hiking tariffs can help the poor who are not yet connected to piped water. Third, in the future, investments in large city water supplies should be financed directly from tariffs.

Note: This material was originally produced by the author for ADB and UN-Habitat newsletters.

Water and Poverty (Problems) in a Nutshell

- The poor are willing to pay but governments are unwilling to charge.
- The poor often pay \$20 per month for 6 m³ of water. The rich often pay \$4 per month for 30 m³ of water.
- Up-front lump sum connection fees are an impediment to the poor getting connected to piped water.
- The status quo is determined by those with vested interests who profit from the plight of the poor.
- Intermittent water supply exploits the poor.
- The private sector is not very willing to connect the urban poor—there are few incentives.
- The poor have no voice.
- Standpipe supplies are not an adequate service.

Water and Poverty (Solutions) in a Nutshell

- Public audits are needed to obtain the facts about service levels.
- Policies are needed that focus on providing the poor with piped water.
- Raise the tariffs to connect the urban poor.
- Employ a block tariff structure, but watch the sizes and prices of blocks.
- Soften the terms of payment for connection fees.
- Eliminate standpipes wherever feasible.
- Encourage civil society (NGOs) to champion the poor.
- Detach land tenure issues from access to piped water.
- Governance is at the core of the solutions.
- Develop knowledge bases related to the water needs of the urban poor.
- Enable the poor to influence decision making.

Small-Scale Water Providers

An ADB-funded survey was conducted in 2002 to gather and analyze information about small-scale water providers (SSWPs) in eight cities: Cebu, Delhi, Dhaka, Ho Chi Minh City, Jakarta, Kathmandu, Shanghai, and Ulaanbaatar. An independent survey by the Water and Sanitation Program was conducted in Manila, and the author also conducted field surveys in this city. Appendix 3 provides brief examples from Cebu, Delhi, Dhaka, Ho Chi Minh City, Kathmandu, and Manila.

Evidence suggests that a large percentage of urban poor populations is still without access to water and sanitation services, despite improvements in this sector. Many surveys done in Africa and Latin America have demonstrated that a significant number of urban populations are served by SSWPs that provide competitive and appropriate service to households without access to utility connections. There is little data on this phenomenon. For this reason, nobody has a clear picture of the role played by SSWPs in water supply, particularly with respect to the urban poor. This chapter looks at that role.

A. Limits of Conventional Responses

Over the past decades, governments have favored large water utility companies, and results remain unsatisfactory. With existing tariffs and management structures, these companies have been unable to provide piped water coverage to whole populations. For example, in some unauthorized settlements, a large percentage of people draw (or illegally receive) their water from “spaghetti networks” that connect to the edge of a municipal grid system. Others remain without service for one or more of the following reasons.

- Connection fees are too high, and lump sum up-front payments exclude the poor.
- Total available water is not always sufficient to cover whole populations, and vulnerable groups are the first to be left out.
- Even when water supplies are sufficient, tariffs and low volumes of water consumption may not make



Water vendor in Manila

it attractive for utilities to deliver services in low-income areas, where the minimum cost of extending services is relatively high.

- When people occupy land illegally, it can mark them as not eligible for public services (otherwise, the provision of public service could provide de facto a proxy for legal status).

Even if water companies are allowed or mandated to serve poor households, they often do not have the know-how to do so, which leads to the following.

- Service levels are often not tailored to demand, but are instead based on technical standards and therefore are not affordable for low-income families.
- Payment systems are at times not adapted to the particular conditions and constraints of the poor (irregular income).
- Employees of main operators do not always communicate well with residents of low-income areas, which only exacerbates the risks of being overcharged or penalized in the case of improper billing.

B. Alternative Water Supply Services and Local Initiatives

Because of the failure of conventional utilities to serve many low-income households, a large number of people rely on alternative forms of service, which are either run by community groups or delivered by local entrepreneurs. Yet sector reform and modernization have focused exclusively on large-scale operators and have ignored the potential offered by community-led initiatives and local private operators. Private sector involvement now increasingly includes SSWPs.

Surveys have highlighted the comparative advantages of SSWPs over large utilities in periurban areas, low-income neighborhoods, smaller towns and centers, and consolidated inner-city neighborhoods. Low-income households buy their water from these operators because they provide the right service at the right price. Even if the cost of water from SSWPs is higher than the nominal tariff charged by utilities, poor consumers may prefer the former because the supply is reliable and flexible (particularly in terms of quantity and hours of supply) and there is no excessively high connection fee.

C. Types of Small-Scale Water Providers

SSWPs can be small companies, cooperatives, individuals, and community-based organizations. They are independent to the extent that some are self-employed entrepreneurs or artisans. Most work without formal recognition from local authorities and are not usually subcontracted by major water distribution companies. Unlike multinational companies, such operators enter markets freely, take risks, and invest without an agreement with the public sector. Small-scale investors and local entrepreneurs have always supplemented trunk concessions and public companies in serving hard-to-reach parts of towns and in tailoring services to the poor. They account for a significant share of the market. There are three main types of SSWPs.

- **Partners of water utilities**

Some local operators work with water utilities, whose water they distribute at kiosks or standpipes. These operators buy water from water companies at a flat rate and sell it on to end users at a profit. They do not receive a salary.



Small-scale water provider



No need to regulate (yet)

- **Vendors and resellers**

Vendors include mobile water truckers, carters and water carriers, and household resellers. They provide water (most often drawn from water company taps) at times and places that water utilities are unable to serve.

- **Pioneers of small piped networks**

Pioneers bring piped water from their own sources (often groundwater) to communities where water utilities have not yet expanded their networks. The level of investment and the initiatives and financial risks taken by these various types of water providers are quite different (see Table 7.1). The level of service provided fits with urban population demand. Due to the dynamism of this service and the strong existing barriers for these private operators, there is a need for more in-depth analysis.

Type of Provider	Level of Investment	Level of Initiative	Link with Water Utility	Financial Risk	Level of Service
Partners of Water Utilities	Very Low	Very Low	Strong	Very Low	Low (water outside home)
Resellers	Very Low	Low	Strong	Very Low	–
Carters and Water Carriers	Low	Low	Weak to Strong	Low	Average (water delivered to home)
Truckers	Medium to High	High	Weak to Strong	Medium (water trucks can be used for construction activities, etc.)	Average (water delivered to home)
Pioneers of Piped Networks	Medium	High	Weak to Strong	High	Average to High (water delivered to home by hose or household connection)

D. Scope and Scale of Small-Scale Water Providers in Asian Cities

The role played by SSWPs in water supply in selected cities is strongly linked to the water service provided by water utilities. For example, in Shanghai the utility provides good service with a low connection fee. Apart from bottled water businesses, there are no SSWPs in Shanghai. In cities like Delhi, Dhaka, and Kathmandu, about 5–10% of all households are served by SSWPs. The high level of subsidy and the policy of providing “free” water to the poor in South Asian countries, combined with good access to groundwater, have limited the niche market for SSWPs, despite the low level of service provided by water utilities. Currently, the most important input of SSWPs is in Southeast Asia, where the coverage of piped systems operated by water utilities is about 50% with medium-to-high connection fees. Roughly 20–45% of households in Cebu (Philippines), Ho Chi Minh City, Jakarta, and Manila may rely on water supply services provided by SSWPs. Table 7.2 shows the types of services provided.

E. Small-Scale Piped Systems

Apart from real estate developers who have installed piped systems for their own residential areas, few local entrepreneurs have installed piped systems in low-income areas to provide household connections. The number of people served by each system is still limited in the cities studied (100–700 connections). In Manila, a small local company—Inpart Engineering—operates 12 systems and serves today around 30,000 households in low-income areas (see Appendix 3).

Nevertheless, local entrepreneurs have implemented low-cost technology and proposed low connection fees to customers. The connection cost is limited to the cost of the needed materials (pipes, meters, etc.). The materials generally fit the settlements they serve, and these entrepreneurs adapt billing to the customers’ forms of income (from daily to monthly payments). In Ho Chi Minh City, entrepreneurs have invested in a water treatment unit to serve safe water to customers. In most cases, SSWPs support the total amount of their investments through privately sourced loans with high interest rates of up to 5% per month. They do not have access to commercial loans and do not receive any financial support from local authorities or external support agencies.

Table 7.2 Services Provided by Small-Scale Water Providers in Study Cases

Service	City	Main Location of the Service		Population Targeted	Origin of Water
		Within Utility-Operated Piped System	Outside Utility-Operated Piped System		
Household Connection	Cebu Delhi Dhaka Ho Chi Minh City	–	X	All people	Groundwater
	Cebu	X	–	Medium-income to poor families who cannot afford the (\$100) connection fee	Groundwater
Standpipe	Cebu	–	X (in areas with limited access to groundwater)	All people	Groundwater and water utility
Kiosk	Ulaanbaatar	–	X (in <i>Ger</i> area not served by utility kiosk)	All people	Groundwater
Tanker	Ho Chi Minh City	–	X (in an area with quality issues concerning groundwater salinity)	All people	Water utility and surface water
	Ulaanbaatar	–	X (in <i>Ger</i> area not served by utility kiosk)	All people	–
	Delhi Kathmandu	–	X	High- and medium-income families (to supplement the low water quantity provided by the utility)	Groundwater, spring, and surface water
Pushcart	Dhaka	X	–	Medium- and low-income families (to supplement the low water quantity provided by the utility)	Utility standpipe
	Delhi Jakarta	–	X (in area near the utility's piped system)	Low-income families	Utility standpipe
Reseller	Cebu Ho Chi Minh City Jakarta	X	–	Poor people who cannot afford a household connection	Tap
Water Carrier	Dhaka	X	–	High-income families (to supplement the low water quantity provided by the utility)	Utility standpipe

Their legal environment is poor, and generally they work under an illegal framework (due to water distribution monopolies of utilities). This situation is particularly true in Delhi and Dhaka. In Cebu, however, operators have received authorization from the local authority (chief of the *barangay*), and in Ho Chi Minh City some entrepreneurs have signed contracts with the water utility that define the water tariff.

The tariff charged by SSWPs is lower when they operate in a friendlier environment. In Delhi, Dhaka, and Kathmandu, where SSWPs operate in an illegal environment, the water tariff is 6–10 times more than the utility tariff (which is strongly subsidized). In Cebu and Ho Chi Minh City, where SSWPs have received official authorization, the multiplier is respectively 2.6 and 1.7.

F. Examples of Small-Scale Water Providers⁸

Cebu

The water utility serves only about 30% of the 1.5 million people in this city. Several SSWPs provide water services, mostly based on small distribution networks connected to privately owned and maintained wells. These systems are of various sizes, serving up to 500 households. Average consumption is in the range of 12–15 m³ per month, and the monthly water bill is \$6–8. In comparison with the utility service, which is not available in locations served by SSWPs, connection arrangements are simpler and cheaper but the tariff is higher.

Delhi

About 60% of Delhi's 14 million people live in slums, resettlement colonies, and low-income clusters. Most of these are not served by household connections. Instead, they get water from public standpipes, tubewells (with handpumps), and water tankers. The utility—Delhi Jal Board—operates about 1,000 tankers delivering 23,000 m³ per day. Supply by tanker costs close to \$1/m³, while supply through the piped system costs only \$0.10/m³. The utility's tankers must provide free water to the poor who have no other source of water. These tankers, when requested, also serve middle- and high-income households. The role of SSWPs in Delhi is very limited because the utility's

water price is low and water is provided free to the poor. There are, nevertheless, a few private pipeline providers who supply connections using their own tubewells. The users pay \$4–10 for about 15–30 m³ per month. There are also tricycle services. These involve payment for the cost of transporting water from standpipes to homes, which equates to about \$4–6 for 1.2 m³ per month of drinking or cooking water per household. The bottled water industry is also strong, with 24-liter bottles of treated water costing around \$0.80.



SSWPs often use meters to manage

Dhaka

The need for water of people living in informal settlements prompted the establishment of one SSWP business in Dhaka. It serves 9,100 households through 100 individual connections and 15 standpipes, and it is located about 1.3 kilometers from the utility network from which it sources its water without charge. The whole operation is illegal, but it provides a basic human need to the people. The business charges \$0.86/m³ for water, compared with the utility's \$0.12/m³. Only about 300 m³ of water is supplied to the neighborhood each day, which equates to about 1 m³ per household per month. It would seem that this water can only be used for drinking and cooking.

Ho Chi Minh City

About 19% of the households in Ho Chi Minh City use SSWPs. Most providers (about 60%) are resellers (households with connections from the water company, which resell water to 3–5 other households in the neighborhood). The rest are tanker operators, providers using small pipeworks, and bottled-water providers.

⁸ For details see Appendix 3.



Bottled-water provider



Water tanker for people not being served

Average consumption from household resale is 17.5 m³ per month, which can be compared with 36 m³ per month from the water utility. The average tariff for household resale is \$0.56/m³. Average consumption from water tankers is 6.6 m³ per month, and the average tariff is \$0.90/m³. A network provider on the outskirts of Ho Chi Minh City uses groundwater from his own well. His system has a design capacity of 720 m³ per day, but presently only 100 m³ per day is provided. The designed number of connections is 2,000, but only 400 households have been connected in the first 2–3 years. Water is sold at \$0.22/m³, and household use is about 7.5 m³ per month. This provider has a license to operate for 3 years and a tax exemption for 5 years. What is unique about the Ho Chi Minh City case is the real partnership and spirit of partnership created between the water utility (Ho Chi Minh City Water Company) and SSWPs.

Kathmandu

More than half of the city's 1.1 million people depend on sources other than the utility to meet their water needs. About 31% rely on their own wells, 15% on community managed systems, 6% on SSWPs, and 5% on neighbors' connections. Most SSWP services are provided by about 65 tankers operated by 36 providers. The quality of the water depends on the source, which can be natural springs or groundwater. Consumers prefer one company over another based on its source of water. In general, this service is provided to the more affluent members of the community (who can afford to pay \$1.30/m³ for delivered water).

Manila

It is estimated that millions of people in this city receive water from SSWPs. About 2 million receive water (by resale) from neighbors' connections or from neighborhood kiosks, another 2 million from pushcart water vendors and tanker deliveries, and a further 1 million from direct connection or hose. The average consumption volume per household is 6 m³ per month, and the monthly water bill is \$10–20. By contrast, those on the utility supply get about 30 m³ per month and pay \$3–6 per month. In most cases, the source of water is the water utility.

G. Conclusions

"Water for All" is the catch cry of governments, development agencies, and operators alike. Yet in many deliberations over the years, SSWPs have been to a large extent ignored. **But in terms of the total revenue turnover from water in megacities, like Jakarta or Manila, SSWPs are responsible for more revenue turnover than formal utilities.** This alone is justification for taking a much closer look at SSWP operations. When their operations are seen as intimately linked to the urban poor, because of low rates of effective coverage with piped water (often less than 50%), there is another powerful reason for further investigating their operations.

The main issue with SSWPs is the great lack of equality between those connected to piped water and those not connected. There are people with vested interests (which might include utility staff, utility owners, local authorities, and government and elected officials) who are keen on maintaining the status quo. It should be noted that the only vested interests of SSWPs relate to employment and the operation of small businesses. The studies to date appear to show

that SSWPs make little profit and do not exploit their clients (who are mostly the urban poor).

Is there a need to regulate SSWPs? Evidence suggests that there is not. That would probably drive many of them out of business. To a large extent, the market promotes regulation through customer choice concerning price and quality of water. Competition is strong. There is, however, a need to recognize SSWPs officially. Then it will be important to under-

take comprehensive, independent audits of water and service levels to ascertain the facts from the field. Water utilities need to be regulated and guided by clear policy statements from governments on piped water service coverage and SSWPs. Any water supply study strategy for a city must consider the role of SSWPs. Finally, financial assistance should be made more readily accessible to SSWPs so that more investments can be made to bring good-quality piped water to the urban poor.

Small-Scale Water Providers in a Nutshell

- Services provided include distribution pipework for utility water and/or groundwater, kiosk sales, pushcart and tanker vendor deliveries, and neighborhood resale of utility water.
- Water sources (whether legal or illegal) are mostly water utilities, but also groundwater.
- SSWPs sometimes generate more revenue than formal water utilities.
- In default of the water utility, SSWPs provide the urban poor with essential services. Many SSWPs are also poor.
- The great inequity: the connected can pay \$4 for 30 m³ and those not connected (supplied by SSWPs) can pay \$20 for 6 m³. The status quo is maintained by those with vested interests.
- In many cases, SSWPs are not formally recognized by utilities or local governments.
- Tariffs are higher than those charged by utilities but connection fees are lower.
- SSWPs provide more flexible arrangements for connections and payments than water utilities, leading to better relations with customers.
- Officials need to learn more by auditing existing utilities and SSWPs, so that SSWPs can be registered and recognized but not regulated (yet).
- Residents need to have clear policy statements from governments on piped water coverage and SSWPs. Governments should include SSWPs in water supply strategies.
- SSWPs need access to financing.

Chapter 8

Management

This chapter examines the problems associated with managing water utilities responsible for major urban water supplies in Asia's developing countries. It identifies the lack of autonomy of water utilities as one of the core problems leading to secondary problems, such as the caliber and skills of management and staff, the overstaffing of utilities, and the lack of accountability and incentives (including remuneration) to perform. Of course, autonomy is also linked to the ability of a utility to set tariffs in accordance with government policy—and that degree of autonomy is rarely attained. This chapter looks at solutions in the context of good governance, higher tariffs, organization development, reducing NRW, ending intermittent supply, and effective metering of water use.

A. Current Situation

Autonomy

The lack of autonomy extended to the management of most Asian water utilities is the strongest factor affecting their performance. This means that matters concerning staff numbers, staff remuneration, and staff recruitment are not decided by service providers. This also means that matters concerning tariffs, on which the financial viability of each utility depends; investment, including extensions of supply (often beyond hydraulic design limits); and disconnection for nonpayment of bills are not decided by the people who are probably most qualified to make these decisions. In short, it means that managers of many utilities are not being allowed to manage.

Caliber and Skills of Management

The civil servant rules in Asia's developing countries result, in most cases, in seniority or longevity of service leading to promotion to management positions, not management skills or merit and performance. The lack of autonomy extended to management encourages this state of affairs. Men and women who do not rock the boat are supported. Even if managers had the autonomy to manage, many would not have the skills to do so. Most senior positions in water utilities are filled by staff with little, if any, management training.

Caliber and Skills of Staff

What is found in water utilities in Asia is a heavy predominance of engineering professional staff, many of whom have degrees from universities in developed countries. What is lacking is more qualified professional accountants and financial managers, because the market rates for such people are well above civil servant salary rates. There is a need for more professional staff with backgrounds in sociology, information technology, public relations, and environmental studies. When it comes to professional staff preferences, development (with its associated perks from development agencies) is much more attractive than O&M functions. Indeed, at the field level, O&M staff are often inadequately trained for their jobs. Training is given more to professional staff than to field workers. As a consequence, the quality of repairs and maintenance is not great.

Number of Staff

Many water utilities are heavily overstaffed, mostly as a consequence of the involvement of elected officials and nepotism. In 1996, for example, the utilities of Delhi, Dhaka, and Faisalabad (Pakistan) had 21.4, 18.5, and 25 staff per 1,000 connections respectively, whereas Singapore, Seoul, and Hong Kong had 2.0, 2.3, and 2.8 staff per 1,000 connections. Overstaffing lowers staff morale, because some staff do much more work than others. Output or productivity is low. Many professional staff also moonlight as freelance consultants, to augment their income. Unions tend to be strong and active when it comes to staff being laid off (regardless of the reason, even wrongdoing).

Incentives to Perform

There are examples of bonuses given to water utility staff, but this often has more to do with the tariff level and financial performance of a utility than the merit and performance of its staff. In general, there is little incentive with civil servant bureaucracy and civil servant salaries for staff to extend themselves. Promotion, after all, is usually based on seniority, not merit. NRW reduction is often seen as a necessary evil that provides justification for employment. It is not seen as

a challenge associated with bonuses for meeting goals. Incentives relate also to accountability. If there is no accountability for performance, there can be no incentives. In fact, staff incentives often relate to illegal connections, meter reading manipulation, and valve operation for intermittent supply, all of which are associated with staff receiving bribes from the public.

Measurement of Performance

Some attempt is being made nowadays by water utilities in developing countries to measure indicators of performance, such as NRW, collection efficiency, operating ratio, etc. If, however, managers are not inspired to act on the information collected, staff soon become less enthusiastic about collecting data. Today we have computerization and the ability to carry out in-depth analysis, which can then lead to action, but these tools are not being adequately employed.

Delegation and Micromanagement

A consequence of the lack of autonomy extended to water utility management is the lack of delegation extended down the line by management to staff. It is not an uncommon sight in South Asia to see the head of a water utility seated at his desk with as many as six telephones at his side. He must answer all questions, even if these pertain to matters that are trivial and should be answered by a division manager. In other words, true management is rare. Good examples of utility management can be found in Bangkok, Malé, Phnom Penh, and Singapore (Malé and Phnom Penh may be further reviewed in the case studies in Appendix 2).

Billing and Collection

Billing and collection may be improved in many places by making it very easy to pay bills. One way to do this is to have many local outlets where customers can pay bills without having to queue for a long time. In addition, utility fees could be paid daily, weekly, biweekly, monthly, bimonthly, or quarterly, depending on each customer's earning cycle. Another option, which is used in Bangkok and elsewhere, is to encourage consumers to read their own meters and pay on that basis each month. From time to time, those readings must be checked by utility employees.

Financial Management

Annual audited reports of water utilities have a tendency to surface for public consumption about 3 years after the year of reporting. They are then useless as management tools and of little interest to the public. The annual report of the Metropolitan Waterworks Authority in Bangkok, however, is always in public hands within 6 months of each fiscal year's end. Internal audit offices are often ineffective and inadequate, and external audits, conducted under the auspices of an auditor general's office, tend to concentrate on minor offences and ignore the big picture. It is indeed an unfortunate state of affairs when this situation can apply to \$100 million per year businesses being controlled by only one or two qualified accountants. Much more attention needs to be given to utility and project accounting. More transparency is required.

Water Management

There are often major deficiencies in measuring water production and consumption, but estimates of NRW indicate figures of 30–60% for most Asian cities. As for the breakdown of NRW into its component parts and committed strategies to deal with each of them, few utilities embark on such tasks.



If you can't measure...you can't manage

Working Environment and Incentives

Through transparent policies and independent regulatory bodies, Asia must ensure autonomous water utilities. Then it must obtain free market remuneration for water utility staff, based on accountable, incentive-based, and merit-based performance. While Asian water utilities have many very well-educated professional staff who have been trained in developed countries, their potential has not been realized. The Singapore Public Utilities Board, perhaps the best water utility in the world, gives us a very strong example of how to do it right. It offers strong incentives for staff to perform. Managers are paid more than \$150,000 annually. In Bangkok, Metropolitan Waterworks Authority managers are also paid relatively high salaries, which are at least commensurate with those in the private sector. Only when utilities have this type of enabling environment can they go to work on organization development. An example of a successful reform program is shown in Box 8.1.

B. Organization Development⁹

New organizations are formed and old ones are energized through organization development. Resources are directed to high priorities. Goals are established and translated into jobs that people do every day. Efforts are balanced with available resources. People are rewarded for achievement and initiative. In short, organization development embodies the principles of modern management.

Leadership skills and management skills are important, and they are not the same. In managing change, leadership skills will be more important. Once the organization is up and running, management skills will become more important. Leadership must emanate from the governing body, move to the management group, and filter down into the ranks of the organization. Leaders inspire others and set a good example. The Director of the Phnom Penh Water Supply Authority is an example of such a leader (see case study in Appendix 2). A governing body leads through policy, planning and budgeting, delegation, oversight, and advocacy. An organization must have a clear mission and objectives. It must have a strategy to implement policies. It must start off by analyzing what function it needs to be able to perform and determine what organizational structure is best for that purpose. Then job titles and job descriptions need to be defined. Clearly, the

Box 8.1 Indonesian Water Utility Rehabilitation

In 1998 many of Indonesia's 300 municipal water enterprises were, due to rocketing costs of electricity and chemicals, putting untreated water through mains, which could have led to large epidemics. The situation was so bad that some enterprises were planning complete shutdowns that would have devastated the urban poor. The Water Efficiency Team (WET) project quickly created a database and used the information gathered to diagnose the major problems of these enterprises. WET helped small entities create recovery plans and understand the Government's stance. Seventy engineer trainers were trained under the project. These trainers learned about re-rating water treatment plants to increase efficiency, which saved money by eliminating the need for new construction. In one plant, capacity increased from 100 liters per second to 170 liters per second. The savings totaled about \$240,000 (roughly four times the cost of the WET project). WET's emphasis on transparency and self-help, instead of capital infusion, has helped the Government shift its water sector development priorities toward full commercialization. The project demonstrated that even small enterprises can become self-funding if proper systems and procedures are implemented. (Woodcock, 2001)

number of employees necessary to do the job will be a key consideration. The management culture needs to include planning, delegation, and management by results. Employee development must be a cornerstone of the organization. This will include professional human resources management, compensation and rewards, training, and creating a pleasant work environment.

Information is needed for management (see Box 8.2 for Bill Gates' views). For a water utility, managers should be provided with data relating to revenue and expenditures, accounts receivable, water production, water consumption, new connections, water availability, number of staff, etc. There is a need to computerize information about every dwelling in a utility's area of responsibility, and whether each dwelling has an official connection. Managers need to know how many people (adults and children) live in the service area, what alternative sources of water

⁹ Special acknowledgement to Barnes, 2003.

Box 8.2 Business @ the Speed of Thought

(This advice is just as applicable to selling water as any other product.)

- *No one is using information well.*
- *Turn passive data into active information.*
- *You are competing.*
- *Customer service will become the primary value-added function in every business.*
- *Be proactive, not reactive.*
- *It is all about public awareness and transparency.*
- *Knowledge is power.*
- *Companies should focus on their core competence and outsource everything else.*
- *Web lifestyle eases geographic constraints. Knowledge workers can live where they like.*
- *Competition in hiring the best people will increase in the years ahead.*
- *Historical consumer data are a valuable asset.*
- *The speed with which you respond to bad news is critical. Focus on the consumer's definition of good service.*
- *Collect detailed data on consumers and nonconsumers.*
- *Analysis should lead to action.*
- *Use data mining (where computers look for patterns). (Gates, 1999)*

they use, their average monthly consumption from the utility, whether that consumption is metered, how long ago meters were installed, the state of internal plumbing, etc. For this information to be fed to computers, on-the-ground caretakers are needed for zones of up to 500 connections. These caretakers should also maintain detailed information on those not served with a piped supply, including whether or not those without service have applied for connections, what sources they currently use, what their constraints are, when they were told they would be connected, etc. Interface between staff and consumers is important, especially in the field. Performance indicators need to be

developed. Utilities can benchmark their performance against other utilities regionally or nationally and also against their past performance. Information technology needs to be introduced to make reporting systems easy, transparent, and able to incorporate feedback. Utilities need strong public awareness and customer service units. Interactive Web sites are nowadays expected. Public and employee safety issues should be addressed.

A culture of continuous improvement needs to be inculcated. The Singapore Public Utilities Board, for example, was not satisfied when it had NRW down to 7%. It continued to work on reducing this figure, and it is now less than 5%. Bearing in mind the current culture, a special effort will be required to build up prestige in O&M. Much more effort will be needed in training the hands-on people in organizations and helping them take pride in their performance. Utilities should be encouraged to network informally among themselves. Country, regional, and global water partnerships are flourishing. It would be healthy to take advantage of these to improve utility performance by implementing integrated water resources management, which is the theme of these partnerships. Utility staff can learn a great deal straight from the Internet. For example, reading the articles on a Web site such as www.watermagazine.com can be very enlightening. Yes, there is a need for governments to create enabling environments, but there is also a need for professionals to behave responsibly. This will be done when they promote learning, share information with government agencies, and inculcate professional ethics.

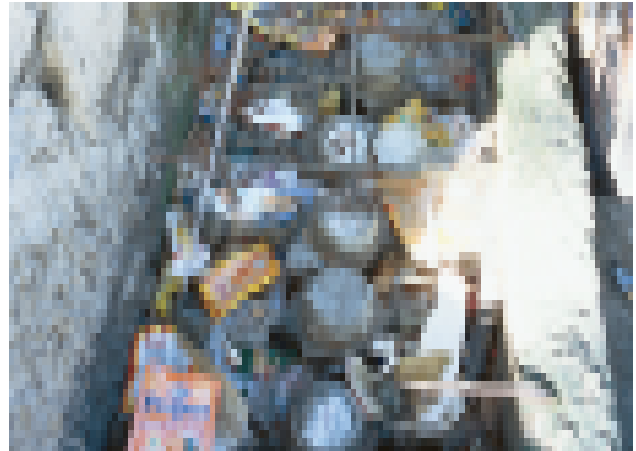
There is probably nothing so guaranteed to lift the morale of water utility staff as tariffs being high enough to ensure that utilities are financially viable. There are also few excuses for not having excellent information, on which management decisions can be based. Computerization has made all of this possible.

C. Metering

It has been said that if you cannot measure, you cannot manage. Moreover, if a job is worth doing, it is worth doing well. These statements are true in water and metering. So, wherever there is 24-hour supply, there should be 100% metering, and all meters should be in working condition. Where intermittent water supply exists, a plan to gradually increase 24-hour coverage should be set in motion. Likewise, all groundwater extraction by industry should be metered and charged if that resource is to be controlled and maintained.



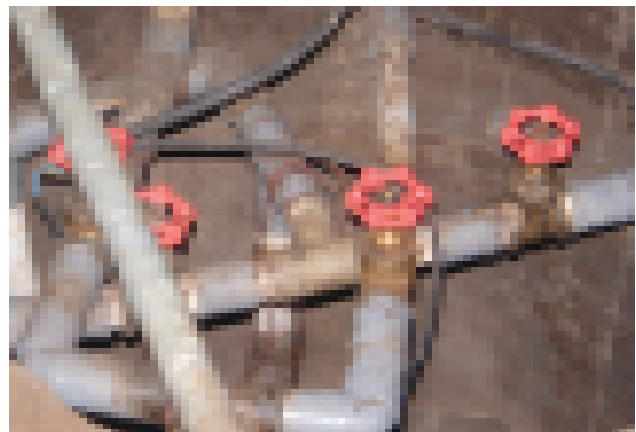
Are these read?



Water meters—how many are working?



Meter all or nothing



A need for construction standards

Meters must be of good quality and should be replaced regularly (about every 5 years). The large users of water should be accurately metered, and the meters used might need to be replaced every 2 or 3 years. To some extent, it must be acknowledged that when tariffs are very low (as they are in most of South Asia) metering is somewhat irrelevant, as the cost of maintaining and reading meters may be more than the water bill itself.

When it comes down to estimating consumption where metering is absent, such as on standpipes, it is quite simple to meter a number of standpipes for a short time and extrapolate the results for others. The same holds true for household connections that are not metered. Pump hours run compared with the pump performance curve is often used to estimate production

volume. This, however, is not a long-term recommendation. When it comes to production, there are almost no excuses for not having good metering. The accuracy of any assessment of NRW is important, especially when the result is to be used for monitoring improvement in performance.

It is estimated that two thirds of household water consumption and almost 100% of industrial consumption in Organisation for Economic Co-operation and Development member countries are now metered, and meter penetration continues to expand in most other countries (OECD, 1999). Certainly, in countries like Australia and New Zealand, metering consumer connections has recently been deemed necessary in reducing water use.

Management (Problems) in a Nutshell

- There is a lack of autonomy of utilities.
- Revenue (tariffs) is affected by political considerations.
- Utilities are overstaffed.
- Management skills are lacking.
- Accountability is needed (annual reports + 3 years).
- Civil servant rules and civil servant salaries are ineffective.
- Public relations are poor, and there is a lack of awareness among consumers.
- O&M functions are treated as “project” capital works.
- High rates of NRW, intermittent supply, and standpipe service need to be addressed.
- Construction standards are poor.

Management (Solutions) in a Nutshell

- Policies must provide autonomy and revenue (tariffs).
- There should be accountability through regulatory bodies and annual reports.
- Organization development is necessary.
- If you cannot measure, you cannot manage.
- Incentives must be linked to performance.
- Use open market salaries for professionals.
- Give O&M prestige.
- Interface between staff and consumers should be given importance in the field.

Chapter 9

Non-Revenue Water

The terms unaccounted for water (UFW) and non-revenue water (NRW) have been widely used in the past. The use of these terms, however, has been confusing. The International Water Association (IWA) recommends the use of NRW (IWA, 2000). IWA “Best Practice” Water Balance and Terminology for NRW and its components is explained in Box 9.1 and Box 9.2. In these, UFW equates to Water Losses. Accordingly, throughout this book, reference is made wherever possible to NRW, not UFW.

A. Components of Non-Revenue Water

Unbilled Authorized Consumption can include water used for fire fighting or free water distributed at standpipes or provided to religious institutions.

Apparent Losses comprise unauthorized consumption and metering inaccuracies. It is estimated that in Asian cities 50–65% of NRW is due to apparent



Spaghetti network repairs and leaks

Box 9.1 International Water Association Water Balance

The following are definitions of principal components of IWA water balance.

- **System Input Volume** is the annual volume put into the part of a water supply system that relates to water balance calculation.
- **Authorized Consumption** is the annual volume of metered and/or non-metered water taken by registered customers, water suppliers, and others who are implicitly or explicitly authorized to do so for residential, commercial, and industrial purposes. It includes water that is exported.
- **Water Losses** can be identified by calculating the difference between system input volume and authorized consumption. They consist of apparent losses and real losses.
- **Apparent Losses** result from unauthorized consumption and all types of inaccuracies associated with metering.
- **Real Losses** result from losses at mains, service reservoirs, and service connections (up to the point of customer metering). The annual volume lost through all types of leaks, bursts, and overflows depends on their individual frequencies, flow rates, and duration.
- **Non-Revenue Water** is the difference between system input volume and billed authorized consumption, and it consists of the following:
 - Unbilled Authorized Consumption (usually a minor component of water balance),
 - Apparent Losses, and
 - Real Losses.

Box 9.2 “IWA Best Practice” Water Balance and Terminology				
System Input Volume	Authorized Consumption	Billed Authorized Consumption	Billed Metered Consumption (including water exported)	Revenue Water
			Billed Non-metered Consumption	
		Unbilled Authorized Consumption	Unbilled Metered Consumption	Non-Revenue Water
			Unbilled Non-metered Consumption	
	Water Losses	Apparent Losses	Unauthorized Consumption	
			Metering Inaccuracies	
		Real Losses	Leakage on Transmission and/or Distribution Mains	
			Leakage and Overflows at Utility’s Storage Tanks	
Leakage on Service Connections up to Customers’ Meters				

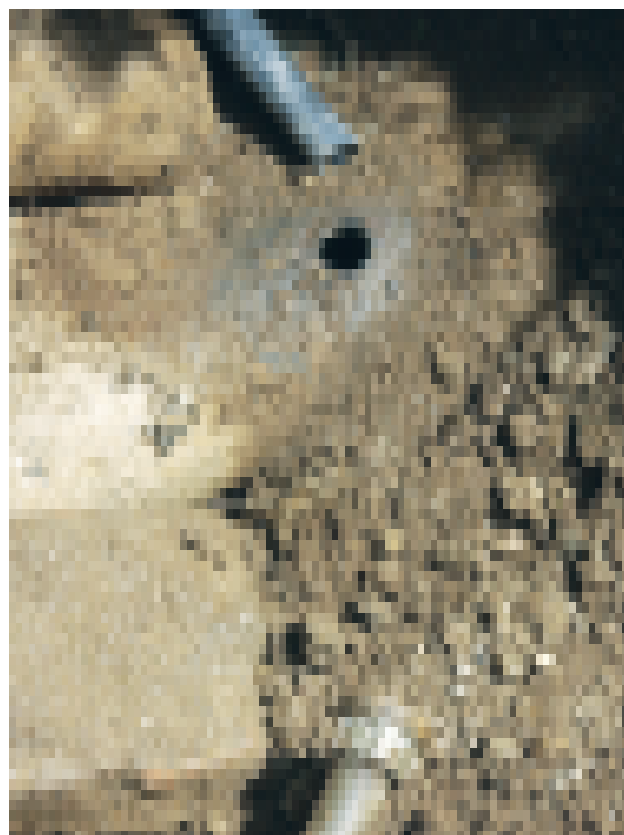
losses. Unauthorized consumption means illegal use, and this could be (i) sole illegal connections, (ii) illegal connections to properties that also have legal connections,¹⁰ or (iii) illegal connections for the purpose of selling water. Metering inaccuracies can include malfunctioning water meters, estimated water consumption (when meters are not working), and misreading water meters.

Real Losses comprise leakage from transmission or distribution mains, leakage and overflow from utility storage and balance tanks, and leakage in reticulation systems (especially service connections) up to the point of metering. Experience has shown that most leakage results from service connections, and to a large extent this is due to poor construction.

B. Consequences

The issues related to high NRW rates are (i) consumers paying for inefficiencies of water utilities, (ii) a precious and scarce resource being wasted, and (iii) unnecessary investments in production. Another important consideration is that high NRW rates equate to poor governance, which results in low utility staff morale. From the consumers’ point of view, those who have illegal connections or have estimated actual consumption below real consumption are cheating

those who pay for water. Poor governance is at the root of the problem. See Figure 9.1 for an illustration of the extent of NRW in Asian cities.

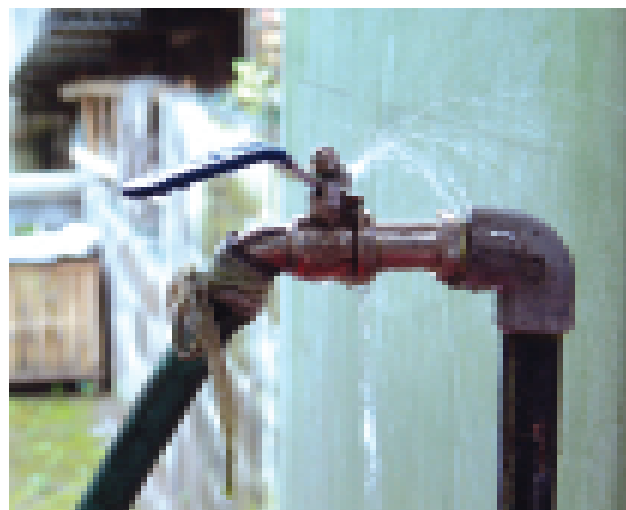


Illegal connection in Nepal

¹⁰ I once watched many residents on one street (in Manila) divert water for a short time from their illegal to their legal connections.

Linkage of Non-Revenue Water to Low Service Coverage

Where there is low coverage with piped water there is also likely to be high NRW. It is possible that those with vested interests condone the illegal sale of utility water to SSWPs at high prices (low volumes). The total revenue obtained from this source may be of the same order of magnitude as the official sale of water by utilities. Someone should ask where the revenue generated through illegal sales to SSWPs goes, because the answer to that question might explain why the status quo (the urban poor not receiving service) has remained for so long.



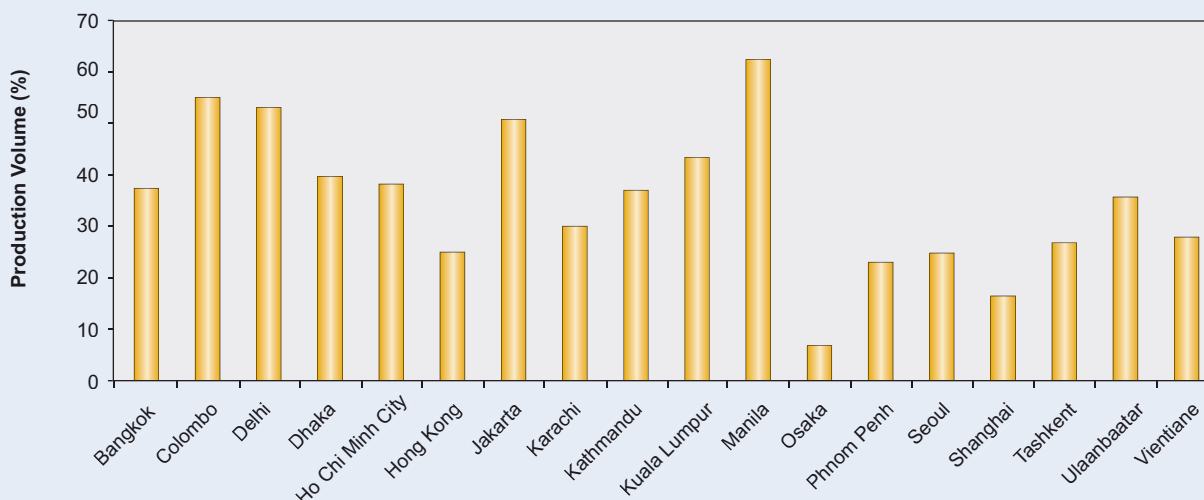
Service connection leakage

C. Reducing Non-Revenue Water

The benefits of reducing NRW include:

- need for less water to be produced, treated, and pumped, translating into the postponement of the expansion of capacity—producing less water also translates immediately into cost savings on O&M, due to savings in energy and treatment costs;
 - reduction in apparent losses, which will result in more water being billed and more revenue for utilities—it has also been shown that water metering and adequate rates reduce wasteful consumption, which will likely decrease total consumption;
 - adequate understanding of consumption patterns, which will allow utilities to optimize distribution systems;
 - better knowledge of real consumption, which will improve demand projections; and
 - reduced sewage flows and pollution.
- These benefits depend on adequate pricing of water resources and services. Subsidies for water extraction, discharge of wastewater, capital investment, and operation of water supply systems lower the cost of water as perceived by utilities and thus remove an incentive to reduce physical losses. Low

Figure 9.1 Non-Revenue Water in Asian Cities (2001)



water rates for consumers do not encourage utilities to meter their water consumption and detect and deter unauthorized water use. Moreover, low rates fail to provide consumers with an incentive to deal with leaks and wastage beyond their meters.

It is often said that there is no point in reducing NRW below about 20% of production, because the costs outweigh the benefits. An example from Singapore seems to disprove that theory (see Box 9.3).

Mapping

The distribution systems of most Asian cities are very poorly mapped. Only when these are well mapped can the hydraulics be properly calculated and limitations on extensions to the distribution systems be properly controlled. Now, with global imaging tools and computerization, this work can be more easily accomplished and maintained. Good records and public scrutiny (with the help of neighbors) will help eliminate illegal connections.

Control Measures

Programs for controlling NRW should tackle at least the following three main causes of loss: (i) metering inaccuracies, (ii) unauthorized consumption, and (iii) leakage. Methods of controlling leakage include passive control, regular sounding, district metering,

waste metering, combined district and waste metering, and pressure control. Selecting the most appropriate method would depend on the level of leakage, the cost of leakage, and the cost-effectiveness of each method.



System leakage

Box 9.3 Case Study Singapore (pop. 2.8 million)—Public Utilities Board

- *NRW was reduced from 10.6% in 1989 to 6% in 1994.^a*
- *Metering of production and consumption is 100%.*
- *Meter accuracy is very high. Production meters are calibrated every month. Domestic consumer meters are replaced every 7 years and industrial meters every 4 years.*
- *Volume of water used for fire fighting is estimated or measured and fire departments are billed.*
- *Commercial system is highly reliable and controls are in place to prevent tampering.*
- *Billing complaints are dealt with promptly.*
- *High and low consumption patterns are investigated.*
- *Average water rates are close to the incremental cost of water.*
- *The entire distribution system is surveyed for leaks every year.*
- *Water districts can be fully isolated to monitor for leaks. Distribution pipes are cement lined to reduce corrosion and are replaced if the number of breaks exceeds three per kilometer per year.*
- *House connections are made of stainless steel or copper.*
- *Certified plumbers do in-house repairs and installations. (Yepes, 1995)*

^a NRW was reduced to 5% in 2000.

Points to Remember

- Accountability must be high at all levels.
- Water services must be adequately priced.
- Reducing commercial losses is very important, because it helps improve the revenue stream almost immediately.
- Reliable information on production and consumption is necessary.
- NRW is the result of a combination of factors, not of a single one.
- NRW programs must be institutionalized and not be the result of sporadic exercises associated with the availability of grants or loan financing.
- **NRW cannot be addressed in isolation. An enabling environment must be created. This means that (i) utilities must have autonomy in terms of management, and they need competent and motivated employees; (ii) tariffs must be adequate, which will result in cost and benefit incentives to reduce NRW; and (iii) good governance must be practiced.**

The proportion of all accounts that show an estimated billing amount or a minimum figure is a good indication of the whole discipline of accountability. These days, with computerized accounts, there are few excuses for not identifying and correcting these inadequacies. Amnesties to ferret out illegal connections, public advertising, and convictions in courts of law for those discovered with illegal connections (who did not come forward when amnesty was offered) may be implemented.

It might surprise some to know that in cities of developing countries, under projects assisted by development agencies, the first effort to reduce NRW often involves the purchase of leak detection equipment. This is the developed country approach, and in most cases it has little relevance when solving developing country problems. It is far more realistic to go out and repair all visible leaks (of which there are usually plenty) and carefully scrutinize and accurately meter large water consumers. A caretaker approach to O&M and reducing NRW is shown in Box 9.4.

Pipe Replacement

In Singapore and Tokyo galvanized iron and polyvinyl chloride (PVC) service connections have been replaced with stainless steel service connections, and NRW levels in these cities (4% and 8% respectively) demonstrate the success of this approach. Singapore, Tokyo, and other cities also have programs for replacing asbestos cement pipes in distribution systems, as pipe breaks have increased over time.

Benchmarking

Benchmarking NRW is useful, as it enables utilities to compare themselves with others. Moreover, benchmarking helps utilities compare their performance during one period with their performance during another. The leakage component can be measured in other ways—as water lost per kilometer of distribution and as water lost per connection—but this assumes that NRW does not have a high component of apparent losses.

Summary Remarks

Reducing NRW is not technically difficult. It is, however, challenging in a governance sense. Illegal connections can only be eliminated when utilities have autonomy and discipline, and when they are accountable to regulators and the public. In addition, utility employees need genuine incentives to do their jobs and replace the incentives they have made for themselves through illegal connections, false meter reading, etc. (see Phnom Penh case study in Appendix 2). The status quo needs to be overturned. Comprehensive audits of water and service levels are needed and links between NRW, low service coverage, and SSWPs need to be explored. When tariffs are much higher, consumers will put pressure on operators to eliminate leaks and chase illegal connections. Good organizational development is needed to take advantage of autonomy and deliver accountability.

Box 9.4 Caretaker Approach to Operation and Maintenance and Reducing NRW

Rationale: Legal and technical approaches to combating NRW have met with limited success. Generally, utility staff will only appear when called out in an emergency or a crisis situation, rather than show a daily presence in a given locality. The proposed caretaker approach would add a social dimension to addressing the problem. It is based on managing water supplies at the lowest practicable level and on maintaining a good utility and consumer interface. It is particularly suitable for those developing countries without shortages of relatively cheap manpower.

Definition: The caretaker approach is essentially one in which the whole of a distribution system is divided into zones, each containing about 500 connections. A caretaker is appointed to be responsible for all water supply activities within a given zone. The concept is not new. In fact, it is employed in Tokyo and is, to some extent, also used effectively by one of the concessionaires in Manila. An SSWP in Manila uses this approach to manage its system by assigning one *aguador* to every 100 connections.

Institutional Framework: A caretaker who lives in the locality is given responsibility for a water distribution zone. The caretaker will report to an O&M supervisor located at a nearby maintenance depot. The caretaker's area of responsibility is small enough that it can be walked in its entirety once per week. This individual will lease an office from a resident in his or her zone of responsibility and have access to a telephone at that point (or will use a mobile phone). The O&M supervisor (an engineer) will be responsible for 10 caretakers and not more than 5,000 connections.

Caretaker Duties: The caretaker is expected to develop a friendly relationship with the people living in the zone of responsibility. He or she will do the following.

- Keep a daily diary of all activities in the zone.
- Be responsible for mapping the distribution system, including all connections.
- Be responsible for accurately metering all consumer connections and arranging for meter replacement when necessary.

- Analyze billing records and collections monthly, investigate high and low consumption and tardy payments, and report total consumption each month.
- Report leaks to be repaired and record the dates the repairs were effected.
- Report maintenance or new work requested and completed.
- Record and follow up on consumer complaints.
- Inspect plumbing in all households and assist with repairs, where feasible.
- Disseminate to consumers notices of interruption of supply for maintenance purposes and information concerning water tariffs, water consumption and conservation, demand management, hygiene education, and utility performance.
- Report alternative sources of water used by both utility customers and noncustomers.
- Report hours of service and pressure to the zone (day and night).
- Report numbers of persons in each household in the zone each year.
- Read district flow meters and pressure gauges daily.
- Inspect the entire zone on foot weekly.

O&M Supervisor Duties: The O&M supervisor is expected to support the caretaker in the following manner.

- Provide timely support and quality control on maintenance and repairs.
- Visit and talk with each caretaker daily.
- Review caretaker diaries weekly and provide comments and guidance.
- Inspect with each caretaker his or her zone monthly.

next page

Box 9.4 continued

- Encourage competition and incentives among caretakers for good performance.
- Comment on all caretaker reports before submitting them to the head office.

Conclusion: In this age of information technology there are few excuses for not having up-to-date data on every connected and nonconnected household in a given water service area. If this

information is appropriately analyzed, it will be relatively easy to trace illegal connections, defective meters, and incorrect meter reading. At the same time, with the ability of caretakers to get to know the people in their zones, and with the timely use of amnesty periods, it should be possible to flush out most illegal connections. By examining individual zones and comparing these with others, it should be possible to identify quickly any problem areas.

Non-Revenue Water (Problems) in a Nutshell

- NRW includes water not billed as a result of leakage, illegal use, inadequate measurement, and free (authorized) use.
- NRW averages 30% of production in Asian cities, but ranges from 4% to 65%.
- High NRW is connected to low piped water coverage.
- There is a need to determine whether physical losses (leakage) are maintained to mask the illegal use and sale of water.
- Illegal sale of water from utilities can generate revenue equal to legal sales.
- Consumers pay for utility inefficiencies.
- A precious and scarce resource is being wasted.
- Unnecessary investments in production are made.

Non-Revenue Water (Solutions) in a Nutshell

- Governance and tariffs must be tackled first.
- Leak detection equipment comes last, not first.
- Repair visible leaks.
- Make utility staff responsible for small zones (caretakers).
- Meter all production and consumption properly.
- Add district metering.
- Provide incentives for utility staff performance.
- Explore links to water vendors.

Chapter 10

Sanitation

Conventional wisdom dictates that water should not be supplied without complementary sanitation. This is a development principle. The reality, as many know, is different, because there has not been enough funding for water supply, let alone sanitation.

Given a choice, the needy urban poor will always opt first for water supply, since it will have a direct economic benefit, whereas sanitation will have more indirect benefits related to health. Because sanitation in Asian cities could well be the subject of a book by itself, the function of this chapter is merely to give some indication of the existing status of sanitation in Asia, emphasize its importance, identify some appropriate technologies, and look at what is needed to break out of the status quo.

Improved environmental sanitation also improves economic benefits. Consider the case of investments for sewage collection in Santiago, Chile. The principal justification for the investments was to reduce the extraordinarily high incidence of typhoid fever in the city, but a secondary justification was the need to maintain access to the markets of industrialized countries for Chile's increasingly important exports of fruits and vegetables. (Briscoe, 1993)

A. Gender Issues

World Bank findings from studies indicate that men and women value sanitation very differently. For women, since they are more personally concerned with these issues and more intimately involved in them with respect to their families, sanitation is often the second highest development priority. For men it may be the eighth development priority. To ensure that water sector activities are gender responsive at policy and institutional levels, ADB will promote the integration of gender concerns in policies, plans, programs, and projects. Incorporating explicit gender equity provisions in the objectives and scope of water sector activities will be encouraged.

B. Analysis

Sewerage costs are in the \$300 per capita range, septic tanks cost \$100 per capita, and latrines cost \$25 per capita. The advantages of sewerage are convenience; low health risk; no nuisance from smells, mosquitoes and flies; no problems with gray water (sullage); and no problems discharging industrial wastewater. The disadvantages are high cost, need for access to a reliable supply of piped water, difficulty of construction in high-density areas, unsuitability for self-help, need for pumping on flat ground, difficulty of maintenance, and concentration of pollution. Blockages and the breakdown of pumping equipment pose problems in sewerage systems, especially for low-income communities. There is now, on environmental as well as economic grounds, a growing appreciation of the fact that large sewerage schemes are not necessarily the best solution for some parts of cities, especially those with predominantly low-income communities (see Box 10.1).

In countries where sewerage service costs have risen significantly, industrial users have increasingly questioned whether the public sewer system represents the most cost-effective means of discharging their sewage. There is evidence of a trend toward more use of self-treatment and effluent reuse options. (Organisation for Economic Co-operation and Development, 1999)



Health risk—water pipe in drain

Box 10.1 Rethinking Sewage in Low-Income and Slum Areas

(This material was prepared specifically for this book by ADB's Alex Jorgensen.)

It is quite common for an international consulting firm to use conventional thinking in scoping and sizing various project facilities, including sewage collection and treatment systems. This often leads to the gross oversizing of these systems for a variety of reasons, which are not always the fault of the consultant. Normally it is the city council that insists on “fully modern” sewerage systems, regardless of actual demand. The officials involved have read or believe that such systems are essential for good sanitation, and these men and women are not amenable to a simpler technical solution, such as on-site septic tanks or even pit latrines in low-income or slum areas.

The basic design criteria for water are 24-hour supply and 120–150 l/c/d consumption. This consumption figure ignores NRW (often more than 50%), low pressure, and intermittent supply. Actual water supply is often between one hour every other day and two hours per day, and at low pressure. The real consumption in many areas is more like 30–40 l/c/d. Therefore, the conventional 80% wastewater generation ratio is false. Actual wastewater generation is closer to 50% of the “real” water supply. A related issue concerns individual house or property connections. Due to the cost of these being loaded onto the users, the connection rate is often low. The cost of connections from the street sewer to the property line should automatically be included in the project cost and be financed under the “loan.” While the cost of the connection from the property line to the house would normally be the responsibility of the owner, there may still be a case

for this being financed under the project when a low-income household is involved.

In addition to the capital cost aspect, there are serious operational problems. Sewers tend to be designed to minimum slopes to reduce pumping. When the actual flow in these sewers is half of that anticipated, or much less (as is often the case in low-income and poor areas), the scour velocity is not maintained and the sewers clog. Having an incoming wastewater volume half or less of that expected exacerbates problems, as the wastewater is much stronger in terms of solids and organic content. Therefore the minimum scour velocity needed is much higher. Operational process problems, with resulting odors, poor effluent quality, and high O&M costs, occur when sewage treatment plants have gross excess hydraulic capacity and the sewage strength is stronger than anticipated. To make matters worse, the income from water and sewerage tariffs ends up as a fraction of that projected, which leads to an inability to pay for O&M costs and a greatly reduced ability to repay capital costs.

The answer is for loan agencies to insist on a careful review of actual water use and wastewater generation at the planning stage as a condition of the loan and likewise at the detailed design stage. Once this is done, low-density, low-income, and slum areas should be converted to low-cost sanitation—septic tanks where space and groundwater conditions permit, dual pit latrines with squatter plates in slum areas (where there is usually no space), and good people-sensitive public toilets (like in Pune). Coverage of sewers and reticulation pumping stations and treatment systems should be reduced accordingly.

Nonconventional sewerage—using smaller pipes, laying pipes on a flatter gradient and at a shallower depth, laying pipes inside plots, reducing the number of manholes, and providing interceptor tanks for the settlement of solids—is a potential solution for low-income communities. Recently, in cities like Yogyakarta (Indonesia), small and affordable sewerage schemes have been seen. These serve 200–500 plots with local treatment facilities underground or landscaped. An NGO in this city says government needs to

agree to adopt community-based sanitation. The entry point is giving unauthorized settlers a semilegal status.

Septic tanks are constructed in many areas in Asian cities. Unfortunately, they are often not constructed properly (as in the Maldives, where the effluent outlet feeds almost directly into the water table) or discharge effluent directly into storm-water drains. Furthermore, in areas where there are many septic tanks, desludging and treatment and disposal of sludge are often totally

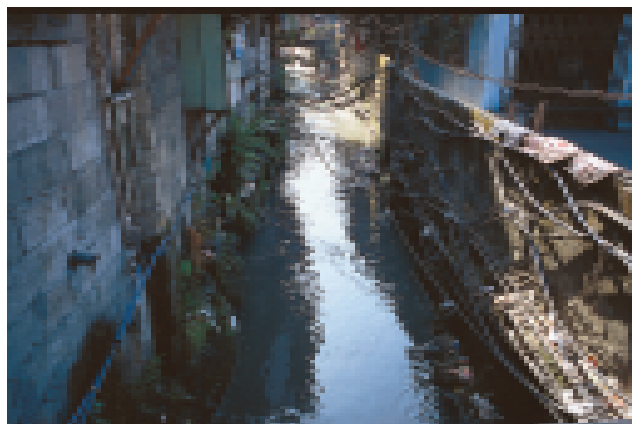
inadequate. As with sewerage systems, if the system is designed to operate a certain way, it should be operated in that way.

There are many different types of on-site latrines used in Asian cities. These include pit, twin pit, pour flush, and ventilated improved pit varieties. “Overhung” latrines (where excretion is direct to a water body) and bucket latrines (where the excreta is dumped outside the community) are also seen. The type of latrine will depend on local conditions, especially the level of groundwater.

C. “Sanitation Connection”

The selected information that follows was sourced from the “Sanitation Connection” Web site. It is offered here as a guide to addressing sanitation issues in developing countries.

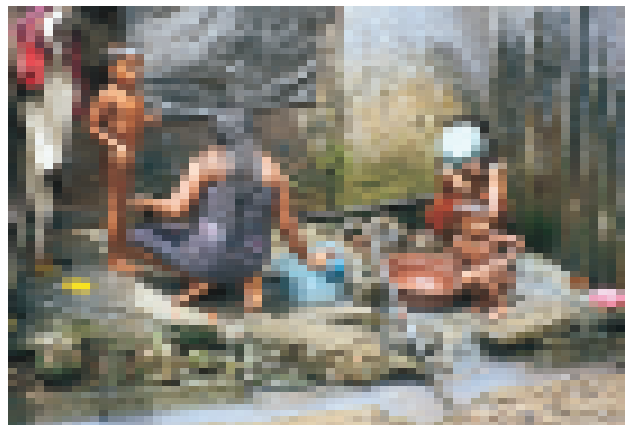
The World Health Organization (WHO), United Nations Environment Programme (UNEP), Water and Sanitation Program (WSP), Water Supply and Sanitation Collaborative Council (WSSCC), and International Water Association (IWA) form an international partnership known as the “Sanitation Connection” to offer a comprehensive Internet resource to environmental sanitation practitioners.



Health risks

Policies and Strategies

- *Provide increasing emphasis on demand responsive approaches where the services provided are closely linked to what consumers want and are willing to pay for.*
- *Minimize the quantity of waste: for example, improve water demand management to reduce the*



Sanitation is needed, too

quantity of wastewater generated at source and reduce transfer of wastes to the wider environment through reuse and recycling.

- *Promote solutions that are, as far as is possible, locally based at the household or neighborhood levels, rather than depending upon “downstream” transfer of wastes.*
- *Develop institutional arrangements, mechanisms, and incentives that stress the participation of users and encourage the involvement of both the formal and the informal private sectors.*
- *Develop procedures for economic and financial analyses and planning of investments that include the consequences of suboptimal development: for example, downstream environmental damage or failing to make the best use of local resources.*
- *Develop mechanisms for cost recovery that provide appropriate incentives to achieve stated policy objectives: for example, with regard to subsidy and financial performance.*

Health and Society

The starting point is the household, as people are most likely to be at risk from contamination in the place where they spend most of their time. Health benefits accrue to families who have latrines, even if their neighbours do not; additional benefits then accrue as coverage extends to the whole neighbourhood. Gender equality needs to be promoted through recognizing that women are key providers of health and hygiene services to the family. This household-centered approach rather reverses the way in which planners and engineers view the situation; their starting point tends to be with centralized treatment and primary networks, rather than households. It is important to note



Desludging to the drain

that where wastewater treatment is inadequate, the hazard is moved around rather than eliminated, thereby emphasizing impacts on coastal areas.

Adopting a household-centered approach provides the opportunity to find out what householders think about the sanitation they already have and to explore what they actually want, rather than have other people decide for them. When people are ignored and the local context is not taken into account, sanitation schemes will fail. It is important to build awareness and create the environment to make informed choices. Social marketing is likely to be a key means of stimulating effective demand. This has to be followed up with supporting and facilitating measures to respond to the generated demand: for example, through better access to finance.

Inadequate sanitation impacts on children. Even where facilities are available, there are problems of acceptability and sharing of latrines and of the willingness of children to use them. There is a need for special attention to children's sanitation (including health and hygiene education) both in the home and at school. As well as being essential for a healthy environment at school, there are important opportunities for outreach into households and communities through educating school children.

Environment

- It is important not to lose sight of the fact that the first environmental priority for most families is a clean household that is an attractive place to live. Next comes the local neighbourhood environment around their house and on their street. Only after these are all satisfied is there likely to be much concern with the area beyond, such as the city or rural environment as a whole.

- An important component of sanitation programmes is therefore increasing user awareness of problems of environmental pollution and of local means that can be adopted to minimize adverse impacts of activities.
- Wider problems of regional and national water scarcity and consequent environmental degradation have focused attention on the quantity of water used by different sanitation systems, both sewerred and unsewerred. In addition to moves towards improved reuse and recycling of wastewater, this is leading to calls for sanitation systems that use far less water than is presently the norm. There are a number of on-plot latrine systems that do not require water in order to function, and interest in this area has gained momentum.

D. Community-Oriented Sanitation in Pune¹¹

This now well-known example of urban community sanitation development is presented because it is a success story and as a result is replicated in many parts of South Asia.

The Pune Municipal Corporation (PMC) has been constructing community toilet blocks in slums for more than 30 years. However, the number of blocks built was small and far below the demand for toilets. Moreover, costs were high because of expensive designs and the involvement of contractors. Finally, in the absence of community involvement during project preparation and implementation, existing toilet blocks were abused and became dilapidated, and municipal conservancy staff could not maintain them. As a result, people had to suffer the indignity of having to defecate in the open, and the incidence of diseases like diarrhea was higher in slum areas. The surrounding environment was polluted, leading to the spread of other diseases.

For the first time, in 1999, the Municipal Commissioner wanted to tackle the issues effectively. First, he took up the program at a citywide scale and managed to reach 500,000 people out of a slum population of 600,000. Second, he invited bids only from NGOs so that community participation in construction, design, and maintenance would be ensured. The final partners in the program included the local authority, PMC, Society for the Promotion of Area Resource Center (the

¹¹ Based on ADB's Impact Evaluation Study on Water Supply and Sanitation Projects in Selected Developing Member Countries (2002), presentations made to ADB in Manila, and numerous Internet links to this case study.

lead NGO), and seven other NGOs. Third, he brought down costs significantly by laying down the condition that the eight NGOs chosen could not bid higher than the estimated cost. The total project cost was \$4.2 million, equivalent to about \$25 per family. Fourth, he personally reviewed in weekly meetings the implementation of the program of building about 3,500 toilet seats within 2 years, which helped energize all PMC staff and also remove obstacles.

The role of PMC, which has taken the initiative and provided the basic framework for implementing the scheme, is worth recording. What stands out in the program is the willingness on the part of PMC to involve the beneficiaries through NGOs and let them make their own decisions in matters related to the planning, design, and maintenance of the toilets. In limiting its role to providing finances, PMC may have been the first such corporation in India to adapt itself to a new role, that of the state as a facilitator of development, instead of relying on the straitjacket approach of centralized planning. Having made a tangible impact on the urban poor in Pune, the program has all the characteristics of good practice in terms of partnerships, sustainability, replicability, scalability, and empowerment of beneficiaries.

An independent survey by the Human Settlements Management Institute (India) covered eight case study toilets—each toilet block had 30–40 seats serving about 125 adults and children—operated by caretakers providing 24-hour service. The survey has provided an insight into how a community-based approach to the problem of sanitation along with participatory planning and execution can work wonders in a lifeless system. The survey concludes that the Pune program has demonstrated an innovative solution to tackling the seemingly intractable problem of public health and sanitation. The expeditious implementation of the project and the maintenance of the toilet blocks by the community with the guidance of NGOs are the highlights of this achievement. There were no time and cost overruns in the project, and it provided a citywide solution to the sanitation problem. It has also confirmed that people are willing to pay user charges at the rate of \$0.50 per month per family for sanitation and that these services would not be a burden on the government anymore. The survey records that the program has opened a possibility for a paradigm shift in sanitation infrastructure development.

This experiment in Pune has attracted many visitors from other Indian cities, governments in other countries, and international agencies. The Pune experiment led to the acceptance of this model in Mumbai on a

large scale, as well as in other cities. The Government of India has based its new program for universal sanitation in India on the principles of the Pune program, confirming the replication of this approach.

E. Some Solutions

Worldwide experience shows that sanitation solutions must come from joint efforts of governments and communities. The community must understand the problem and be willing to act. It helps to have a champion of the cause within the community, and members of the community must have a sense of ownership of the project. But no community is an island. Households should pay for on-site facilities, residents of a block for collection, and residents of a neighborhood for treatment and disposal.

It increasingly appears that it does not make sense to mix feces and urine with water to transport and treat these. Eco-sanitation is the process of safely sanitizing and reusing human feces and urine while minimizing water use. Eco-sanitation largely comprises desiccating and composting toilets. These toilets contain and destroy the pathogens, convert the feces into a safe soil improver, and use the nutrients in the urine to grow useful biomass. This approach is being tried in many countries, including Sri Lanka (through an ADB-funded project), with some success. There are cities in the PRC where up to 200,000 households employ eco-sanitation. This process is not a second-rate technology for the rural poor. It is equally, if not more, applicable to periurban and urban habitation at all income levels.

A variation of roof zone technology, the INDION reed bed system, treats and recycles sullage and sewage. Combining physiochemical and biological processes into a single operation, the reed bed forms a complete treatment unit that also reduces energy use and the load on the central sewer system. It can easily be implemented at housing complexes, holiday resorts, schools, hotels, and military camps. It consists of a treatment tank that is filled with proprietary reed bed support and filtering material and planted with wetland plants. Wastewater flows through the medium and around the roots of acclimatized plants and gets treated for organic and suspended impurities by the combined action of plants, microorganisms, and fungi. It can then be disinfected for toilet flushing, gardening and irrigation, or to recharge groundwater. (IEI News, 2000)

Development agencies and governments should funnel development financing away from large urban water supplies (consumers can pay) and into urban

sanitation and rural water supply. The real issue is hygiene education and awareness. Efforts must start with all schools. For pupils to understand this subject and relate to it, they must see good water supplies and sanitation facilities in each and every school throughout a given country. Efforts must ensure that there are good and adequate public sanitation facilities in every town in a given country. The Sulabh (private financed) or Pune (public financed) public pay toilets in India are good examples that can be followed elsewhere. Efforts must address environmental sanitation issues affecting the urban poor residing in unauthorized settlements.

How can this agenda begin to be addressed? The foundation must start with transparent government policies on integrated water resources management. These should include specific policy statements on sanitation. Then independent regulatory bodies (joint water supply and sanitation regulatory bodies) are needed, so that civil society can be assured governments will indeed implement those policies. Development agencies need to partner with one another, and with governments and NGOs, in pursuing the sanitation development agenda. When it comes to “privatization” of services in urban areas, care should be taken to ensure that water supply and sewerage remain bundled. Development agencies can highlight the needs and issues with regional studies and capacity-building efforts. Last, but not by any means least, culture, traditions, and religion must start to be used to inspire people to action on sanitation.

It is important to realize that there is no universal solution. Different ethnic and cultural conditions will affect every approach. Some factors, however, will be involved regardless of other considerations. These factors include understanding that social, cultural, and technical aspects need to be addressed; understanding that small is OK, which means that stakeholders must develop their own approaches; realizing that capacity improvement is needed when considering regional autonomy; realizing that government agreement is needed when adopting community-based sanitation; understanding the need for credit facility, education, and awareness; and knowing that the entry point is giving informal settlers some type of legal status. (Sudjarwo, 2001)

Sanitation (Problems) in a Nutshell

- Funding for sanitation development is a constraint.
- Willingness to pay for sanitation is relatively low.
- Awareness of the need for sanitation is minimal.
- The poor are often in the most vulnerable environments.
- There is a gender issue here—women place a much higher priority on sanitation than men.
- Septic tank design, construction, and maintenance are poor.
- Poor sanitation can lead to cholera or typhoid epidemics.
- The situation is compounded by inadequate solid waste disposal.

Sanitation (Solutions) in a Nutshell

- There is a need for explicit government policies.
- In densely developed areas, conventional centralized sewerage systems are a must.
- In less densely developed areas, it may be possible to construct decentralized small sewerage systems with local, appropriately landscaped, sewage treatment facilities.
- On-site sanitation is OK, if the plot size and ground permeability are adequate and the groundwater table is low.
- Eco-sanitation (not mixing feces with water) has promise.
- Reed bed technology for treatment of wastewater is OK.
- Target the urban poor as a matter of priority.
- Divert development agency and government funding from major urban water supply projects to urban sanitation projects.
- Solutions must be part of integrated water resources management.
- Opt for community sanitation facilities, like those in Pune.
- Get the facilities and education in the schools first.

Tariffs, Subsidies, and Development Funding

This is a very important chapter. If there is one specific matter that has most constrained the development and management of water supplies in developing countries, it is the issue of tariffs. Some governments have found all sorts of reasons not to approve tariff increases, even though these increases would be strictly in accordance with stated policies and legislation. The consequences have been a low level of development, poor O&M practices, low staff morale, and the facilitation of corruption. This chapter examines tariff levels, tariff structures, affordability, willingness to pay, connection fees, types and levels of subsidies, and the money trail. It describes why there is a need for a paradigm shift in tariff levels and the good things that can happen when this takes place. Last, the most viable source of development funding is identified. In line with this, ADB's water policy suggests that the economic value of water should be recognized and reflected in national policies and strategies by 2005 and mechanisms established by 2015 to facilitate full cost pricing for water services where guarantees for the poor exist.

A. Tariffs

Policy Considerations

Governments of developing countries prepare policy statements, including those on cost recovery and tariffs. Many of these governments go through this exercise at the request of development agencies. Once loans are approved, however, these statements are sometimes considered irrelevant, which is unfortunate because the public does not get to see them, leaving the door open for elected officials to interpret and adjust policies on an ad hoc basis. When tariff revisions are required, the utilities will put them before the relevant government entities for approval. Often the entities concerned, on the instruction of the highest elected authorities, will defer tariff revisions citing (i) pending elections (presidential, national, provincial, or local authority), (ii) high NRW, or (iii) affordability issues involving the poor. Alternatively, tariff revisions are approved, which are only a fraction of what was sought. This undermines the morale of utility staff, perpetuates unnecessary government subsidies, and

encourages corruption. Above all, this remains an obstacle to the urban poor connecting to piped water and intermittent water supply becoming a 24-hour service.

Official policies often support tariffs covering O&M costs plus the greater of depreciation or debt servicing (interest and capital repayment) and a contribution to new capital investment. O&M costs are not defined, so there is a gray area between O&M and rehabilitation. Also, depreciation is subjectively assessed, which results in it being invariably greatly underestimated. The area for the greatest subsidy, however, pertains to the contribution by central governments to capital investments that can be in the form of grants or soft loans. Quite unnecessarily some large cities, such as Colombo and Kathmandu, continue to enjoy grant financing of their capital investments. Policies also cover such matters as "apparent" cross subsidies, including those from large domestic consumers to the poor, those from industry to domestic users, and those from large cities to small towns. Policy may also address matters such as service coverage, service levels, demand management, and new connection fees. **Most important of all, however, there is often no accountability for the implementation of policies.** What we commonly see in terms of tariffs in water utilities is a roller-coaster ride taking the utility in and out of financial viability and a large number of water supply schemes that do not meet even their O&M costs from tariffs. In some cases, like that of Colombo, the average domestic tariff is only about one seventh of the average nondomestic tariff and equates to about 1% of household income. In fact, the tariff is so low that for many people transportation costs are higher than the amount of the bill itself, thus making collection a problem. Certainly the potential for resource mobilization from the consumers has never been fully explored.

In 1985, a World Bank evaluation of projects came up with the following conclusions.

- *The Bank's main concern is that the costs be recovered to the maximum extent feasible.*
- *The study concluded that the majority of public utilities failed to meet their revenue covenants, largely due to inadequate action on approval of new tariffs by governments.*

- *Financial covenants have worked better when linked with detailed action plans.*

In 1990, the World Bank reiterated that the economic analyses of projects and pricing policies have been neglected with adverse results in project design and justification. ADB findings at around the same time were similar (see Box 11.1). Despite these findings, which were recorded many years ago, little has been done to change the situation.

Box 11.1 Water Pricing—ADB Postevaluation Results

Tariffs and recovery rates continue to remain critical issues in nearly all developing member countries, notwithstanding the evidence that in most cases people have been willing to pay for water supply above existing tariff levels and that tariffs can be structured to appropriately blend equity and efficiency objectives. The difficulty has been that there is general political resistance to tariff increases and to maintaining tariff levels in real terms. The tariff structure should be sufficient to cover O&M costs, enable debt servicing, and support development plans while at the same time providing low lifeline rates for low consumption and a penalty rate for high consumption. Experience shows that increasing tariffs and improving billing and collection cannot be achieved solely through loan covenants. (ADB, 1994)

Objectives

The transparent policies of governments must state the objectives of tariffs and the rationale of tariff policies. The main goal may be to protect consumers while achieving and maintaining the financial viability of utilities. Other objectives may include serving the urban poor, using lifeline rates for the urban poor, encouraging demand management, developing schemes that ensure self-sufficient O&M, setting average tariffs for industrial use that are not more than twice the average tariffs for domestic use, and making connection fees payable as tariffs. In addition, tariffs should be based on the full price of water, which includes source development, purchase of raw water, treatment, and distribution costs. Allowable costs (those required for providing an efficiently operated water supply service) should be defined. **One objective that should be applied for major cities, but has**

seldom found favor, is that of funding all capital works directly from tariffs. This is not an unreasonable objective when we consider that on average the monthly power bill in an Asian city is some four times the amount of the monthly water bill.¹² It also is not unreasonable if one considers the potential revenue to be gained if 5% of household income is the ceiling applied to all households for water charges in a city (see Figure 11.1). In setting tariffs, the first consideration must be a transparent tariff policy endorsed by the government. This policy should reconcile economic efficiency, social equity, and financial viability. We need tariff goals. What is to be achieved in 5 years? What is to be achieved in 10 years? We need to examine the need for loans that must be paid with interest against the possibilities of tariff increases to cover capital development directly. As can be seen from the example of Greater Colombo (see case study in Appendix 2), it is eminently possible to fund all major urban water supply developments directly from tariffs. We should not forget that all funding, except grants, must also be paid or repaid (loans) out of tariffs.

It is the reluctance of elected officials to increase tariffs that has, more than any other single factor, constrained water supply development in terms of quality of service and coverage. Also, it is their reluctance to consider funding development directly from tariffs that has, as a matter of policy, further constrained development.

Tariff Levels

Tariff levels should be tied to meeting objectives, and two of those objectives should be connecting the urban poor to piped water and providing 24-hour potable piped water in the home to all. The average domestic tariff in Asian water utilities is \$0.05–0.15/m³, but this is a long way short of meeting the stated objectives. Domestic tariff levels are so low in South Asian countries (\$0.01–0.05/m³) that there is no possibility of achieving price elasticity of demand (see Figure 11.2 and Box 11.2). The tariffs in Jakarta and Manila were less in 2001 than in 1995–1996. European urban water supply tariffs are generally \$1.20–1.80/m³. While Singapore's tariff is about \$1/m³, the average domestic tariff in Asia is about \$0.20/m³. This tells us something.

¹² *Second Water Utilities Data Book—Asian and Pacific Region* (McIntosh and Yniguez, 1997).

Figure 11.1 Ratio of Potential to Actual Revenue from Water Services (2001)
 [based on a 5% of household income affordability ceiling for households earning less than \$5,000 per annum]

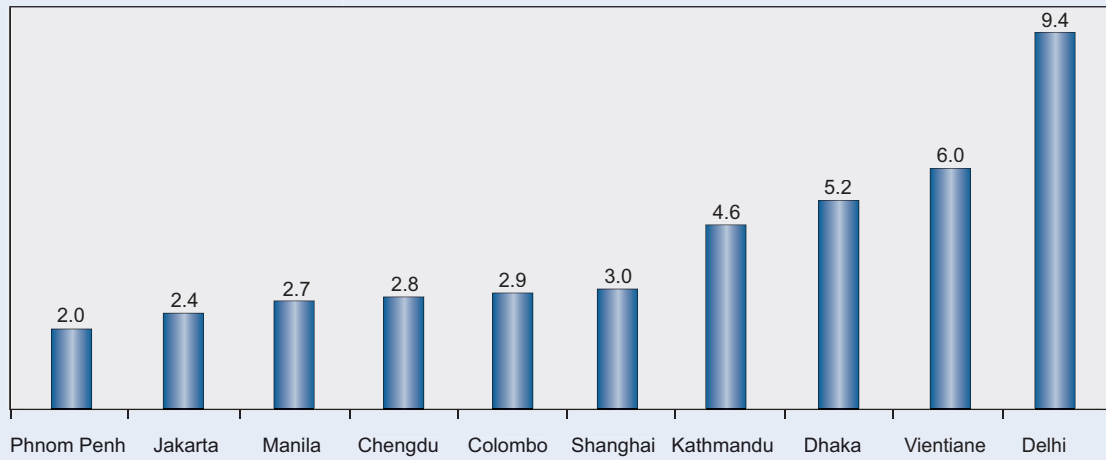
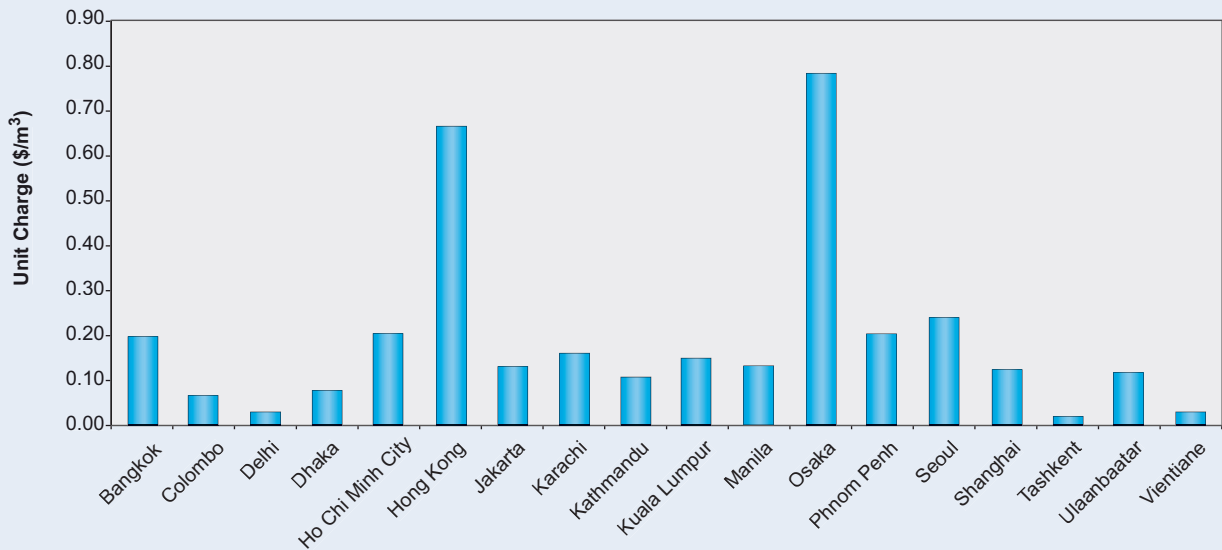


Figure 11.2 Typical Domestic Piped Water Unit Charges (2001)
 [based on a consumption of 20 m³ per month]



**Box 11.2 Asian Development Bank's
Second Water Utilities Data Book—Asian
and Pacific Region (1997) Analysis^a**

Average Domestic Tariff (Strong) cents/m³

Malé, 437.0; Hong Kong, 56.0; Cebu, 52.4; Singapore, 47.0; Jakarta, 40.6; Taipei, 39.0; Chonburi, 37.0; Bandung, 29.0; Ulsan, 26.7; Kuala Lumpur, 25.4; Bangkok, 24.7; Chiang Mai, 24.3; Davao, 24.2; Johor Bahru, 24.0; Suva, 23.6; Manila, 22.0.

Average Domestic Tariff (Weak) cents/m³

Almaty, 1.2; Mumbai, 1.4; Bishkek, 1.8; Faisalabad, 2.5; Tashkent, 3.2; Delhi, 3.4; Tianjin, 3.6; Beijing, 3.7; Thimpu, 4.2; Calcutta, 4.8; Ulaanbaatar, 4.8; Colombo, 4.9; Shanghai, 5.7; Hanoi, 5.9; Dhaka, 8.0; Chittagong, 8.7.

Annual Revenues (\$ Million)

Seoul, 335; Hong Kong, 327; Bangkok, 272; Singapore, 259; Taipei, 211; Jakarta, 101; Manila, 100; Shanghai, 98; Karachi, 73; Mumbai, 45; Johor Bahru, 42; Kuala Lumpur, 39; Ho Chi Minh City, 22; Colombo, 17; Dhaka, 13; Kathmandu, 3; Ulaanbaatar, 3; Calcutta, 2; Phnom Penh, 2; Vientiane, 2; Malé, 2; Faisalabad, 1.

^a 1995–1996 data.

Tariff Structures

Graphs derived from the *Second Water Utilities Data Book—Asian and Pacific Region* (Figure 11.3a and Figure 11.3b) show the types of tariff structures typically used by Asian city utilities. The most obvious conclusion is that the lifeline rate is far too broad, offering extensive subsidies to the rich. Also, demand management through penalty rates for excessive use is ineffective to a large extent. This is the case for two reasons: (i) the tariff rate is too low; and (ii) the penalty rate occurs only after high volumes have been used. Much has been said about the failure of the block tariff¹³ system to benefit the poor. Most of the poor, however, are not even connected to distribution systems. And when one connection serves multiple households, as is common among the poor, the tariff is normally applied at the penalty rate for high consumption.

¹³ A block tariff is one in which the tariff varies for different consumption ranges. It is normally an ascending tariff (for example, 0–10 m³ at \$0.10/m³, 10–20 m³ at \$0.20/m³, etc.).

Block Tariffs

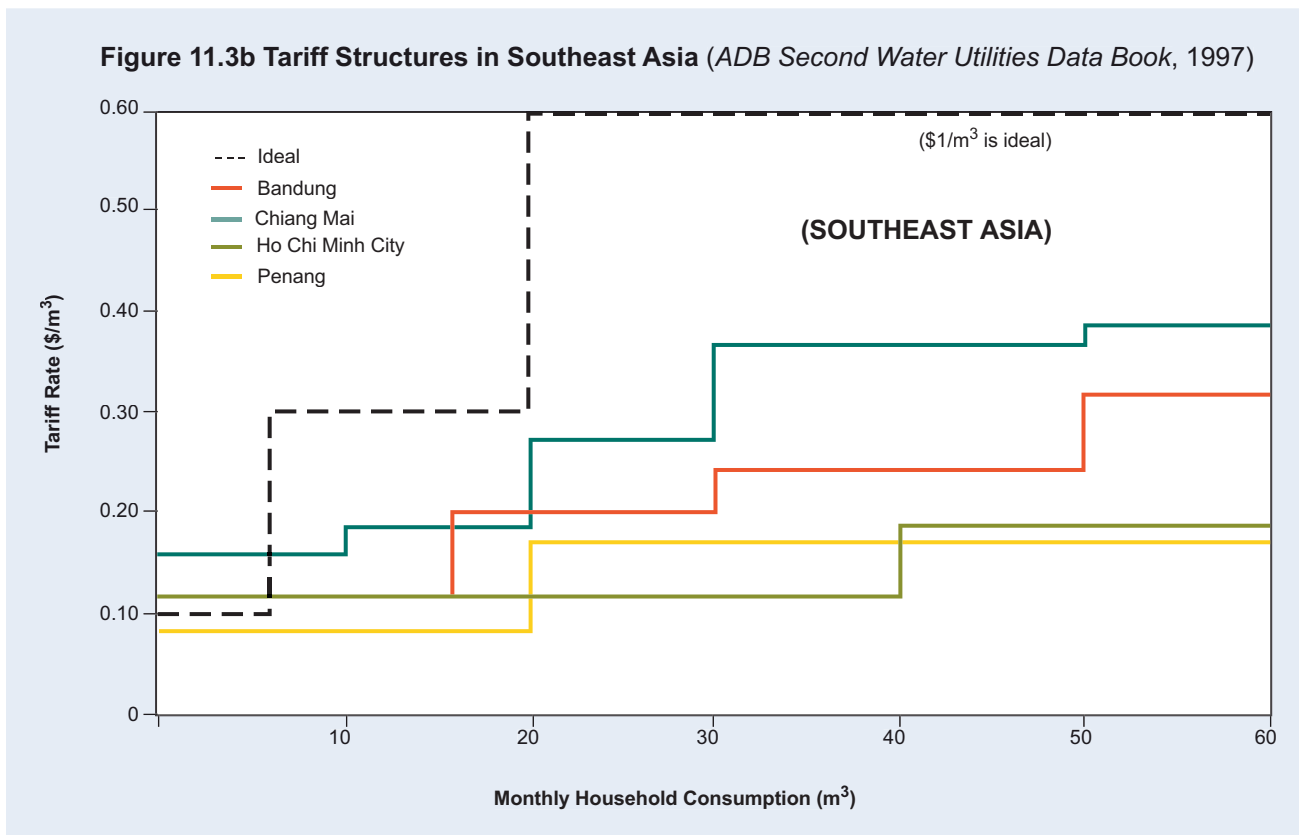
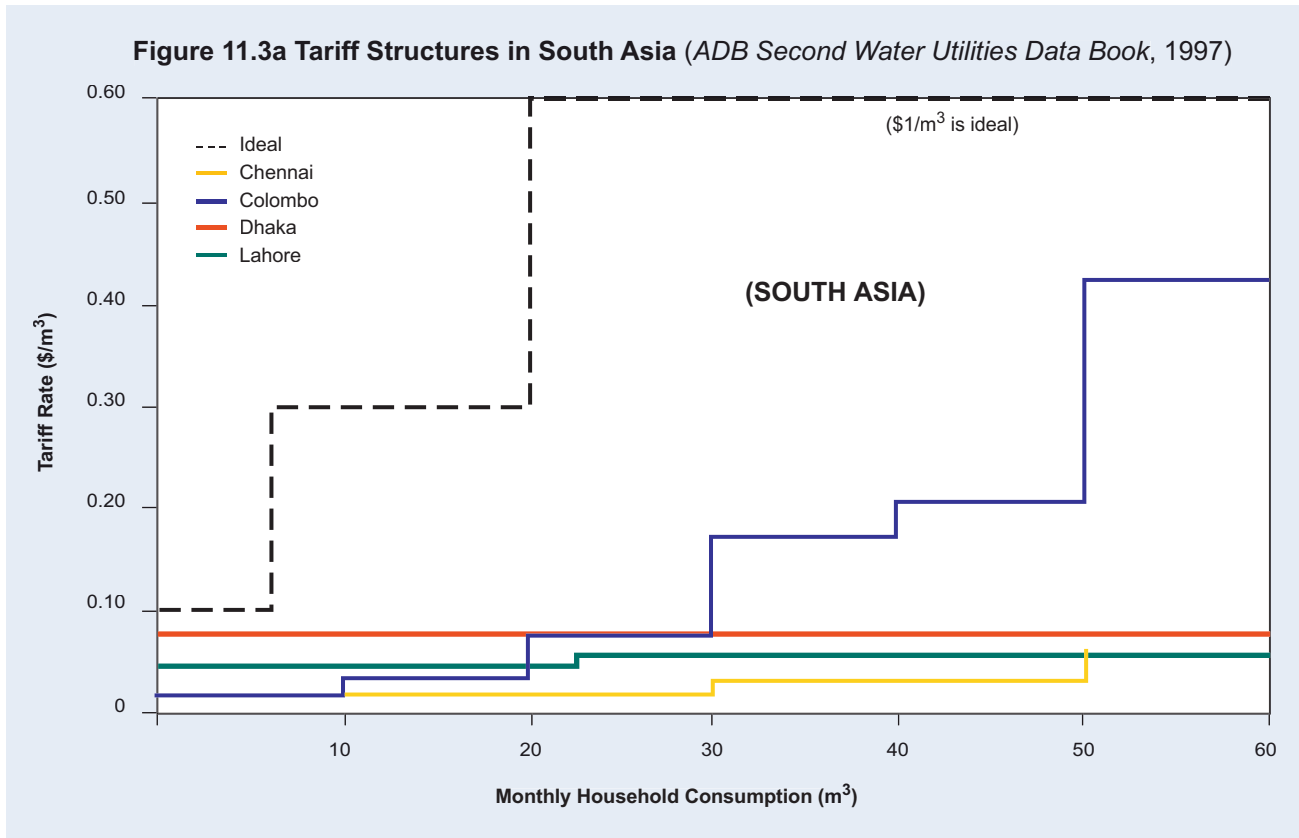
Although most developing countries readily accept block tariffs, there has been some opposition to these from economists for the reasons cited above (Whittington, 1992). In this age of computerization, however, it should not be difficult to make allowances for individual families with special conditions and allow their use of water at the lower lifeline rate. There is a need to consider that the range of household income in a city like Manila can be as wide as 1:100 (or, in other words, from \$500 per annum to \$50,000 per annum). In a city like this, a flat rate tariff may be too high for some and too low for others. **The best block tariff system might be a three-block system with the lifeline consumption rate at 0–6 m³ (tariff limited to 5% of household income for the lowest 10th percentile), consumption of 6–20 m³ charged at a rate to recover all financial costs, and consumption of more than 20 m³ charged at a penalty rate equal to about \$1/m³ (to conserve water).** It has also been noted that rising block tariffs is an ineffective means of targeting subsidies, because the income elasticity of household water demand is low. This is true, but it is obvious that when there is no elasticity of demand the general level of tariffs is too low. Care should be taken with the tariff structure in the width and price of the block.

Tariffs and the Urban Poor

The poor are better served by gaining access to piped water than by continuing global subsidies. Subsidy mechanisms targeted at the poorest households can be designed, and these policies can be energetically publicized. This worked in Chile. We know from Manila that most of the poor who are not connected,



One objective—to eliminate this



who pay up to 1,000 pesos per month to water vendors, would be very happy to pay 300 pesos per month for piped water. Box 11.3 shows that there is plenty of room for financing from tariffs.

In the case of the intermittent standpipe water supply services that are common in South Asia, the poor can have 24-hour direct access to piped water. This can happen if tariffs are raised equitably throughout society, with a ceiling of 5% of household income as the upper limit of affordability. For those already connected, there are considerable savings in terms of water treatment and pumping and storage costs once water is supplied on a 24-hour basis. **As an interim measure, those receiving a 24-hour water supply**

should pay a much higher tariff than those receiving an intermittent water supply. Going from an intermittent to a 24-hour water supply, however, will only be possible when a water utility has full autonomy and is free from political interference, especially regarding pressure for new connections in a system that is hydraulically inadequate.

Affordability

Some 20 years ago, a figure of 5% of household income was arbitrarily set as a realistic ceiling on affordability for water supply and sanitation services. It was felt that nearly all people in developing countries could pay this amount. Today, this is still a reasonable benchmark. We can, of course, see examples of those not connected to piped water paying up to 20% of household income for water purchased from vendors. That is not a measure of affordability, but rather a measure of willingness to pay where there are few options. However, we rarely see (with the possible exception of Malé) anyone connected to a piped supply paying over 5% of their household income for water. Why? Because they have the ability to adjust their consumption level to fit their income. Box 11.4 shows why an average domestic tariff of \$0.40/m³ is affordable in any large Asian city.

Box 11.3 The Hidden Economy

In developing countries, households cope with unreliable water supply by building in-house storage tanks, installing booster pumps, and sinking wells. The size of this informal and often hidden water economy dwarfs that of the visible water economy. In a city in an African country, for example, water vendors collect 10 times the revenue collected by the formal utility. The existence of this hidden economy shows that there is a high demand for service that is not being met by the formal sector. While the informal sector provides some services efficiently, the costs related to other services (such as water vending in the urban periphery) can be excessive. The reason for this is tied to the inability of these providers to transmit water by pipe, instead of by person or vehicle. A profound implication is clear: there is an enormous reservoir of resources that can be drawn on at reduced costs for all. This can happen when the formal sector begins to meet consumer demand and provide services in a responsive and accountable way. The bulk of financing, which is needed for improved service, can and should come from users. But this can only happen when supply and demand side factors have been considered. On the supply side, the focus must be on facilitating the provision of responsive and accountable service at least cost, which can be done through developing institutional arrangements. On the demand side, it is important to concentrate efforts on providing the services that people want and are willing to pay for. (Seregeldin, 1994)

Profiling Household Income

To get a good appreciation of the theoretical potential revenue in an urban area, it would be very useful for the utility to profile the full range of household

Box 11.4 Tariff Affordability

First, assume there is a population of 1 million, with five persons per household and a 5% of household income ceiling. Next, assume that consumption of 0–10 m³ is billed at 20 cents/m³, consumption of 10–20 m³ is billed at 40 cents/m³, and consumption of more than 20 m³ is billed at \$1/m³. Last, assume 200,000 people (40,000 homes) have an annual income of \$500 and use 10 m³ per month, 600,000 people (120,000 homes) have an annual income of \$1,000 and use 20 m³ per month, and 200,000 people (40,000 homes) have an annual income of \$5,000 and use 40 m³ per month. This would result in a revenue total of \$22,080,000; a total consumption of 52,800,000 m³, and an average tariff of 41.8 cents/m³.

income in that whole urban area. A typical profile would give a series of annual income ranges and the percentage of households in each category, for example \$0–500 (60%), \$501–1,000 (20%), \$1,001–2,000 (10%), \$2,001–4,000 (5%), \$4,001–8,000 (3%), and greater than \$8,000 (2%). This information could then be used to structure tariff charges, assuming a ceiling on affordability of 5% of household income. Of course, we should not forget that willingness to pay will depend on (i) household income, (ii) tariff, and (iii) alternative water supplies.

Willingness to Pay

It has been said that the people in Asian cities have a willingness to pay for water but governments do not have a willingness to charge (United Nations Development Programme 1991b). An example of willingness to pay for piped water comes from Malé (\$5/m³). Willingness to pay depends on the tariff, the household income, and the volume consumed. **But most of all it depends on the option of the consumers to use alternative sources, such as dug wells or handpump-operated tubewells. This is the main reason why ADB and World Bank postevaluation findings on water supply projects conclude that demand is invariably overestimated.**

Connection Fee

One reason so many of the urban poor are not connected to piped water is that the advance payment of the connection fee is too high (often over \$100). Perhaps it has been kept artificially high because potential (rich) consumers have an incentive to approach moonlighting utility staff and ask for the installation of illegal connections. Perhaps it has been kept artificially high so that water can continue to be “informally” sold by utility staff to water vendors. Regardless of the reason, connection fees are so high in some places (Kathmandu is one example) that despite receiving no water consumers continue to pay a minimum charge every month rather than get disconnected (see Figure 11.4).

There is no doubt that this has been a barrier in the past to the urban poor getting connected to piped water from existing systems. It is certainly feasible to allow connection fees to be paid over a period of years by bundling them with tariffs. There is for that reason no need for households to seek microcredit finance to pay these fees. If bundling starts as a matter of policy, it can be implemented without hurting the operator. For new systems, there is no reason why connection costs cannot be included under development loans.

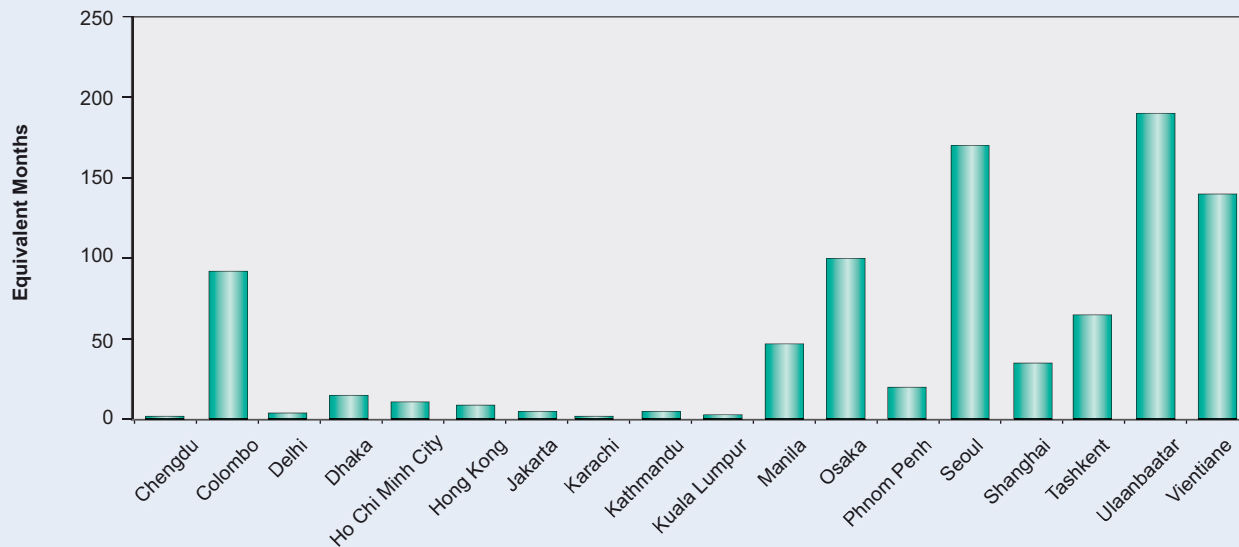


20 pesos a day for clean water



High connection fees keep the poor from being served

Figure 11.4 Connection Fee—Equivalent Months of Typical Tariff
(based on typical consumption of 20 m³ per month)



Private Sector Participation and Tariffs

It is unfortunate that the private sector gets the blame for high tariffs. Much higher tariffs are needed anyway, and if tariffs are increased before “privatization” there would be many more private operators interested in bidding.

Ten years ago, the push for PSP in water supplies of developing countries was spearheaded by the belief that the private sector would bring much needed monies to the table. For a while this happened, and it resulted in the construction of many BOT projects for production and treatment facilities. Malaysia was one of the countries embracing this approach. It was later acknowledged that unsolicited bids, “take or pay” contracts, and dealing with only one component of a water supply system (the easiest) left many problems unresolved. What we now see is very little funding coming from the private sector for concession contracts, despite contractual obligations to expand services. The primary reason for this is low tariffs. In other words, the main problem is still unresolved.

Tariffs and Decentralization

Tariffs are mostly controlled by elected officials holding central government offices. This goes against

the principle of managing water at its lowest practicable level. It also prevents true devolution of power to local governments. However, as has happened in Sri Lanka, even when local governments are given the power to run their own water supplies, they find ways to hand systems back to national authorities when it comes time to increase tariffs, and in that way avoid making that unpleasant decision themselves. Later, they often ask for the systems to be returned.

Tariffs and Regulation

Tariff systems cannot exist in isolation. They need to be based on transparent policies that are kept in the public eye. Regulators need to see that policies are implemented as intended. When operators believe tariff increases are necessary, they should make specific references to policies in justifying the tariff increases requested. Regulators then must review requests before approving them, to see if they are needed and that they comply with policies. The intent of policies, such as providing sufficient capital to connect more urban poor, should be paramount. Everyone involved needs to be aware of and educated about tariffs and how the monies from tariffs will be used. It would be healthy for regulators to promote consumer societies. The objectives of the operators, in terms of performance, also need to be agreed upon and monitored by the regulators.

Tariffs and Civil Society

If governments are to change their policies on tariffs, they need the strong support of development agencies and civil society. Central to the debate is agreeing on what the long-term solutions should be and how to effect these. Resistance to tariff increases in the past has come from elected officials. **One reason some elected officials do not want to increase tariffs is that the money trail runs through governments, and eliminating subsidies through higher tariffs means that it would not. So the issue here is governance.** Three changes are needed: first, transparent policies that include funding investments from tariffs must be developed. Second, independent regulatory bodies to monitor the implementation of those policies must be formed. Third, organization development that includes a step away from civil servant rules and civil servant salaries for commercial operations and remuneration based on the market and accountability and incentives for performance must be implemented. These changes must come about through civil society pressure. Governments will not voluntarily reform themselves.

How to Increase Tariffs

There are a couple of golden rules here that can help assuage the complaints of consumers. First, once goals have been set, **tariffs may be increased gradually every month until the goals are reached.** This was done once in Manila, when tariffs were doubled over a period of about 15 months, and almost no one appeared to complain. The second rule is to **make sure that service improvements, in terms of 24-hour coverage or reduced NRW, parallel tariff increases.** Public education and awareness are very important. Today, with the Internet, it is possible to keep many consumers informed of such matters as tariffs. And those without access to the Internet can be informed through radios, televisions, and newspapers. When this happens, the consumer will be more in control. Civil society (NGOs, journalists, and academics) has a role to play. Public relations consultants can also be employed to get the story on tariffs across to consumers. Once major capital investments have been made, and city populations begin to stabilize, it should then be possible to stabilize tariff levels, apart from annual adjustments for the consumer price index. Utilities must be given the right to implement automatic adjustments based on increases in wages or power costs. Utilities should also develop good graphical presentations of past versus future tariff adjustments in relation to the implementation of policies. A cash-needs accounting method can be effective in showing the public where

tariffs went or will go (for example, rehabilitation, new works, debt service, interest payments, etc.).

Tariff Management

A dynamic situation is created when tariffs are at a level to induce demand management. This needs careful monitoring to see the effect of tariff adjustment on consumption levels for all types of consumers. In Sri Lanka, for example, very high nondomestic tariffs have forced some businesses to drill their own wells. Such information can then be used to fine-tune the tariff structure to more accurately achieve policy objectives. Monitoring the effects of tariff adjustments is so important that one person could be given this job as a full-time task, and this person's findings should be documented so that others can learn from the experience. Utilities need all the information they can get about consumers and nonconsumers in service areas. With modern computerization it is much easier to collect, for analysis and management, information on consumers. An audit of computerized accounts can show whether or not systems are being properly managed. Analysis of annual information can, for example, reveal that there was a 10% increase in connections but only a 2% increase in revenue. This would need further investigation. Also, care should be taken in the accounting process to record the bulk supply of water to estates.

B. Subsidies

Where there are very high subsidies, the money trail runs through governments, which can be inefficient or even suffer from corruption. This is a major reason for long implementation delays due to procurement issues related to development projects.

In Manila, the urban poor not being served have a monthly water bill up to five times that of those connected to piped water. They buy water from vendors but can only afford one fifth of the volume that those connected to piped water consume. Thus their effective unit price for water (which is also often of inferior quality) is 25 times that paid by those connected to piped water.

The following were some findings of the World Bank in India (2001).

- *Residential and commercial consumers are willing to purchase water from tankers at 50 times the price that households are charged.*
- *Commercial and industrial consumers took 10% of the water but provided 80% of the revenues. Tariffs*



An emergency every day

for commercial and industrial consumers ranged from 7 to 38 times the domestic tariff.

The Water and Sanitation Program's Survey (2001) on Tariffs and Subsidies from 260 Cities and Towns in India revealed the following.

- 45% use water charges, 17% use a water tax, and 38% use a combination of the two to fund water and sanitation services.
- 17% use only metered connections and 38% use a combination of metered and unmetered connections. The rest are unmetered. Many metered connections are not working.
- There are two types of tariffs for metered connections, a flat rate and an increasing block tariff. The former is much more prevalent.
- The tariff for unmetered connections is based on either a simple fixed rate per month per household, a rate based on the diameter of the water pipe, or a rate based on the number of taps per house.

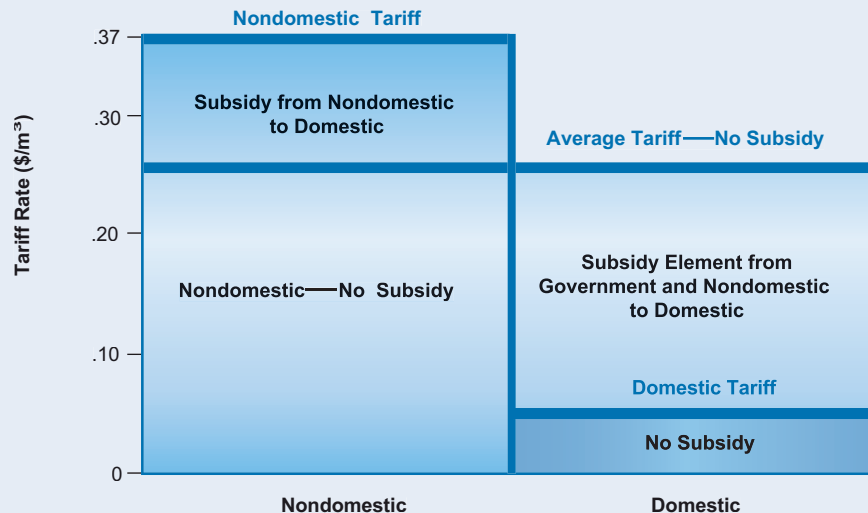
We can justify subsidies if they have a specific purpose, such as targeting the poor. But they must be transparent and there must be a time-bound plan to phase them out. **We need to analyze subsidies to see**

who benefits. It is today quite common to see a large lifeline rate for those served with piped water that benefits most of those connected, but there are still millions of poor consumers who are not yet connected and pay vendors very high prices to get water. More recently, such as in Chile, there have been attempts to directly subsidize the poor. Complete socioeconomic surveys of households determine those eligible for benefits, including water subsidies. Such families pay the utility only a reduced tariff, and the balance of the cost of water is recovered by the utility directly from the municipality through the use of a fully computerized database. This is known as an output-based subsidy (see Box 6.5).

Sewerage is normally charged as a percentage of the water bill sufficient to cover O&M costs of that service, but not capital costs. Thus there are normally grants to utilities for sewerage investments. These need to be phased out over time.

Cross subsidies include those from large users to small users, industrial users to domestic users, and large cities to small towns. These are, however, normally only apparent subsidies, because in reality, the large city, the large domestic consumer, and the industrial consumer nearly always receive some subsidy (although small) from the central government, represented by the grant or soft loan element in capital

Figure 11.5 Subsidies—Greater Colombo



financing, risk taking on foreign exchange, etc. In Colombo, at one time, industrial water tariffs were 13 times domestic water tariffs. Even now, they are as high as 7:1 (see Figure 11.5). This distorts development. More generally, in Asia, the figure is around 2:1. In Tokyo and Singapore domestic tariffs are now the same as industrial tariffs. Note, however, that household income is somewhat more uniform in these cities than in cities like Colombo or Manila.

An example of the distortion of subsidies is provided from the current tariff in Cebu. Since everyone must pay the \$2 service charge, the effective tariff for the poor, who may use only 6 m³ per month is \$0.60/m³, while the rich, who use 30 m³ per month, pay an effective tariff of \$0.36/m³.

National tariffs help increase coverage with water by spreading investment costs, but they are not good for the sustainability of individual schemes. Every water supply scheme must be able to at least meet its O&M costs from its own tariffs. In the long term, schemes should become self-sustaining.

Removing subsidies on urban water use can have dramatic effects. An increase in the water tariff in Bogor (Indonesia) from \$0.15/m³ to \$0.42/m³ resulted in a 30% decrease in household water demand. Increased water tariffs induced a 50% reduction in water use over 5 years in a fertilization factory in Goa (India).

When a government gives a grant to a major urban water utility, it is in effect the people who pay taxes in the country who are contributing, but only the few who are in the city are the beneficiaries. It could also be said that this is a form of the poor (in rural areas) cross-subsidizing the rich (in urban areas). This is particularly so for sewerage development.

Governments also need to show, in a transparent manner, what effective financial subsidies are provided to farmers for irrigation when they compete with domestic water supplies in the development and use of water.

C. Funding Development

The Funding Mind-set

A policy briefing paper on financing water and sanitation recently prepared by an international NGO identified the potential solutions to meet the financing gap in water and sanitation as (i) increasing bilateral aid flows, (ii) international PSP, (iii) reallocating public sector resources, (iv) debt relief, (v) recognizing household and community contributions, and (vi) global potential for innovative mechanisms (trading water rights, debt swaps, and water bonds). Recognition of household and community contributions through tariff increases represents perhaps the greatest potential solution of all.

Self-Funding

There is evidence that internal cash generation, used to finance water supply and sanitation in developing countries, has declined. World Bank figures indicate that it went from 34% in 1988 to 10% in 1991, and by 1998 it was only 8%. This is a sad indication of the development of sustainable water supplies, as one would expect that the figures would be increasing each year in line with an exit strategy for funding assistance. Figure 11.6 shows the proportion of total O&M plus capital expenditure covered by tariff revenue in Asian cities.

Funding Operation and Maintenance

Most utilities do not have a very clear definition of what comprises O&M. Therefore, governments often fund maintenance work, such as replacing water meters and vehicles, under capital works programs. Indeed, whenever public enterprise utilities fail to meet their obligations from tariffs, governments are all too ready to bail them out.

Amount of Funding

It is generally recognized that there has been inadequate funding of water supply development in urban areas of Asia to keep pace with the rapid trends

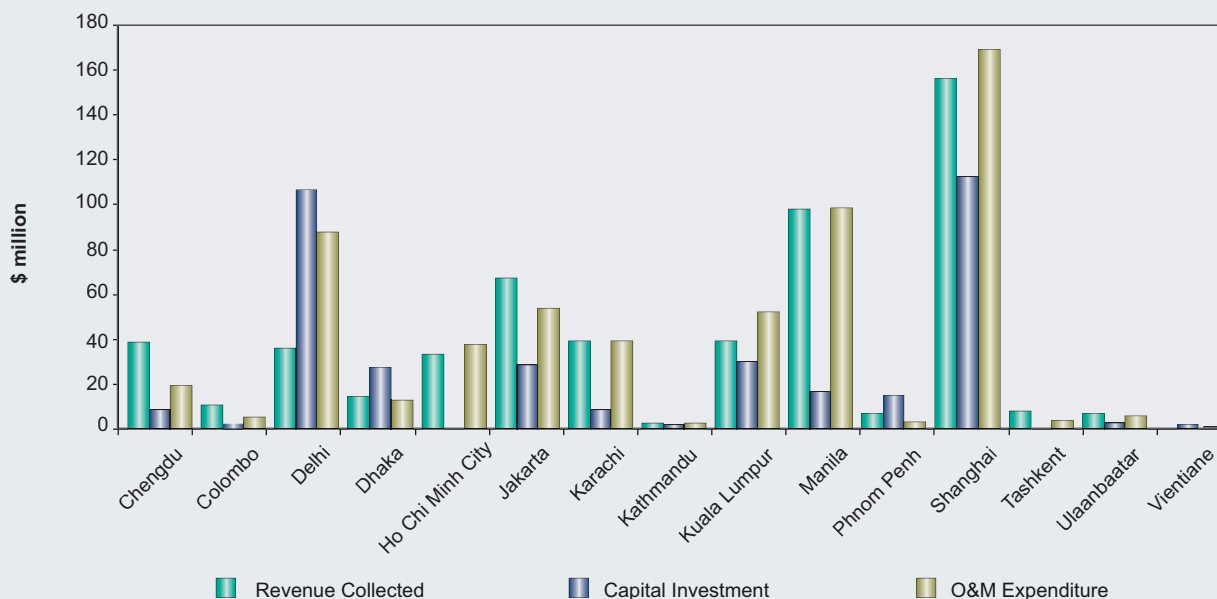
in urbanization. Large portions of the population are not served with piped water. A very large number of South Asia's people rely on standpipe supplies and receive very poor intermittent water supply service. This is evidence that there is inadequate funding of development.

What is the reason for this inadequate funding? It has been realized for at least 10 years that governments and bilateral and multilateral funding agencies do not have sufficient capital to make much difference if they continue to allocate only 5% of their development budgets to water supply and sanitation. So, one issue is prioritization of the sector. *It was once said that the private sector would be able to bridge the development funding gap, but recent evidence suggests that this is not so. The pace of development needs far outstrips private sector involvement, not to mention contributions. Furthermore, tariff increases under private sector contracts are constrained by these contracts, rather than guided by policies.*

Sources of Funding

The sources of funding depend on the performance of utilities and the economic conditions of developing countries. They also rely on government policies. Depending on the economic status of a developing country, the sources of funds are likely to vary between government and bilateral or multilateral funding institutions.

Figure 11.6 Annual Investments and Revenue Collection (2001)



Well-established utilities, like the Metropolitan Waterworks Authority in Bangkok, have in the past been able to access domestic money markets through bond issues. Major utilities, like the Metropolitan Waterworks and Sewerage System in Manila, were able to borrow money directly from institutions like ADB. Where concession or BOT contracts are under way, the private sector may provide funding, but depending on the contract it may (like in Manila) not be timely.

The main source of funding for urban water supplies should be tariffs. Secondary sources may include central and local government loans, and private sector capital. Once a utility has established a good reputation, it may also use public bond issues to fund development. Consideration might be given to writing off all debt owed by a utility to the national government, if the utility opts to fund all future development itself directly from tariffs. **In the long term, neither development agencies nor governments should be funding major urban water supply development. For this to be the case, an exit strategy is required.**

Terms of Funding

Many major utilities continue to receive much of their funding in the form of grants. For example, development agencies extend loans and grants (on a 50–50 basis) to the National Water Supply and Drainage Board in Sri Lanka to finance the Greater Colombo Water Supply Project. But if development funding is from governments directly, all the money is passed on in grant form. Tariff revisions then fail to be made on time and adequately, and debt servicing is often forgiven by governments (the Nepal Water Supply Corporation is an example). Government policies, therefore, are not always followed. When funding is sourced from an international funding institution, loan covenants will apply. ADB has in the past had soft loans with long grace periods, long repayment periods (40 years), and low interest rates (equivalent to about 1% per annum). The eligible countries for these loans affecting the water supply sector were the least-developed countries. ADB also had loans from its ordinary capital resources with shorter repayment periods (20 years) and higher interest rates (around 6–7% per annum). These loans were for more developed countries and large countries like the PRC and India.

Funding Investment from Tariffs

The main solution to the shortage of financing for urban water supply infrastructure lies in a policy reform that dictates that most, if not all, financing for investments

must come directly from increased tariffs. In general, this will mean raising the average tariff from the range of \$0.05–0.10/m³ to \$0.40–0.50/m³. The example of Greater Colombo (see the Greater Colombo case study in Appendix 2) shows that this is eminently affordable (less than 5% of household income). Such tariff increases may be made incrementally (a little every month) until the target is met and must be accompanied by improvements in service, such as increasing the number of people with access to a 24-hour supply. The PRC is already implementing this policy through the Harbin Water Supply Project. A \$70 million investment is provided directly from tariffs (see Box 11.5). In a practical sense, governments would be advised to set such policy objectives as 5- or 10-year goals.

Funding Priorities

If major urban entities can fund all or nearly all their investments directly from tariffs, government and development agency funds can concentrate more on rural and small town water supplies and on sanitation. What makes this solution reasonable is that there has not been any other viable solution put on the table by development partners or governments that would have the same impact. Nevertheless, we should remember that integrated development reforms are needed. So, organizational development and the extension of real

Box 11.5 People's Republic of China Water Tariff Study

The tariff study approved by ADB in 1997 assisted the Government in preparing the first ever *National Guidelines on Water Tariffs*, which was promulgated in September 1998. Major features included (i) selecting a tariff structure based on local conditions and priorities, (ii) considering a two-part tariff with a volumetric and fixed demand charge, (iii) adopting full cost recovery as the main objective in setting and approving tariffs, and (iv) adopting a simplified process for tariff regulation requiring evaluation and approval at the local level, which was supported by review and monitoring at the provincial and national levels. The *National Guidelines on Water Tariffs* is expected to improve the long-term financial viability of water supply companies, provide for O&M and service expansion, and increase PSP in the water sector.

autonomy to the water utilities, which are products of policy and regulatory reform, must accompany tariff reform, too. Funding should also be provided for watershed rehabilitation. This is long-term thinking, but very necessary for sustainable sources. Rainwater harvesting, wastewater recycling, and trading water rights should also receive funding when tariffs are raised.

Conclusion

The problem in funding the development of water supplies is the dual government policy of not committing more than 5% of annual development budgets to the water supply and sanitation sector and not allowing tariffs to increase to help fund development. It is this dual government policy that has constrained water supply development in many Asian countries. Even policies of funding development through “privatization” have been hamstrung by tariff issues. What is more relevant is that there are no exit strategies for development agencies and governments funding major urban water supplies.

The most important reason for increasing tariffs is to implement government policies, especially those parts that prioritize connecting the urban poor to piped water. The next most important reason is the matter of governance, since improvements in this will put the consumer more in control (the one who pays the piper calls the tune). After tariffs are increased, water will be recognized as primarily an economic good. Higher tariffs will reduce excessive consumption and waste. These reductions will focus attention on reducing NRW (leaks, illegal connections, and metering problems). These savings in water can help eliminate intermittent water supply and will allow other sources of water to be developed, such as rainwater harvesting, trading water rights, wet season storage, recycling wastewater, and watershed rehabilitation. When Asia gets ahead of the game with investments in water, it will spur economic growth in general. Macau,¹⁴ in the 1990s, was a good example of this. In Box 11.6, Peter Rogers summarizes why it is necessary to increase the price paid for water.

Box 11.6 Water in the 21st Century, “The Looming Crisis Averted”

- *Increased price reduces demand, substitutes become cheaper, conservation becomes affordable, and it changes consumption preference.*
- *Increased price increases supply, marginal projects become affordable, and economic incentives are provided to reduce water losses.*
- *Increased price facilitates reallocation between sectors, from irrigation to domestic and industrial and from off-stream to in-stream uses.*
- *Increased price improves managerial efficiency, due to increased revenues that improve maintenance, improve staff training and education, and make modern monitoring techniques and modern management techniques affordable.*
- *Increased price reduces the per unit cost of water to poor people, extending piped supply, which reduces the reliance of the poor on water vendors and makes water available to tail enders in irrigation systems.*
- *Increased price leads to sustainability, as it reduces demands on the resource base, reduces pollution loads (due to recycled industrial water), and makes more water available for ecosystems. (Rogers, 2001)*

¹⁴ Macau has one of the best examples of “privatization” of water services in the Asian region.

Tariffs, Subsidies, and Development Funding (Problems) in a Nutshell

- Tariffs are too low in most parts of Asia to influence demand.
- Tariff structures are also to blame for subsidies going to the rich and inadequate demand management.
- Major tariff reform is needed before PSP makes sense.
- The poor are able and willing to pay, but many governments are unwilling to charge.
- High subsidies equate to low governance.
- Tariff covenants do not work.
- Tariff policy is invariably ignored.
- The poor often pay about 25 times the unit rate (for water) paid by the rich, because the poor are not connected to a piped supply.
- Low tariffs perpetuate the status quo, where the hidden economy of water vending is tapped.

Tariffs, Subsidies, and Development Funding (Solutions) in a Nutshell

- Tariffs begin with policy—analyze subsidies.
- Tariff reform is a manifestation of good governance—fewer subsidies.
- Alter the money source from governments to consumers.
- Those connected must pay more so that those not connected can get piped water.
- No question of affordability—the hidden economy proves this.
- Block tariff structures are best when income profile varies greatly.
- Fund investment directly from tariffs—the PRC is doing this now.
- Connection fees can be absorbed by tariffs.
- Tariff reform is needed to encourage PSP.
- Higher tariffs make good things happen in terms of water development options.

Private Sector Participation

For the last 10 years, PSP in water supplies has been a hot topic. There was a little "pull" from governments and a lot of "push" from development agencies and the private sector toward PSP, which was spearheaded by half a dozen French and British companies. This chapter looks at the progress made in Asia against the main reasons for PSP, and it looks at the future of PSP in Asia through several different eyes to get some perspective on the subject. The Malé and Manila case studies in Appendix 2 give a more in-depth look at two examples of PSP.

ADB's water policy notes that private sector initiatives and market-oriented behavior are expected to improve performance and efficiency, particularly in service delivery. ADB will seek to provide innovative financial packages to enable commercial lenders and promoters to manage the risks involved when investing in water and related projects. ADB will also develop modalities for public-private partnerships in managing physical infrastructure.

A. Promises and Realities

The advantages of PSP heralded in the 1990s included bringing greater efficiency to management, bringing investment monies to the table for development, and bringing autonomy of operations through legal contracts. Looking around the developing country scene in Asia, 10 years later, it can be perceived that the governments of these countries initially welcomed the BOT type of PSP, but soon became disillusioned with "take or pay" contracts, unsolicited bids, and the fact that these focused on production facilities when the real problems lay in distribution. Some governments—such as those in India, Pakistan, and Sri Lanka—were not prepared to accept long-term concession contracts dominated by foreign contractors for major city water supplies. Labor unions and activist NGOs have provided resistance to PSP. Disappointment about PSP may have been caused by expectations that were too high and wrong perceptions about what can be achieved in the short term. Unfortunately, the need for higher tariffs (which has little to do with PSP per se) has been used against the PSP process. Moreover, and just as unfortunately, regulation by contract became a noose around the necks of



Service in low-income areas (after the meter)

contractors and governments, as illustrated by the foreign currency exchange risk issue and demands for higher tariffs to compensate for the effects of the Asian financial crisis. **Finally, neither regulation nor domestic PSP were offered as solutions by themselves. These might have been more appropriate steps in the development process.** Only now are we beginning to see independent regulatory bodies being established in Asia (Nepal and Sri Lanka) and attempts at domestic PSP (Bangkok).

Examples of PSP in Asian Water Supplies

- **Bangkok:** Consultants proposed splitting the city into two concessions (like Jakarta and Manila). The Metropolitan Waterworks Authority rejected this and proposed instead that, like Thai Airways, the Government would retain a 51% shareholding and the rest of the stock would be offered to the public through the stock exchange. This will be effected in 2003.
- **Chengdu:** This BOT project, prepared under ADB financing, was designed to produce 400,000 m³ per day on a "take or pay" basis. There were five bidders, and Vivendi with Marubeni was successful. Regulation is by contract. The contractor put in only about 30% of the financing. Meeting the terms of the "take or pay" arrangement is now difficult, because demand was overestimated.

- **Colombo:** The World Bank proposed a concession. The Government turned it down. The real issue was autonomy, as already provided for under legislation but not allowed in practice, because the Government averred that all public enterprises need to be similarly treated. Under ADB loan covenants a regulatory body is being established, and PSP is now being introduced through a BOT contract for water production.
- **Ho Chi Minh City:** Three BOT contracts for bulk supply of treated water were signed in 1995, 1997, and 1999. This is a “take or pay” deal, but there was a mismatch of production and distribution capacity, so the water company had to pay for water that could not be sold. One of the BOT operators is pulling out due to financial difficulties.
- **Jakarta:** Only 30% of the 10 million people in Jakarta are directly served with piped water. Concession contracts that split the city’s water supply were negotiated directly with Suez Lyonnaise des Eaux and Thames Water in 1998. Originally the concessionaires were joined by local partners, but after the change in government the Indonesian partners relinquished their shareholdings. NGOs claim concessionaires are not investing their own money in capital works but are using instead the money collected from consumers. The legality and fairness of the contracts were questioned, which led to renegotiations. Both concessionaires have had to grapple with the consequences of the Asian financial crisis and low tariffs.
- **Karachi:** Leveraged by loans to the public sector, the World Bank (water supply) and ADB (sewerage) tried to introduce private sector concession contracts from 1996 to 1998. Due to major objections from NGOs and consumer groups, these failed to eventuate. Recently, NGOs have suggested that the sewerage component could be implemented for just \$20 million, versus \$100 million under the ADB proposal, by using gravity instead of a pumped design and local consultants, suppliers, and contractors.
- **Kathmandu:** Preparations for a management contract for the Kathmandu Valley Urban Water Supply and Sewerage began in 1996. It was a precondition for ADB support to the \$464 million Melamchi Water Supply Project. The World Bank agreed to provide financial support to the PSP process in 1997. In mid-2002, the World Bank pulled out after two unsuccessful attempts to prequalify contractors ended with only one prequalified each time. ADB staff requested that joint ventures of water utilities from developed countries and international consultants with experience in developing countries be allowed to bid. ADB will now revisit the PSP and regulation processes.
- **Kuala Lumpur:** Syabus, a joint venture between the state government and private firms, has been chosen to produce, distribute, and sell water to consumers. The former Selangor Waterworks Department is expected to take over as regulator. The award to Syabus follows the federal Government’s directive stating that companies that have been given the right to undertake the treatment of raw water must also be involved in water distribution. From mostly BOT projects in the early 1990s, government policy shifted to PSP in the whole system, from source to consumer.
- **Macau:** The city has about 500,000 people and 170,000 water supply connections. Although it was originally under the private sector around 100 years ago, the Macau Water Supply is regarded as one of the best examples of a water supply run by the private sector. The concessionaire is 85% owned by Sino-French Holdings Ltd., which comprises Lyonnaise des Eaux (50%) and New World Group (50%). Rapid development of the service in the late 1980s was seen as a major catalyst in spurring economic growth. Major achievements include reducing NRW from 48% to 11%, introducing European water quality standards, increasing connections from 55,500 in 1985 to 170,600 in 2000, and increasing production from 85,000 m³ per day to 265,000 m³ per day. The average tariff is now around \$0.60/m³. Recently, there have been some problems with the raw water source and upstream pollution in the PRC.
- **Manila:** Metro Manila has about 12 million people and service coverage with piped water is nominally about 60%. The PSP process was started in November 1995, and the two concession agreements were signed in February 1997. This was in and of itself a remarkable achievement for the largest ever water supply “privatization” in the world, and it was due to two factors—strong political will (of President Ramos) and managing the process of change (with about \$8 million in support from International Finance Corporation). The concessions were bid on a low tariff and awarded to Benpres Holdings Corporation and Lyonnaise des Eaux for the west at 4.97 pesos/m³ and to Ayala, Bechtel, and North West for the east at 2.32 pesos/m³. The winning bids can be compared with the then Metropolitan Waterworks and Sewerage System average tariff of 8.78 pesos/m³. Performance to date is mixed. The

east concession seems to have reduced NRW from about 65% to 57%. The west concession has not reduced NRW (now around 68%). By the end of 2001, only about 75,000 connections had been added. On 10 December 2002, the west concession sought to withdraw—citing failure to agree on new tariff rates and a moratorium (5 years) on the payment of the concession fee as factors in its decision to pull out.

Box 12.1 shows that PSP is of concern to many people all over the world. A major review of PSP in water supplies of developing countries is long overdue. While the results may not augur well for the policy, this study needs to be carried out, and preferably by an independent body of professional repute. Areas of evaluation could include NRW reduction, investment magnitude, staff training, asset mapping, metering, computerization, performance analysis, service to the urban poor, reselling water, and tariff constraints on investment. Box 12.2 summarizes some problems of PSP in the water sector.

Box 12.1 Private Sector Participation in Islamic Countries

Most Muslim scholars agree that a just price for water is that determined by the market, providing the market is free from unfair practices, such as collusion. Even if full privatization of the water sector is allowable in Islam, that does not mean it is desirable. Instead, as is generally the consensus in the rest of the world, where the private sector participates in providing water services, public-private partnerships are recommended where the government retains its “ownership” of water for the community and allows the private sector to deliver (withdraw, treat, and distribute) water and sewerage services but regulates the sector to ensure equitable access and also to ensure that quality standards are maintained. (Faruqui et al, 2001)

Box 12.2 Problems of Private Sector Participation in the Water Sector

- *The headlong rush toward private markets has failed to address some of the most important issues and concerns about water. Water has vital social, cultural, and ecological roles to play that cannot be protected by purely market forces.*
- *There is a need to provide for the basic water requirements of people and ecosystems, permit access to water for poor populations, include affected parties in decision making, and improve water use efficiency and productivity.*
- *Openness, transparency, and strong public regulatory oversight are fundamental requirements in any efforts to shift the public responsibility for providing clean water to private entities.*
- *The World Bank, other international aid agencies, and some water organizations like the World Water Council are increasingly pushing privatization in their efforts, but without a common set of guidelines and principles.*
- *The rapid pace of privatization in recent years and the inappropriate ways several projects have been implemented have compounded the worries of local communities, NGOs, and policy makers. As a result, private water companies are increasingly seeing serious and sustained public opposition to privatization proposals.*
- *Improvements in efficiency reduce water sales and hence may lower revenue. As a result, utilities or companies that provide utility services may have little or no incentive to encourage conservation.*
- *Efforts should be made to strengthen the ability of governments to meet water needs. Unfortunately the worst risks of privatization are also where governments are weakest. (Gleick et al, 2002)*

B. Investments

While investment monies did flow into the “take or pay” BOTs, they have not flowed as expected into the major concessions. In Manila, 5 years after “privatization,” there are still 5 million urban poor without access to piped water. In Jakarta, 4 years after “privatization,” there are about the same number without access to piped water. Elizabeth Brubaker, in a paper prepared in 1998, noted that *the French system is heavily subsidized. Both public and private operations receive subsidies from many levels of government and from one another. In other words, the privatization of the delivery of services has not led to the privatization of the financing of services.* In Jakarta, the leading NGO for consumers has become a watchdog monitoring the implementation of private contractor investment programs. Even where concessions are in place or planned, funding by development banks continues. When international private contractors do invest, they often seek funding from private sector windows of development banks. So, it must be concluded that PSP has not proved to be a panacea for the shortage of development funding in the water supply sector. Part of the reason for this lies with low tariffs that do not encourage operators to invest. Table 12.1 shows utility performance in Jakarta and Manila in 2001. The high NRW, low service coverage, and low capital expenditure levels should be noted.

In Malaysia, by 1996, 57 water treatment plants with a total capacity of 3.8 million m³ per day had been placed in the hands of the private sector. Consumers now enjoy better service in terms of both reliability and quality of water without any substantial increase in tariffs. Nevertheless, the major problem in Malaysia's water sector, the high level of NRW, has not been addressed.

C. Efficiencies

NRW has not been greatly reduced under private sector management. In Jakarta, some consumers think that there is just as much corruption in illegal connections and meter reading as there was under the public water utility. According to some residents, these practices are so common among employees that only firing all staff and hiring new staff would likely resolve the issue. The two concessions in Jakarta have NRW of 48% and 53%. The two concessions in Manila have NRW of 66% and 57%, based on 2001 data. None of these figures are in any way respectable.

D. Competition

International competition for private sector contracts in water supplies has been severely restricted. Early attempts to increase private sector competition for the Kathmandu Valley Urban Water Supplies management and lease contract were resisted. BOTs were also in the early days fraught with much unsolicited bidding and direct negotiation.

Inexperienced organizations with no knowledge of the water industry may begin to make an appearance. These organizations may focus on short-term financial gains instead of on finding long-term solutions to the management and technical challenges resulting from the need to provide quality water and wastewater services to consumers. (Lyonnaise des Eaux, 1998)

Table 12.1 Utility Performance—PSP Concessions (2001)

Contract	Piped Water Coverage (%) ^a	Supply Continuity (%)	NRW (%)	Staff per 1,000 Connections	Ratio of Revenue to O&M Cost	Annual Capex ^b (\$ millions)
Jakarta West	41	92	48	5.2	1.3	6.7
Jakarta East	51	92	53	5.5	1.2	7.6
Manila West	37	88	66	4.3	0.9	0.1
Manila East	34	88	57	4.5	1.1	16.8

^a Based on household connections (five persons per connection).

^b Capital expenditure.

E. Tariffs

It cannot be presumed that there will be any success with PSP in water supplies of developing countries until the problem of low tariffs is addressed. This can only be accomplished through government policies that encourage tariffs covering investments, not just O&M plus depreciation or debt servicing. Then independent regulatory bodies need to be in place and tasked with ensuring that utilities, on the one hand, and governments, on the other, adhere to these policies. Given that the consumer must pay for investments sooner or later, and given that private sector financing is generally the most expensive, it is quite possible that tariffs in the future can fund all water supply investments in cities with more than a million people.

F. Regulation and Contracts

One problem facing water utilities and governments of developing countries, in regard to PSP in water supplies, is the uneven playing field. The knowledge of contractors (one party to the contracts) is far greater than the knowledge of governments (the other party to the contracts). This knowledge disparity is exacerbated by the potential for corruption in making the "deal." Some senior level civil servants and elected officials may have a short shelf life and a tendency to "take and run," leaving other civil servants and another administration to wrestle with the consequences of skewed negotiations. Transparency has also not been evident in deals. It is not normally possible for the public to review contracts signed between concessionaires and governments. Indeed, many legal contracts are so replete with confusing language that very few people can understand what has been written. The draft lease contract for the Kathmandu Valley Urban Water Supply was such an example.

G. Serving the Poor

The summary of problems and solutions in serving the urban poor by Lyonnaise de Eaux (see Box 6.1) illustrates that there are indeed many problems to be overcome, but that there is some reluctance on the part of the private sector to take much financial responsibility for the solutions. Perhaps this is because contracts were not based on policies to serve the urban poor. In Manila, one concessionaire has responded to serving the urban poor by selling water in bulk to a third party who connects the poor to a 24-hour supply of piped water. Unfortunately, the monthly cost to the consumer is four times the normal rate, and the volume consumed is one quarter of the normal consumption. Likewise, one

connection is offered to multiple households, so these users are forced to pay a penalty for high consumption.

H. Risks

A major banker notes that the main risks that banks want to see addressed pertain to construction, revenue, operations, politics, and finance. Significant currency risk arises because customers pay in domestic currency, which does not match the currency of international debt and equity financing. It has also been observed that fewer projects have been successfully financed with private capital than in other infrastructure sectors, and projects financed with private capital have tended to involve direct financial or credit support from governments or third parties, such as bilateral, multi-lateral, and export credit agencies. When we consider risks, the guaranteed rate of return on concession contracts gives an impression that the main risk assumed by the contractor is one of cash flow. Likewise, on BOTs, contractors take negligible risks under the take or pay scenario. Risks for investors can also be reduced if PSP is considered for a pool of towns at one time, which allows risk sharing.



Difficulties of management in low-income areas

I. Future of Private Sector Participation

There is no doubt that the jury is still out after 10 years of PSP in the water sector. The following excerpts from different sources, however, may provide some guidance on the future directions of PSP.

1. Developing Best Practices for Promoting Private Sector Investment in Infrastructure and Water Supply (ADB, 2002)

The Reform Unit

Establishing a state-owned enterprise reform unit is an important first step toward water supply reform and the introduction of private sector investment in water supply. The unit should consist of a team of trained individuals with expertise in economics, management and finance, water supply, and negotiation.

Sector Reforms

There is a strong case for introducing wider sector reforms, such as commercialization and corporatization of water supply utilities, particularly if the introduction of PSP in water supply is to be a phased or staged process.

Tariff Reform

Tariff reforms are essential if the scarcity value of water and efficient use of water are to be achieved. If water tariffs fail to reflect the costs, householders, when deciding to use water, do not know the value of water in its alternative uses. The same is true for the irrigation farmer and the industrialist. Major river diversions for irrigation needs or hydro schemes will only make sense if nearly all potential water uses are factored into calculations. In some cases, closure of irrigation schemes and generous compensation of farmers may be attractive. This is because the new water released may permit industrial and residential expansion and the export of goods and services far more valuable than some grain foregone. As in other markets, appropriately set tariffs will operate as signals for efficient water consumption, production, and investment in water supply. Tariff reforms should be a precursor to PSP in the water supply sector. Without tariff reform, water supply investments will not be financially viable from the private sector lender's and investor's point of view. If private sector investment goes ahead without tariff reform,

DMC governments will need to fund the difference between the lower water tariff paid by consumers and the higher payment made by DMC governments to the private sector. This situation is unlikely to be sustainable in the long term.

Risk Mitigation and Management

In general, risks should be allocated to the party that can minimize and manage risks most effectively. Where no party has a clear comparative advantage in managing risks, they should be shared. Careful identification, analysis, and ranking of risks by an expert team before competitive tendering is a key to best practice in risk mitigation and management. The reform unit, if necessary, in consultation with independent experts, can undertake this process. Ideally, the information gained should be published as part of the tender process.

2. Lessons Learned from the Study of Privatization of Water Supplies in 10 Asian Cities (McIntosh and Yniguez, 2000)

- A regulatory body must be in place prior to signing contracts.
- Governments and water utilities should obtain expert advice.
- The appropriate PSP option should be selected.
- Good relations between governments and private operators are needed.
- Transparency, public awareness, and public relations are beneficial.
- An integrated approach (bundling from source to consumer) is best.
- Employee rights need to be protected, and staff transfer needs to be planned.
- Good and reliable water sources are needed for long-term viability.
- Appropriate tariff structures and tariff-setting mechanisms should be agreed upon.
- Fair and open competition is better than negotiated contracts.
- There is no blueprint for "privatization." Its elements and processes should be adapted to the culture, political structure, and legal and regulatory framework of a given city.

3. The Dutch Model (Blokland et al, 1999)

In many countries water supply is a public service controlled by the Government. There is a lot to be said for this, even if it is only that good water supply and sanitation is in the public interest. The other side of the coin however is that government operated utilities are not always a shining example of efficiency. In recent years, privatization of the water supply sector has therefore been the favoured option. Market forces must ensure that supply and demand are efficiently matched. Private business however has tended to focus on areas where demand is backed up by purchasing power. That means that there are still sections of the population who do not have access to affordable, good quality water.

There is an alternative however. The Netherlands can draw on almost 100 years of experience of working with an alternative mode of organization that is a cross between a public owned utility and a private company: the Public Water PLC (a government owned public limited company). Public Water PLCs are incorporated as private companies and are also subject to the rules and regulations governing commercial business. The majority of their shares however are owned by local or national government. These Public Water PLCs are relatively common in the water supply business. They can be found in Europe as well as in North America, Asia and Africa. In actual fact, the Public Water PLC combines the best of both worlds: public ownership with operation according to commercial business principles. As a public limited company it is required to provide optimum water supply services for everyone in its service area. The fact that it operates on a commercial basis means that the cost of services provided has to be recovered from the users. Another advantage, the importance of which can scarcely be underestimated, is the financial transparency of a Public Water PLC, which is required to open its accounts to public scrutiny. *As a public limited company it cannot conceal data in the annual figures of the holding company.*

Depending on the local situation, various success factors have a part to play:

- One important factor is the political will to make the public water supply system a success. This is no easy task, as politicians and administrators—paradoxically enough—have to relinquish a degree of influence to make this happen.
- The shares and the seats on the board of directors must be divided carefully among the various local authorities to prevent one local authority gaining the upper hand.
- Encouraging local share ownership is important as it ensures that the customers can influence policy. Local involvement is increased by appointing representatives of local authorities or consumers.
- It is advisable to consider private minority shareholding in the PLC. The introduction of private shareholding is likely to increase pressure on the management to improve efficiency. It also means that the water utility can benefit from the private shareholders' knowledge of the market.
- It is vital that the board of directors possesses sufficient utility-specific expertise in the fields of engineering, finance, environmental protection and human resources. This prevents a knowledge imbalance between the managing director and the board.
- Company law must ensure that Public Water PLCs are accountable for their actions, just like other businesses. This transparency is essential to prevent abuse of power and mismanagement.
- It may be advisable to appoint an independent regulator, for instance to reduce political intervention and guard against both technical and financial mismanagement of the water utility.

4. Excerpt from *The New Economy of Water: The Risks and Benefits of Globalization and Privatization of Fresh Water* (Gleick et al, 2002)

Principles and Guidelines (Suggested for PSP)

- **Continue to Manage Water as a Social Good.** (1) Meet basic human needs for water. All residents in a service area should be guaranteed a basic water quantity under any privatization agreement. (2) Meet basic ecosystem needs for water. Natural ecosystems should be guaranteed a basic water requirement under any privatization agreement. (3) The basic water requirement for users should be provided at subsidized rates where necessary for reasons of poverty.
- **Use Sound Economics in Water Management.** (1) Water and water services should be provided at fair and reasonable rates. (2) Wherever possible link proposed rate increases with agreed upon improvements in service. (3) Subsidies, if necessary, should be economically and socially sound. (4) Private companies should be required

to demonstrate that new water supply projects are less expensive than projects to improve water conservation and water use efficiency, before they are permitted to invest and raise water rates to repay investment.

- **Maintain Strong Government Regulation and Oversight.** (1) Governments should retain or establish public ownership or control of water sources. (2) Contracts that lay out the responsibilities of each partner are a prerequisite for the success of any privatization. (3) Clear dispute resolution procedures should be developed prior to privatization. (4) Independent technical assistance and contract review should be standard. (5) Negotiations over privatization contracts should be open, transparent, and include all affected stakeholders.

5. The Private Sector in Water—Competition and Regulation (World Bank, 1999)

Private Participation in the Water and Sewerage Sector—Recent Trends

- There is potential for gains from private sector involvement through greater efficiency and improved access to finance for new investments.
- *There has been considerable political resistance to raising tariffs to cost-recovery levels, increasing the risk of long-term investment in water and sewerage assets.*
- By the end of 1997, private companies operating in developing countries had reached financial closure on \$25 billion of investment in water and sewerage projects. There were 97 projects in 35 countries, including management contracts, leases, concessions, divestitures, and build-operate-own and BOT projects. Just a few international companies were sponsoring and operating most projects. About 33% of the investments were in East Asia and the Pacific and 48% in Latin America and the Caribbean. None were in South Asia; 41 of 97 projects were awarded to just two firms (Lyonnaise des Eaux and Vivendi).
- Water and sewerage contracts increasingly are attracting bids from consortia of multisector utility and construction companies.
- *The water sector has a long history of tariffs below costs and political resistance to raising them. Considerable government commitment is required to raise tariffs to cover costs and to build regulatory arrangements that give private companies*

confidence they can make a fair rate of return on their investments.

Improving Water Services through Competition

- Regulators and consumers may compare utilities to judge their performance.
- The price a firm may charge is set by the costs of other firms in the industry.
- Regulatory benchmarking of companies against one another should be practiced.
- Comparisons of the performance of companies should be publicized by the media.

Regulating Water Companies

- To regulate well, the regulator needs to have an idea of how much it would cost an efficient company to supply high quality water. One way of generating that information is to auction the right to supply water every 20 years or so. Firms state the price at which they would be willing to supply water of a specified quality, and the firm offering the lowest price wins the contract.
- Prices can be adjusted between auctions based on maintaining a given rate of return on capital or on retail price index minus a factor to account for productivity gains and other changes.

Getting the Private Sector Involved in Water—What to do in the Poorest of Countries?

- Take a stepwise approach—begin with a management contract.
- Simplify contracts with clear and indisputable performance indicators and a strong monitoring agency.
- Contract out parts of the regulatory function— independent auditors.
- Renegotiate and adjust contracts over time.

Competition in Water and Sanitation and the Role of Small-Scale Service Providers

- There has long been a belief that the water and sanitation sector has a high degree of monopoly. But competition is widespread in the low-income retail market in developing countries. There is no inherent monopoly in such small-scale

activities as reselling water by the bucket. Small-scale service entrepreneurs supply unserved niches of the water and sanitation market. Small enterprises often account for a larger share of the market than do incumbent utilities, and they are well placed to complement and even compete with trunk concessions and public companies in tailoring services to the poor. Thus governments should take account of existing or potential small providers when designing concessions or any long-term rules for the sector.

J. Conclusion

Some comments above could apply equally well to governments running public utilities and private companies running their own utilities. A transparent government policy that adequately addresses tariff issues is the foundation for all water supply development. An independent regulatory body governing water operators is the next step. *Regardless of PSP or a lack thereof, an infusion from the private sector into public utilities is needed in human resources management and financial management.* Much more training is needed in-house, and training programs must be structured and include all staff. In this modern age of information technology, everyone can improve with some training each year. This is not an option, it is a mandatory requirement.

If the international contractor is not going to be a part of the permanent solution, a time-bound program of knowledge transfer to national counterparts must be put in place. This has worked well for the Malé Water and Sewerage Company, where after 5 years there were no longer foreign personnel (apart from Sri Lankans and Indians) on the staff. This, of course, works against long-term international inputs, as it should. All private sector contracts should include the transfer of knowledge from foreign to local staff and be accompanied by the requisite training to achieve these objectives.

The main thrust of new approaches to PSP must come from a policy (not just a contract) that promotes tariffs covering investment and a regulatory environment. Domestic “privatization” must be encouraged much more than it was in the past. Water consumer societies and civil society in general must be watchdogs monitoring the performance of water utilities and the implementation of government policies. The public has a right to know the essence of all private sector contracts and should have access to information, including annual reports of utilities. Comparative benchmarking of performance with other utilities is needed. To level the playing field, much more competition should be encouraged. This includes joint ventures involving consultants with experience in developing countries and utilities from developed countries. More public awareness, public relations, and public involvement programs are needed, as these will ensure the public can learn the facts, instead of myths, about PSP. An exit strategy for any international involvement should be considered as a matter of policy.

Future PSP efforts should look to bundling “source to consumer” facilities, because the “series” system of delivering water is only as good as its weakest parts. If there are parts of that system under public corporation or government department control, the benefits of PSP in other parts will to a large extent be nullified.

The Dutch model of crossing a public-owned utility with a private company, in which mostly local authorities own a water utility that is managed by the private sector, could be replicated. The Malé model of 70% public ownership and 30% private ownership for 20 years also appears to be successful, perhaps because the Government has been strong over the need for tariffs to cover investment costs (see the Malé case study in Appendix 2).

Private Sector Participation (Problems) in a Nutshell

- Promises of finance and efficiency are largely unfulfilled.
- There is a lack of competition and transparency.
- Playing field is uneven.
- Service to the urban poor is a major constraint.
- Social, ecological, and cultural matters are sometimes ignored.
- Tariff reform is needed for the private sector to engage.
- Regulation by contract is not the answer.
- Take or pay is not a good option.
- There is much civil society resistance to PSP.

Private Sector Participation (Solutions) in a Nutshell

- Manage the process of change.
- Domestic PSP is preferred.
- Contracts should be based on policies.
- Consider exit strategies for internationals.
- Tariff reform is a prerequisite.
- Competition and transparency are musts.
- Public-private partnership has promise.
- Principles and guidelines are needed.
- Independent evaluation will help.
- SSWPs should be included.
- Regulatory arrangements must come first.

Chapter 13

Governance

The story may begin and end with governance. What do we mean by governance? It has to do with, first of all, enforcement of the law and accountability, transparency, and implementation of government policy. It also means having the knowledge (ability) and autonomy to practice sound management. A first principle of governance is that “the one who pays the piper calls the tune.” **When water supplies in developing countries are examined, it is found that low tariffs that allow governments and not consumers to be in control are at the core of such problems as the urban poor not being served, high NRW rates, intermittent water supply, lack of demand management, and conflict among water users.** Unlinking tariffs and the political process should be at the core of all governance objectives.

ADB's water policy suggests that governments need to modify their role. They need to move away from being service providers and become regulators. Most DMCs require a phased program to increase the autonomy and accountability of service providers either as new enterprises or by reorganizing existing agencies. Legal and regulatory systems need to ensure that water service providers and resource managers are held accountable by law for their performance relative to prescribed standards. The allocation of water to high-value uses is a matter of economic accountability, and ADB will support DMCs in developing appropriate methodologies for improved allocation efficiencies. Externalities, especially social and environmental, will be considered in the allocation. The promotion of participation involving public, private, community, and NGO stakeholders is a key element of this policy. Transparency will be most effective when governments ensure the timely availability of information about water policies and projects to the general public and clarify government rules, regulations, and decisions in the sector.

This chapter explores governance in the context of "operations" and "projects." It invites readers to return to the Problem Chart and the Solution Chart in Chapter 2 to see why governance is both a core problem and part of a core solution. The role of policy and regulation, civil society involvement, and tariff reform in effecting a new form of governance is described. There is some good advice from Kamal

Siddiqui.¹⁵ (Siddiqui, 1996). Some good examples of governance are provided in the case studies on Dalian, Malé, and Phnom Penh in Appendix 2.

A. Operations

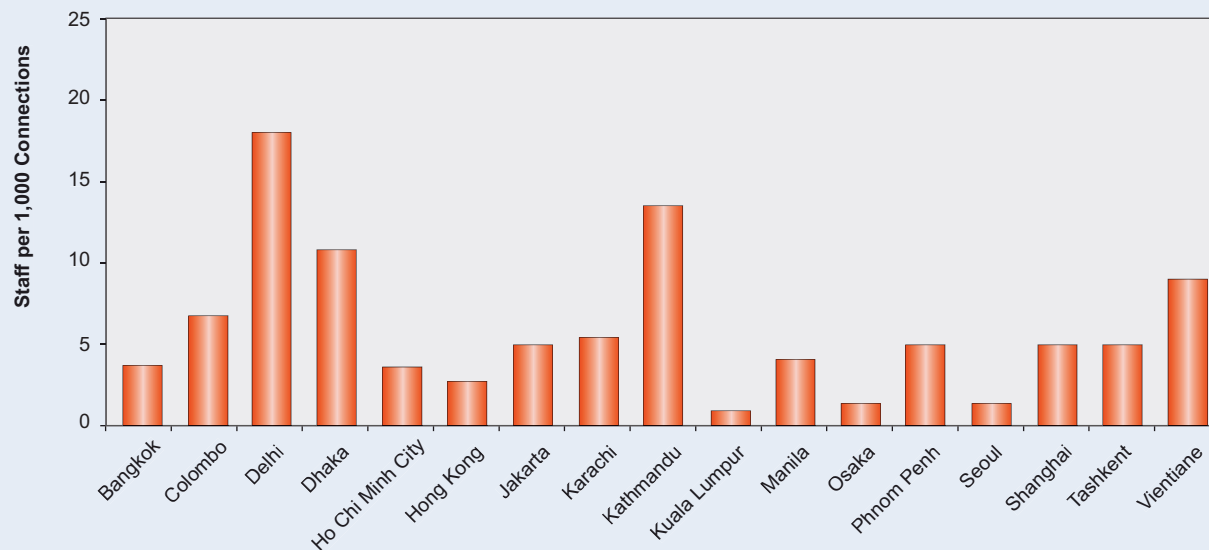
One of the most important considerations in operations is autonomy to run a utility efficiently and competently. The current situation in many utilities is, however, characterized by the interference of elected officials when utilities attempt to exercise the autonomy granted to them to set tariffs to recover costs. This situation is also characterized by the control that elected officials, as opposed to utility management, have over utility staffing. A good utility will have around two staff for every 1,000 connections, but many in Asia have much more than that (see Figure 13.1). **In one country, roughly 500 staff were suddenly added to a utility at the behest of an elected official.** Moreover, many utilities are not allowed to pay their professional staff market rates of remuneration, which affects the quality of their personnel. In some countries, on the open market, accountants can command salaries of up to three times those earned by engineers, but when civil servant salaries and rules govern, this is not the case. The result is that these utilities attempt to run \$100 million per year businesses without competent and qualified accountants. Some elected officials have also been known to interfere in



Water and life

¹⁵ Kamal Siddiqui is a former ADB Director for Bangladesh.

Figure 13.1 Staff per 1,000 Connections (2001)



granting new connections, and they have been known to prevent disconnection for nonpayment of bills.

In some cases, elected officials appear to support large bulk water users being served by illegal connections. These officials keep new connection fees high, which can encourage illegal connections. Certain elected officials have allowed syndicates to control water supplies to the poor. Officials can profit from vendors purchasing utility water, and some condone groundwater use for free by major industries. They often use their influence to get access to 24-hour supplies for themselves, while most people suffer an intermittent water supply. Elected officials have been known to become overly involved in the daily operations of water utilities, control management, and replace heads of utilities on political grounds. For example, since 1984, the Nepal Water Supply Corporation has had about a dozen general managers. Some office holders insist on distribution network extensions beyond hydraulic design criteria, causing intermittent water supply. The current situation is characterized by a lack of transparent government policy on tariffs, service levels, operator performance, and incentives. Consumers are unaware of policies, and even governments are apt to change policies to suit the current political climate. Without such policies there is no accountability for the performance of governments and utilities. High NRW levels and intermittent water supply are direct results of this lack of accountability.

When many water utilities are examined, human resources management and financial management are found to be weak. Utilities lack skilled staff in these areas because of civil servant rules and salaries. Staff do not have job descriptions, and promotion is based on age, not merit. Most of all, there are no incentives for staff to perform well. Many staff of water utilities have no skills, some are also ghost staff—employees who are listed on the books and receive wages without being physically present. Interestingly, there are many highly educated technical and engineering professionals in these institutions, but while utilities lack autonomy, accountability, transparency, and proper management, these skills to a large extent go untapped. The culture of O&M being a poor relation of development is prevalent because there are no incentives. As a result, some valve operators, meter readers, and new connection teams choose to collude with customers to create their own incentives.

Lack of accountability means meters are not replaced when they are no longer functioning properly. Low tariffs contribute to this situation. Annual reports on operations could easily be produced within 6 months of the end of a given financial year, but often such reports become official only about 2 or 3 years later and are therefore of little use to the public in responding to performance. Consumer satisfaction is a factor in good governance, but consumers have for so long been used to poor service that they regard it as normal

and expect nothing more. This is particularly so with respect to intermittent water supply in South Asia. Low billing and collection efficiency are exacerbated by low tariffs (see Figure 13.2), and they result from a lack of accountability and discipline in complying with the law in general and rules and regulations in particular. An example of this would be the existence of laws stating that local authorities are responsible for water supplies when in practice central governments continue to control these.

Regulation by contract is a form of governance now prevalent among private operators in developing countries. PSP contracts in Manila show how a lack of transparent policy dooms regulation by contract to failure. When the Asian financial crisis hit, and operators were exposed to high currency exchange risks, the urban poor not being served suffered. If the contracts were based on a transparent policy, they could have been revised easily by the parties concerned, which would have ensured that the underlying policy (providing water to the poor) was accommodated. Regulation by contract prevented this from happening.

The prevalence of high NRW and low service coverage is an indication of poor governance. Some NRW is illegally sold to SSWPs. The profit to those with vested interests (some elected officials, utility staff, utility owners, and local authorities) is considerable, which explains the desire to maintain a status quo that

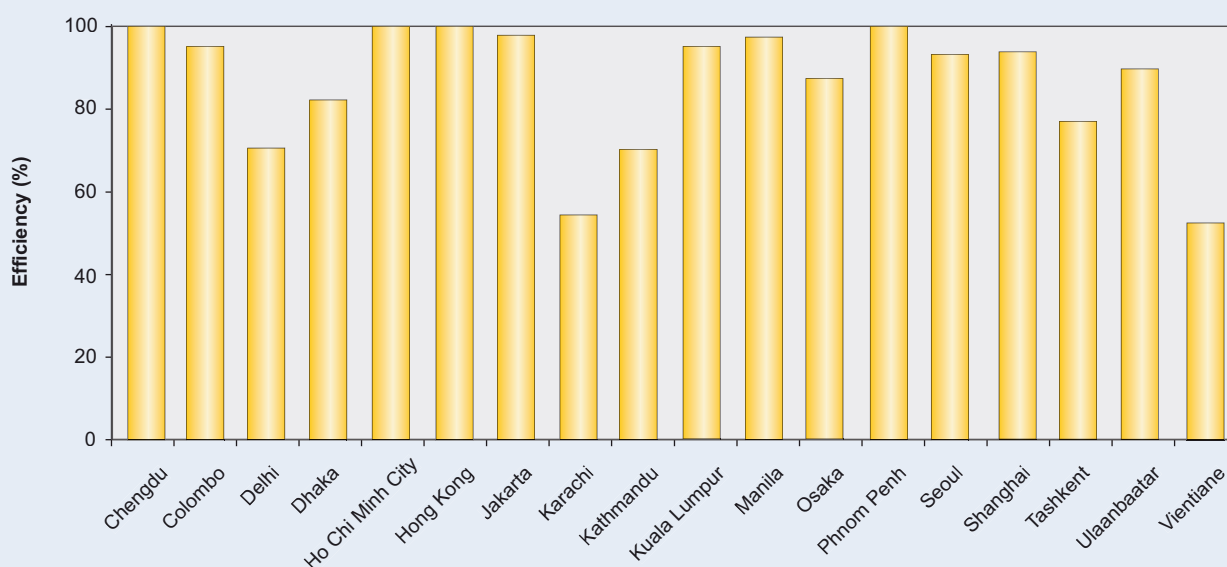
keeps the urban poor paying 25 times the unit rate the rich pay for water. This is also probably why visible leakage is maintained (to mask illegal use). Metro Cebu provides an illustration of this linkage between low service coverage and high NRW. Piped water service coverage based on five persons per connection is 29%. NRW is 34%, and the urban poor buy water from water vendors.



Valve turning is a governance issue

ADB's experience has been that **legislation is necessary, but it is certainly not sufficient to ensure the autonomy of water utilities** (see Box 13.1). There must be an effort to clean up legislation and make it more relevant to today's world. Civil society needs to take more interest in ensuring that governments do not ignore the law. This might apply especially in extending distribution systems beyond their capacity to provide a 24-hour supply.

Figure 13.2 Revenue Collection Efficiency (2001)



Box 13.1 Institutional Development of Water Utilities

For water utilities to become independent and financially sustainable enterprises, it is necessary that (i) water utilities be manned by qualified staff; (ii) water charges be increased to financially viable levels; (iii) management information, accounting, and accounting systems, including billing and collection, be improved; (iv) a degree of real autonomy and accountability be established; and (v) O&M be improved and NRW reduced to acceptable levels. ADB did address these matters, but such institutional development efforts proved to be inadequate in making a significant impact on water utilities. New measures that may be considered include wider application of commercial management principles, broader use of competition, and increased involvement of users and stakeholders where commercial and competitive action is constrained. Experience has shown that one factor that influenced the success of water utilities was the degree of autonomy that utilities had in planning and operations. More managerial and financial autonomy and more accountability of performance are needed. (ADB, 1994)

If we analyze the current governance situation with respect to operations in a water utility, we can conclude that **part of the problem lies in having owner, regulator, and operator as one entity—whereas it is generally acknowledged that in developing countries it would be best if these positions were separated.** Self-regulation can only work in a highly disciplined society. If we have a transparent policy, an independent regulator, and an operator with incentives to perform, the situation may change.

If poor governance is at the root of the problem and government is in control, we cannot ask government to reform itself. There is too much vested interest, and too many people are too comfortable with the status quo. We must go outside government to the people who are most affected, such as the urban poor not being served who pay \$5/m³ to water vendors. Civil society must put pressure on governments for reforms, and it can do this if it understands the issues and is interested in doing something for the poor and the ill-served. We can begin with transparent policies and

a civil society that holds governments accountable for implementing these policies.

There is no question that water utility operators need to have incentives, autonomy, accountability, and the ability to perform. Incentives and the ability to perform can come only when staff are opened up to market forces. As the Executive Director of Dhaka's Water Supply and Sewerage Authority opined, "Why do developing country governments think we can run a multimillion-dollar per year commercial business with civil servant rules and civil servant salaries?" This cannot be done, and the highly successful Singapore Public Utilities Board, which pays its top management staff more than \$150,000 per annum—because that is what they would be paid in the private sector—illustrates the point. Bangkok's Metropolitan Waterworks Authority, another better managed utility in Asia, pays its top managers salaries that are comparable with those paid in the private sector. Besides, if you want to limit corruption, you should remove incentives for corruption.

Autonomy and accountability for operators will come with a transparent policy and independent regulation. Operators need to know what is expected of them and that the public will hold them responsible.

B. Projects

When the Nepal Water Supply Corporation was criticized for its poor performance, comments focused on two areas—utility operation and project management. Neither, of course, was in their hands, because of outside interference. The current situation for project management in many water supplies in developing countries is characterized by outside interference, and the effects are far greater than most can see. We can start with outside interference in extending water distribution systems beyond their capacity to provide a 24-hour supply. Take for example the case of the Nepal Water Supply Corporation in Kathmandu. Despite having water for one hour every other day in the dry season, this utility is adding 5,000 connections per year because of the demands of elected officials. These officials should be held accountable for the extra costs associated with health risks arising from intermittent water supply and for household coping costs, including storage, pumping, and treatment.

Then there is the choice of location for investments. It is fairly common to see investments occur in the hometowns of government leaders. When this

happens, feasibility studies can be subverted if leaders push for investments that cannot be sustained. In these instances it would not be prudent for governments to provide O&M subsidies to these water supplies indefinitely. Other leaders, however, prefer to spread investments thinly. When this occurs, efficiency may be sacrificed for popularity. The result is that many things are not addressed thoroughly for the future, which means that the poor are often neglected in favor of new investments, partly because they have no voice and partly because some leaders might have other interests in maintaining the status quo, including condoning syndicates. Pork barrel spending subverts policy and allows some officials to promote their personal agendas. Investment policies are ignored when elected officials support short-term projects that are politically expedient and can be completed during their own terms in office. This is incompatible with developing water supplies for sustainability.

When it comes to project management, development agency-financed projects in particular are hindered by the involvement of elected officials. **It is claimed that consultants and contractors are expected to favor elected and appointed government officials with percentages of their contracts. Otherwise their bids will not be considered. Payments are made first for shortlisting or prequalification, then again for the winning bid.** Naturally, this means that consultants and contractors must share the blame with officials for perpetuating this system.

The consequences are far-reaching and aggregated. When consultants' fees are squeezed, they can scarcely make a profit, so they skimp on supervising construction. When contractors are squeezed, what was to be their profit disappears. The only way they can compensate is to lower specifications on materials and civil works. This, of course, is aided and abetted by consultants who cannot provide adequate supervision. One result is that pipelines that were made to last for 40 years may end up serving for less than 10 years, because lower pressure rating pipe may be installed and inadequate bedding and backfilling may be used. When this happens, traffic damages the pipes. Another result is that steel can be left out of structures, and lower quality concrete can be supplied. If this happens, safety will be at risk, because water retaining structures may leak, and corrosion may set in on the reinforcing steel very early in its life. In addition, fittings that are not properly protected against corrosion can be supplied.

When development agency financing is involved, governments almost always call for less international



Construction standards?

consultant input, which might be a way of preventing close scrutiny of procurement and construction. At times, governments might try to downgrade international competitive bidding to local competitive bidding. One reason for this could be that local contractors are more easily controlled. It is not uncommon for civil servants working alongside consultants to be paid under the table by these consultants to gain their full cooperation. It has been said that there is a pervasive lack of professionalism among local consultants and government staff. When international consultants and contractors take the view "when in Rome," their professionalism is lowered, too. When a long time is taken in procuring goods or recruiting consultants, it is possible that corruption could be a cause. Leaders might be motivated to approve agreements of this kind, if they are given the chance to visit countries of suppliers or consultants without charge as a favor for appointment. Estimated costs are often inflated to take into account the so-called bribery and corruption factor. Finally, the cost of facilitation in developing countries is considerable. Knowledge is power, and two government agencies, such as one for irrigation and one for water supply, will not necessarily cooperate with each other unless the wheels are oiled. This is all part of the "governance scene." All this is not to say that developing country governments are the only ones at fault. Development agencies and consultants contribute to this unsavory situation, too (see Box 13.2).

In terms of governance and projects, the following can be concluded. A transparent investment policy would certainly help lay the foundation for good governance. This should spell out the criteria to be met and what the overall objectives and goals are. Civil society can then monitor performance while implementing the policy. Providing service to the urban poor should be at the top of the policy list. Consulting and procurement can be taken right out of government's hands and

Box 13.2 Examples of Corruption in South Asia (provided by voluntary informants)

- *Contract kickbacks occur in procuring goods (10–15%), civil works (25%), engineering design (20%), technical assistance (12–15%).*
- *Quality control problems arise in pipe class (PVC), cement, trench depth and width, taps and fittings specifications, aggregate size, corrugated iron thickness and galvanizing standards, dimensions of concrete structures, number and thickness of reinforcing bars, etc.*
- *Political influence is exerted through ministries in prequalifying contractors and consultants; using inappropriate techniques when appointing technical evaluation committees; using incorrect procedures for the constitution of cabinet level tender boards; providing false information to development agencies; collecting money from contractors, suppliers, and consultants for electioneering; harassing contractors to receive money (delaying approvals); extending contracts for unnecessary work; protecting unfit contractors; approving incorrect payments; directly negotiating with contractors over claims; harassing contractors over delays in paying agreed commissions on bribes; and terminating and suspending contracts to exact revenge.*
- *Sector institution corruption includes drawing up specifications to favor certain suppliers, releasing documents and estimates to contractors prior to bidding, having government officials prepare contract bidding documents, paying government officials during tender evaluation, and delaying payment on contractor invoices until bribes are paid. The methods of collecting money are usually through local agents using direct payments with cash notes or deposits in foreign bank accounts; sponsoring foreign tours; covering the costs of educating children in developed countries; and purchasing luxury homes and vehicles. Entertainment costs for government officials during study tours and inspection visits related to the contracts can include payments for shopping and entertainment. Payments are usually made out of the mobilization or advance payment from the development agency.*

subcontracted to a project management team. The performance of this team in complying with the guidelines or rules and regulations can be audited from time to time. Of course, this outsourcing can be done voluntarily (as of now) or it can be mandatory (when the tariff increases to a level that puts consumers in control). Development agencies can get tough on the implementation of loan covenants and provide far closer audits of quality control. Development agencies can also look at reducing bureaucracy, so that projects are implemented in 2 years instead of 8 years. And last, development agencies can more actively promote professional societies and professionalism in developing countries. But before any of this can happen, governments must provide clear policy directions on water resources management, including allocating and trading water rights, pollution control, watershed protection and rehabilitation, and groundwater use for industry.

C. Tariffs and Governance

Since the money trail and power run through governments when there are high subsidies and low tariffs, the answer is to raise tariffs. The more consumers pay, the more power they will have to demand better service.

Policies need to include much higher tariffs that are compatible with full cost recovery. There must be a move toward tariffs covering investments directly and governance shifts from governments being in control to consumers being in control. Some government officials, however, may be reluctant to let this happen, as they currently benefit from improprieties when they control funds that are maintained through high subsidies to water supplies.

D. Public Awareness and Transparency

Corruption can be addressed by increasing transparency in operations, empowering civil organizations through information and involvement, and rationalizing and enforcing laws that already exist. What exist now that did not in the past are the Internet and civil society (represented by NGOs, journalists, and academics who are becoming much better informed about the world around them). Moreover, there are few excuses for not having excellent information upon which management decisions can be made. Computerization has made all that possible.

Governance (Problems) in a Nutshell

- Bureaucracy feeds corruption.
- Political interference (corruption) exists in projects and in operations.
- Snowball effect of corruption in consultant recruitment and procurement is devastating.
- Low tariffs feed corruption.
- Autonomy of utilities is denied.
- Money trail runs through governments.
- Poor governance and low tariffs are at the core of all problems.

E. Private Sector Participation as a Solution to Corruption

While it has been suggested by some that PSP is a solution to the problem of corruption in water supply, others note that some big private operators have already been convicted of corruption.

Governance (Solutions) in a Nutshell

- Transparent policies and independent regulators are needed.
- Tariff reform to put consumers in control is necessary.
- Civil society involvement is a must.
- Good things happen when tariffs are raised.
- Governance is at the core of all solutions.

Government Policy

If governance is both a core problem and part of a core solution, the transparency and implementation of government policies are the criteria against which governance can be measured. This chapter looks at what has happened to government policies in the past and then explores what should be addressed in government policies on water supply and sanitation in the urban context, who should be consulted during the policy formulation process, in what form policies can be communicated, and how policies should be monitored.

A. A Framework for the Policy

ADB's water policy notes that national water policies should address both resource management and service delivery aspects. Effective water policies will involve several reforms, including the development of a neutral sector apex body that can oversee the policy formulation and sector reform processes. ADB will provide support for the review and revision of legislation, particularly in water rights and allocation among competing uses, water quality standards, groundwater use, demand management, resource conservation, private participation, and institutional responsibilities for water sector functions at national, regional, or basin levels. ADB will continue to press for and support policies that provide the explicit participation of the poor in water and related projects. ADB recognizes that women are important water users, clients, and beneficiaries, as well as managers of water for family nutrition, hygiene, and health and community activities. Equally, women are development agents, professionals, and decision makers in water sector activities. ADB will therefore promote the integration of gender concerns in policies, plans, programs, and projects.

The following findings from ADB's Sector Synthesis of Post-Evaluation Findings in the Water Supply and Sanitation Sector (1994) indicate the areas of concern in the sector and some elements water supply and sanitation policies should be addressing.

- Political hesitancy related to regularly raising tariffs could possibly be overcome through a combination of (i) continued policy dialogue supported by

progressive privatization congruent with market values of water and (ii) direct ADB assistance aimed at supporting consumers' education and making them more aware of the value of water, the costs of treatment and supply, and the need for both conservation and further capacity expansion of the supply system.

- The extent to which benefits from water supply are likely to be sustained will depend upon greater recognition of the role that prices can play in managing water demand to expand supply and protect the environment.
- Focus should be on reducing water losses and wastage rather than investing in supply capacity expansion and new distribution systems.
- Rigorous socioeconomic research is required to provide a better understanding of the market for piped water and the response of consumers to different service standards, tariff levels, and pricing structures.
- Several new systems were reported to be underutilized. This was largely due to slower-than-expected growth in water demand, which resulted from unrealistic targets for users of public taps, declining household income, and increased water prices. Slow growth in demand was also in part due to the existence of alternative water supplies and the perceived difference between piped and natural supplies.

Extracts from a draft vision for Gujarat (India) appear in Box 14.1. These extracts could form the basis for preparing a more specific national or state policy.

B. Transparency and Policy

Why is government policy important? Governments have had policies in the past, and policy statements were agreed with development agencies as conditions for loans. Sadly, these policies too often did not translate into actions and were thwarted by the ad hoc involvement of elected officials in management and decision-making processes. The most telling part about these policies was their lack of transparency. In other words, the public did not know about them. Civil society,

Box 14.1 Draft Gujarat Vision for Water Supply and Sanitation, 2010

- **Human Rights**—*Access to safe water and sanitation is recognized as a human right and citizens are active partners and managers in water and sanitation services.*
- **Water Supply**—*Everyone has access through a connection to a regular, reliable, and affordable supply of adequately safe water through systems that are socially acceptable, environmentally sustainable, technologically and economically viable, and managed in a way that is centered on people. Every public tap gives potable water.*
- **Water Resources**—*Integrated water resources management is practiced at all levels.*
- **Sanitation**—*Everyone has access to latrines connected to waste disposal systems. All schools have latrines for boys and girls. Slum dwellers also have sanitation.*
- **Health and Hygiene**—*These are strongly promoted.*
- **Information, Education, and Communication** —*These are promoted.*
- **Equity**—*Gender, religion, class, caste, and community equity are attained. Slum settlements are integrated into urban water supply and sanitation systems. Women are involved in decision making for natural resources management. Instances of girls dropping out of school on account of water and sanitation are eliminated.*
- **Financial and Economic**—*Users are paying for services. They pay according to the level of service they want and are willing to pay for. O&M costs involve communities. Household contributions toward both capital and service costs, routed through communities, make the water supply system more sustainable. Community groups monitor service charges as well as maintenance. Water charges are raised at a progressive rate in urban areas. In urban areas pay-and-use sanitation systems are available.*
- **Water Technology**—*All urban structures have rainwater harvesting facilities. Local sources predominate in drinking water supply. Tanker supplies are reduced to a minimum. Research and development are promoted. Desalinization is introduced.*
- **Water Recycling**—*All high-rises and large structures have recycling facilities. At least 50% of water used is recycled. Storm water is used to recharge underground aquifers.*
- **Sanitation Technology**—*Water use is minimized. Manual handling of excreta is banished.*
- **State Institutions**—*Government monopoly is transformed into facilitation. The Gujarat Water Authority oversees the water sector and undertakes water accounting and auditing. Good governance, transparency, and accountability are practiced. Each district has its own water authority.*
- **Civil Society and Market Institutions**—*The Gujarat Water Authority, set up as an autonomous body with full stakeholder participation, is the apex organization in charge of regulating all water resources in Gujarat. Civil society is an active participant in it. Water committees are functional in every community. User groups have been trained. Local people's institutions are legally empowered. Thirty percent of larger schemes are maintained through private sector initiatives. Civil society in general and women in particular are involved in planning. A positive and synergistic partnership between communities, government, the private sector, and NGOs is established.*
- **Policy, Legislation, and Regulation**—*Policy framework toward decentralized control as well as responsibilities is centered on people and gives opportunity for employment creation, leading to greater self-sufficiency and sustainability of services. Gujarat has a water policy and legislation to back up its actions. Drinking water gets first claim on water supplies. A regulatory framework has been developed to encourage and control private operators of water and sanitation services. Recognition and incentives for drinking water and sanitation performance are given. Regional water supply schemes are adopted as a last resort or backup system. Industrial pollution is controlled. Conflict resolution mechanisms are put in place. (National Institute of Design, Gujarat, Jal-Disha, 2000)*

therefore, could not share in the policy making or monitor implementation. **What is needed first is stakeholder consultation, followed by policy statements for the public that are put up on walls, printed in newspapers, posted on the Internet, broadcast over the radio, etc., in the national language, for everyone to see or hear.** In some countries this might be enough. In other countries it may be necessary to introduce independent regulatory bodies to oversee implementation. If elected officials continue to influence management and decision making, the final line of defense would be private sector contracts for the development and management of water supplies. **If there are transparent policies, independent regulators, and operators with incentives to perform, the situation may change.** Because governments set the policies, there can be no advancing until policy statements have been agreed.

C. Scope of Water Supply and Sanitation Policy

Scope of Policy

It is best to start with those who have no piped water. Policies on new connections and on new investments and their locations and priorities are needed. Once these are established, those served with standpipes should be considered, as well as when and how these people are going to get direct connections. Next, intermittent water supply needs to be reviewed, to provide a policy on 24-hour supply. A policy on water quality is needed. Most of all, a clear policy on tariffs and subsidies and how subsidies may be phased out is needed. The financing policy must be spelled out. Where the funds will come from for investments must be decided. There need to be policies on demand management and water conservation. Certainly, policies on PSP need to be explained. Policies on competition for operating water supplies need to be defined. Decisions must be made in terms of who will be responsible for given water supplies—national water authorities, local authorities, or private operators. Policies covering the operations and investments of SSWPs should be created. Policies on incentives for water operators, designed to improve performance and benchmarking of that performance, are needed. Crosscutting policies on service to the urban poor are needed. Policies on watershed rehabilitation are needed. Policies on wastewater pollution and control, wastewater recycling, rainwater harvesting, and trading water rights should be considered. While these needs are mostly related to water supply, policies on sanitation are needed as well. These should cover service levels (sewerage, septic

tanks, and latrines), tariffs, and financing in particular. The question of who will have institutional responsibility must be answered, and the financing terms need to be defined.

Policies are dynamic and can change with time. But what is needed for formulating sound policies is good field data and appropriate analysis of data, which must be followed by discussions with stakeholders on the objectives, scope, and implementation of policies.



Community bathhouse—a matter of policy

New Investments

Considering those people living in urban areas not being served with piped water should be the starting point for investment policies. These are often the urban poor. Governments should first of all recognize the human right to water. Next, governments should address the issue of land tenure in relation to their policies of providing water to unauthorized settlements. In line with this, some questions need to be asked: What are the policies on the provision of water to new housing estates and industrial estates? What towns have the highest priority for new investments and why? What is the basis for declaring new investments financially viable? How do policies address natural and urban migration population growth? **What is the end game for development agency borrowing or government borrowing?** How can civil society monitor the implementation of investment policies? How are new investment policies linked with tariffs and subsidies policies? How do policies address the phasing out of standpipe supplies and the achievement of a 24-hour supply? What are the policies concerning the portion of the development budget going to water supply and sanitation? What portion will go to water supply versus sanitation?

New Connections

The policies on new connections, especially that part of them that relates to connection fees, should facilitate the urban poor obtaining direct connections. **In new developments, connection fees can be included in development cost financing. In existing developments, the fees can be paid over 2–5 years with the monthly tariff.**

Water Quality

Do governments have policies providing potable water at the tap in their piped water supplies? What are the standards of water quality that governments will be required to meet? What are the water quality monitoring policies that will safeguard the people from arsenic poisoning, bacterial contamination, or heavy metal toxicity? How does all this relate to intermittent supply? Finding the answers to these questions is the first step in determining the level of commitment of Asian governments to ensuring that the water being supplied is of acceptable quality.

Water Accountability

What are the policies on metering water production and consumption? If the job is worth doing, then surely it must be done well. With that in mind, what are the policies on meter replacement? What are the policies on reducing NRW, especially regarding illegal connections and leaks? In this age of information technology, administrative losses should be negligible.

Tariffs and Subsidies

Before these policies can be formulated, the existing subsidies should be clearly determined. The answers to the following questions will help in doing this. What are the policies on phasing out subsidies? What are the policies on national or scheme-specific tariffs? What are the cost recovery objectives? What about tariff structures? Should block tariffs be retained to give lifeline rates to the poor and penalty rates to high-volume consumers? **(In a city where household income varies from \$500 per year to \$50,000 per year, block tariffs are essential.)** Should those people receiving a 24-hour supply pay a higher tariff than those receiving intermittent supply? Should tariffs be raised in the dry season to introduce water conservation? What should be the ratio of industrial to domestic tariffs? What about the policy to reduce this ratio? To what extent should tariffs contribute directly to investments? **(One hundred percent of water supply investments in large**

cities can be funded out of tariffs.) Should tariff policies tie tariffs to a maximum of 5% of household income? Should tariffs include or exclude sewerage charges? What are the tariff policies on sewerage? Are they designed just to collect O&M costs? What then are the policies on phasing in future capital costs? Should tariff increases be matched by service improvements as a matter of policy? Is it good policy to increase tariffs a little every month to achieve objectives, or is it better to have heavy increases from time to time? Should any scheme be subsidized to cover O&M costs? Why?

Financing

When considering issues related to financing, it might be helpful to ask the following questions. What are the policies on financing urban water supplies? What are the policies on financing urban sanitation? What are the mixtures of loans and grants to cities or utilities? What are the policies for phasing out grants? What are the onlending terms? Where will governments get the funds? What proportion of funds should be from World Bank, ADB, Japan Bank for International Cooperation, bilaterals, etc.? What proportion of investments will be funded directly out of tariffs? What are the policies for increasing this to 100% over time? What about municipal or utility bond issues? What about private sector financing of investments? What about BOTs? **Most importantly, what is the end game for independence?** What about options concerning alternative technologies that alter the need for vast public financing of water infrastructure, such as rainwater harvesting and eco-sanitation? Will governments provide financing for household rainwater harvesting and eco-sanitation? Will policies support local financing, suppliers, contractors, and consultants in lieu of those from abroad, as is now being proposed by NGOs for the Karachi Sewerage Project?

Private Sector Participation

What are government policies on PSP? Do these just amount to outsourcing? Do they include management contracts, leases, concessions, and BOTs? Do they include public-private partnerships? To what extent are the limits of international involvement constrained? **Three steps in the development process appear to have been missed in much of Asia: (i) the creation of a public utility with a regulatory body, (ii) the addition of domestic PSP with a regulatory body, and (iii) the addition of international PSP with a regulatory body.** Instead, a number of Asian governments jumped straight to international PSP and regulation by contract, and this is not working. It would, for this reason, be good to

see many more instances where domestic PSP with a regulatory body is introduced. The domestic private sector can provide good human resources management and financial management expertise. Occasionally, the international private sector could contribute through consultancies in the water supply technical field. What do governments expect from the private sector? Are investment monies expected? Is expertise in providing efficiencies expected? Are contracts to ensure autonomy expected? What are government policies on competition for private sector contracts? Will they relax prequalification based on government policies and enact these policies with regulatory bodies in place? Or will governments sign private sector contracts that lead to regulation by contract without basing these on government policies? In government policies, what incentives are to be offered to private sector operators? Will public sector operators be allowed to compete with private sector operators on a level playing field? How will governments ensure level playing fields when negotiating with private sector operators? Will consultants be employed to manage the process of change? What are government policies on redundant staff in water utilities? What are government policies on service to the urban poor under private sector operators? Will governments consider output-based subsidies? All these must be considered when the subject of PSP is raised.

Small-Scale Water Providers

Again, before governments can formulate policies on this subject, they need good data from the field related to these people and who they are, how much money they make, how many jobs are involved, what the price of the water is at the source and to customers, what the source of water is, what water quality is like, how much water is being provided, and how the customers regard this service. Governments must consider registration. Governments must consider financial assistance to SSWPs. They must consider employment issues both now and in the future. The policies on SSWPs must be closely linked with policies and priorities concerning investments. **We should remember that the total revenue turnover from SSWPs in large cities is sometimes more than that of the formal water utilities.**

Performance Incentives

Government policies must recognize that it is not possible to run major water utilities with civil servant rules and civil servant salaries. Staff need incentives to

perform. Performance criteria must be set and staff held accountable for meeting these. Staff must be given training appropriate to their jobs. Policies on participation in national, regional, and international conferences help provide incentives to perform. Government policies that do not address this key issue of performance incentives will surely fail. Utilities must be required to report their performance on agreed performance indicators and show improvement over time. They should be required to compare themselves with others nationally, regionally, and internationally.

Water Conservation and Demand Management

Policies must be specific about how to effect water conservation. Will conservation efforts include watershed rehabilitation, reducing NRW, rainwater harvesting, wastewater recycling, and demand management through both public awareness and pricing? How will each one of these be implemented? Will implementation include working inside homes to eliminate leaks? Will it include extensive and continuous programs in schools? To what extent will the media be employed? How can implementation be monitored so that everyone can see the results? **Rainwater harvesting in cities through the regulation of building permits and provision of incentives to households; demand management by pricing; and reducing NRW will be the most significant developments in cities of developing countries in the next 10 years.** In addition, Asia cannot ignore the rehabilitation of its watersheds. Rehabilitation will not just happen. Government policies and a commitment to implementing them will be necessary.

Trading Water Rights

It should be remembered that around 90% of water is used for irrigation. With its rapid urbanization, Asia cannot ignore a comparison of the uses of water for irrigation and urban water supplies. **Only when the price of urban water is 10 times the price of irrigation water will there be the proper incentive to trade water rights on a win-win basis.** This is coming. The case of the Angat Dam in Manila is a good example. But first the legal ties dictating who owns the water must be loosened, and people must be prepared to trade or at least lease customary rights. Government policies on water supply and sanitation in cities must address this issue.



Can policy protect the poor?



After the meter—a matter of policy?

Wastewater and Sanitation

Government policies on water supply in cities cannot ignore the fact that first and foremost Asian countries need an integrated water resources management approach. This means especially that it is time for separate government agencies dealing with water resources, hydropower, irrigation, wastewater, and water supply to share information with one another and develop coordinated and integrated approaches to the development and management of water. Policies should refer to quality control on effluent discharged from industries. Policies should address the need for industries to treat effluents before discharge, the relocation of industries to industrial estates, and incentives offered to industries to either obtain good treatment or relocate. Policies should address the issue of combined or separate wastewater and domestic sewage treatment. And, policies should consider the issue of large or small sewerage schemes.

In terms of appropriate sanitation, policies should guide developers in the appropriate levels of service, such as conventional sewerage, small bore and/or condominium sewerage with local underground or landscaped sewage treatment, septic tanks, or latrines. Policies on septic tank desludging should be defined. Encouraging the use of eco-sanitation or other appropriate technology solutions should also be included in policies. **We should not collect our wastes to put them in someone else's backyard. We should deal with them in our own backyard.**

Institutions

Policies should define institutional responsibilities, since these overlap for many institutions in the water sector. Where reforms are taking place, policies should elaborate on the reforms and on who will be responsible for what. Do policies support decentralization or devolution of power to local authorities? If so, how will this be achieved? Have national water authorities become too big and inefficient, and will they need to be broken up and their work outsourced? Can regional centers that can run autonomously be created? These are all issues for government policies on water supply and sanitation. A checklist is provided in Box 14.2.

Box 14.2 Government Policy Checklist (Not Exclusive)

Policy statements for release to the public should at least address the following matters.

- Water supply service coverage
- Tariff policies and objectives
- Sewerage service coverage
- NRW
- Water availability (hours per day)
- Demand management
- Water quality
- Criteria for selecting investments
- Levels of service
- Accountability of utilities
- Service to the urban poor
- Accountability of water
- Water vending
- Accountability of finances
- Bottled water
- Public awareness
- Funding of source development
- Water pollution control
- Funding of capital investments
- Tariff structure
- Trading water rights
- Water extraction (groundwater)
- Subsidies and cross subsidies
- Watershed conservation
- Recovery of O&M costs of sewerage
- Private water supplies
- New connections
- Reselling water
- Operator performance
- PSP
- Operator incentives
- Regulation
- Staff numbers
- Illegal connections
- Wastewater and sanitation
- Institutional responsibilities

D. Policy, Regulation, and Civil Society

Governments have a right to formulate their own policies (preferably in consultation with stakeholders and civil society). But for governments to be held accountable for implementing those policies, these must be made available to the people—and this means those connected to piped water (the customer or consumer) and those not connected to piped water. NGOs and the media can play an important role in bringing this policy to the people and in monitoring its implementation.

Independent regulatory bodies will go a long way toward ensuring that there is a continuous focus on the implementation of government policies, whether the focus is on actions of government agencies or those of water utilities. This focus will also give civil society a focal point for gathering information and expressing people's views. **Without civil society and regulatory bodies keeping an eye on the implementation of government policies, nothing from the past will change**—and the chances of good governance and sustainable tariffs being achieved are low.

From the utility point of view, government policies on autonomy and tariffs are paramount. Utilities should be heartened when regulatory bodies and civil society monitor the implementation of those policies.

Government Policy in a Nutshell

- Obtain good field data and analyze them.
- Consult with stakeholders and civil society.
- Address governance and tariff issues.
- Address NRW, service levels, SSWPs, and the urban poor.
- Address PSP and public utility performance incentives.
- Address the roles of institutions in the sector.
- Civil society will monitor policy implementation.
- Regulatory bodies will monitor policy implementation.
- NGOs and the media will bring policies to the people.

Regulation and Benchmarking

By definition, regulation is about making and enforcing rules for, in this case, the development and management of urban water supplies and sanitation in developing countries. This book focuses mostly on economic regulation, which includes investment, tariffs, and service levels. Other regulation connected with urban water supplies includes water resources and environmental and health regulation, but these are all major fields by themselves.

ADB's water policy notes that, to serve the best interests of consumers and managers of water resources, the pricing and incentive and penalty systems, regardless of their simplicity or sophistication, require regulation. Regulatory systems need to be established to ensure that laws, standards, rules, and regulations are equitably and consistently applied.

This chapter touches on why regulation of water supplies has now become important, its objectives, what should be regulated, how the regulation should be undertaken, and who should be doing it. Some principles of regulation are put forward, and the summary findings from an ADB regional seminar on the regulation of water supplies, held in 2001, are listed. The importance of benchmarking the performance of water utilities is emphasized, and the contribution in this field of ADB's two water utilities data books is noted.

A. Purpose of Regulation

In most Asian countries, the entities in charge of water supply and sanitation are nominally given the responsibility of seeing that government policies and legislation are implemented. What is the reality? In a city-state, like Singapore, there is discipline and commitment by the Government, and the Singapore Public Utilities Board ends up self-regulating and doing a fine job. Many developed countries, although not perfect, operate in much the same fashion. But in many Asian countries, both legislation and policy are overlooked. Elected officials become involved in the development and management of water supplies on a daily basis. The crux of the problem is that water utilities do not have the autonomy needed (even though this is legislated) to manage their own affairs. The result has

been low tariffs, intermittent water supply, a large number of urban poor not being served, and high NRW. This problem has also resulted in corrupt procurement, consultant recruitment, and contracting that have severely threatened economic lives of projects. Even though self-regulation was not working in several South Asian and Southeast Asian countries, until very recently there was no move to introduce independent regulation.

Then along came "privatization," and suddenly it was realized that, in the best interest of civil society, Asia should have regulatory bodies to see that the private sector does not abuse its monopoly privilege. But regulatory bodies take time to develop. So, in the meantime, Asia has effectively had regulation by contract. Private sector contracts have not been based on declared government policies, but on an ad hoc set of rules determined at the time by the contracting parties.

When regulatory bodies were set up, such as in Manila, they were not true regulatory bodies. Instead, they were more like contract administrators. While development agencies generally agree that to enter into a private sector contract without first establishing regulatory arrangements is a recipe for disaster, the reality is that over the last 10 years in most developing countries there was only regulation by contract. The example of Manila is a classic case, but it is typical of what has been happening elsewhere in the world. Of course, in most cases, the private sector wants regulation by contract, because private operators will not then be affected by changes in government policies. But as the private sector found in Jakarta, a contract is little protection from the will of the people. Nevertheless, independent regulation can encourage the private sector to invest in Asian water supplies by providing a more stable, transparent, and accountable environment.

Now let us consider public water supplies in urban areas of Asian developing countries. Can regulation help them? Well, one main purpose of regulation is to gain autonomy for utilities. That starts with transparent government policies. In many countries, transparent government policies and regulatory bodies are both needed for utilities to maintain an arm's length separation from elected officials.

B. Objectives

We can see from the statements above that **one main objective of regulation is to ensure that water utilities have the autonomy needed to comply with government policies and legislation.** But how does this work? First, regulation must have its basis in government policies and legislation. Second, while the regulator does not implement policies, it must monitor the implementation of policies. And, third, a regulator should ask many questions, which might include the following. Is the Government facilitating the implementation of its policies? Is the water utility complying with these? Are private sector contracts also in compliance?

Regulation must apply to all water operators, not just those in the private sector. Regulation brings with it sector transparency, accountability, equitability, and efficiency. Regulatory bodies are the entities that civil society can turn to if it is not getting the services it expects. Regulatory bodies must protect consumer interests. And, they must equally protect operator interests. Regulators should not be tasked with administering contracts. That is between owners and contractors. Regulatory bodies should only be tasked with seeing that contracts conform to policies and that policies are implemented. Regulation is not control.

Another objective of regulation is good governance. This applies to corruption in decision making related to the implementation of water supply and sanitation projects as well as new connections, utility staffing, disconnections and illegal connections, and syndicates like those that control informal service providers of water.

C. Scope of Regulation

The first question to decide is the geographic extent of regulation. Should regulation be carried out on the national, state, provincial, or municipal level? Is a multiple sector regulator best? The second question to decide is what policies will fall under this regulator. Is it possible that a regulator could start with a few things to regulate and in time phase in more and more? Regulation is a process or journey. For example, even now water quality is being more closely regulated every year in developed countries. For economic regulation, the first priorities might be water supply investments, tariffs, service levels, and incentives for and performance of operators. If water supplies are bundled from source to consumer, they will be easier to regulate. In fact, if any operator does not have control over the source of water, it will be very difficult to tie that operator to contractual obligations.

Tariffs, the lifeblood of any water utility, are the first and most important matter to be regulated. **It should be noted that regulators do not set tariffs but approve them after confirming that they conform to government policies.** Political obligations should not influence tariff decisions. Tariff structures may also be regulated in terms of objectives, such as serving the urban poor and demand management.

Investment proposals need to conform to government policies, including economic, financial, environmental, and social feasibility on the one hand and priority locations for poverty reduction on the other. Procurement, consulting, and construction must be audited from time to time to see that they conform to policies.

Service levels need to be defined and operators held responsible for providing those service levels. This includes piped water coverage, water quality, 24-hour supply, and phasing out standpipes. It may also include public toilets, on-site sanitation, and septic tank sludge disposal.

Water utility operator performance needs to be regulated. Performance indicators can include the number of connections, production volume, NRW, 24-hour supply, water quality, staff per 1,000 connections, metering, billing and collection, and operating ratio. An independent public audit of the water balance and of service levels should be conducted from time to time. **Profit or other incentives need to be linked to performance, both in terms of bonuses and penalties.** A regulator must determine which targets are satisfactory by benchmarking over time a utility's present performance against its past performance and the performance of others in the sector operating nationally and regionally.

Competition for water supply contracts must be regulated. While competent operators are necessary, broad competition is desirable also. This has been one major failure of the "privatization" process over the last 10 years. Competition has been limited to a select few contractors.

Groundwater regulation is also needed in most Asian cities. Who should be responsible for this is often debated. One opinion is that groundwater regulation is so intimately linked to the water supply itself that it should come under the economic regulator.

We need specific regulation of service to the urban poor. This will address the payment of connection fees, access to piped water, block tariffs, and freedom of information. It will also address SSWPs.

Water conservation must also be regulated. This can include public awareness, education, watershed protection, rainwater harvesting, reducing NRW, and demand management through pricing. Economic regulators will need to coordinate with water resources, environment, and health regulators on these matters.

D. How to Regulate

There is little experience in regulating water supplies in developing countries. Chile provides perhaps one of the better examples, and the main feature is that this country has considerable financial and human resources to carry out various tasks. It uses a hypothetical model to determine the operator's target efficiencies. It also has introduced direct subsidies to low-income consumers on a means basis. There is, however, no blueprint. Each country, and even each location within a country, will have its own characteristics that need to be considered when deciding how to regulate. It is good to remember that regulation is a dynamic process that takes time. The journey should be designed. Consumers are the ultimate regulators. Regulation should involve monitoring, not control. It should be remembered that regulation already exists, but it is mostly not structured, strong, or independent. Regulators do not provide water. Regulators must have access to information. Most information can be provided by water utilities as part of their management regime. Regulators can independently check this information on a sample or audit basis. It is also very important to agree on the validity of information. For example, how will NRW be estimated when the whole system is not metered and half the meters are not working anyway? There is an old adage: if you cannot measure, you cannot manage. That is very relevant to water supplies of developing countries. Regulators should be involved in the process leading up to the signing of a contract with a private sector operator. This is primarily to ensure that it is compatible with government policies. It has been said that regulatory principles should include social equity combined with financial sustainability in a transparent manner. There is a need to ensure that policy, regulation, and operation are separated. Almost everyone agrees that having relatively high tariffs will mean fewer problems. A rigorous analysis of subsidies will help. In fact, it could be said that **unless governments are committed to higher tariffs, compatible with full cost recovery, as a matter of policy, most regulation will be of little use.** An active consumer body will be healthy for regulators. Civil society in the form of journalists, academics, and NGOs should keep regulators on their toes.

E. Choosing Regulators

There are perhaps three schools of thought here. One is that one person should be appointed as the regulator. This person does not necessarily need to be an expert in anything, but he or she should be regarded highly by most people from most political parties. The regulator would have a team of experts in law, water, finance, economics, and social capital to collect and analyze information and advise him or her. The second school of thought is that a regulatory body should be formed by the experts themselves, totaling not less than three or more than five persons. The third school of thought is that the regulatory body should comprise people representing the stakeholders, including industrial and domestic consumers, operators, and local governments. Common to all these is the thought that **there should be appropriate gender representation in the regulatory body, since women are often the main providers of water at the household level.** The regulatory body needs adequate finances to function properly, and it is commonly believed that these should be sourced from tariffs to retain independence from government and should be in the order of 1–2% of the revenue gained from tariffs. Most agree that the success of a regulatory body could depend on its having (i) a clear mandate, (ii) autonomy, (iii) accountability through arbitration, (iv) transparency, (v) stability, (vi) professionalism, and (vii) objectivity. Whoever the regulators are, they need continued education and the ability to network with other regulators in the Asian region. ADB has been supporting this approach.¹⁶ Other advice indicates that regulators should be of the highest caliber and possess great personal integrity to resist political overtones.

F. Principles of Regulation

Regulation must be based on a transparent government policy. Private sector contracts must also be based on that policy. Regulation by contract is not a solution. Regulation should apply to all water supply operators, be they private sector, national authority, or local authority. Regulation is needed to provide autonomy to the water utility and to improve governance. In doing this, it will encourage private sector investment. The principles of accountability, efficiency, equitability, and transparency should be objectives of a regulatory body. Without a government policy that embraces the provision of incentives to operators for performance and a commitment to much higher domestic tariffs, the

¹⁶ Regulatory Systems and Networking of Water Utilities and Regulatory Bodies (ADB, 2001b).

benefits of a regulatory body will be negligible. A summary of findings from a regional seminar on regulatory systems, held at ADB in 2001, is given in Box 15.1.

G. Benchmarking

It is necessary to differentiate between metric benchmarking and process benchmarking. The former is a quantitative aspect and includes collecting and analyzing data leading to the identification of areas of relatively good and poor performance. The latter concentrates on improving the current work process to meet or exceed the targets set by metric benchmarking.

Process benchmarking does this by breaking down current work practices into a series of small steps that are then compared with best practices in other organizations outside the industry.

The ADB *Water Utilities Data Book—Asian and Pacific Region* (1993) and *Second Water Utilities Data Book—Asian and Pacific Region* (1997) provide information that allows water utilities to assess their rank among themselves in terms of various performance parameters. They also allow one utility to assess its own performance over time. A good way to get started is for every utility to set itself no more than 10 performance targets that are manageable (see Box 15.2). If tariff

Box 15.1 Summary of Findings—Regional Seminar on Regulation of Water Supplies

- Sound regulation will attract investment.
- In Chile, the head of the regulatory body is appointed directly by the President.
- Regulation of water vendors is needed, too.^a
- Five caveats: equitability, efficiency, accountability, transparency, and sustainability.
- Three more: performance standards, incentives, and competition.
- Regulation is based on policy and any PSP or other contract must comply with policy.
- The PRC has National Tariff Guidelines and a Municipal Price Bureau.
- Having a transparent policy that the public is aware of is itself a regulatory function.
- Legislation is necessary but not sufficient. A regulatory body can oversee.
- **Civil society is the ultimate regulator.**
- What we have today is the information age, including the Internet, E-mail, and mobile phones. The media can tap into this to bring information to the grassroots level. Therefore, we have an opportunity for transparency. But are all governments ready for transparency?
- Active consumer NGOs can serve as watchdogs.
- Operators must have contracts for performance. Regulators may suggest actions to be taken to improve performance.
- Benchmarking water utilities at country, regional, and international levels is important. This information must also be made available to the public, so it can see how one utility is doing compared with others (ADB water utilities data books).
- If you cannot measure it, you cannot manage it.
- Protection of customer interests is important.
- Regulators must have access to information.
- Regulation in Colombia is based on principles of social equity, financial sustainability, and transparency.
- Regulation in Zambia includes a board of stakeholders and team of experts. Policy came first.
- It is important to get strong skills in a regulator.
- There should be a code of practice for operators with obligations to consumers.
- Regulation is a dynamic process. The journey needs to be designed. Start simple.
- Regulation needs flexibility .
- Anything can work if there is a strong political will. (ADB, 2001b)

^a The latest thinking is that this should be limited in the short term to registration.

policies and loan covenants are to include references to O&M, it is essential that every utility clearly defines O&M. Likewise, it is important to differentiate between NRW and UFW (see Chapter 9). Preparation and timely publication of an annual report on operations are essential for the accountability of the utility to the government and the public. This report can include the information listed in Box 15.2.

Box 15.2 Suggested Indicators for City Water Supply

- Population in city (persons)
- Piped water production (m³ per day)
- Number of household connections (persons per household)
- Number of standpipes (persons per standpipe)
- 24-hour supply in service area (%)
- Per capita consumption from house connections (l/c/d)
- NRW (percentage of production)
- Average actual domestic tariff (\$/m³)
- Operating ratio (expenses against revenue)
- Utility staff per 1,000 connections

H. Evaluation of Water Utilities

This is becoming more and more important as a means of determining whether a utility represents a good investment for development agencies or the private sector. The evaluation needs to be made in two parts. The first part relates to the degree of autonomy of a water utility in terms of governance. These are factors normally outside the control of a utility. The second part relates to aspects under the control of a utility, such as consumer satisfaction, water management, and accountability.

Tables 15.1 and 15.2 can be used as a basis for deriving detailed evaluation criteria for each subheading, so that it is then possible to compare “apples with apples” each year. Development agencies can prepare their own detailed evaluation criteria, so that they can compare utilities on the same basis.

Table 15.1 Evaluation of Water Utilities (Part A)—Governance

• Transparent Policies	20%
• Independent Regulatory Bodies	10%
• Private Sector Participation	10%
• Civil Society Involvement	10%
• Subsidies (low)	10%
• Tariffs per Policy	20%
• Utility with Autonomy	20%
	100%

Table 15.2 Evaluation of Water Utilities (Part B)—Utility Performance

Consumer Satisfaction		40%
Coverage	10%	
Water Availability (24 hours)	10%	
Service Level	10%	
New Connection Fee	10%	
Water Management		20%
Metering	5%	
NRW	10%	
Consumption	5%	
Financial Management		20%
Self-Financed Investments	5%	
Operating Ratio	10%	
Accounts Receivable	5%	
Human Resource Management		10%
Staff per 1,000 Connections	5%	
Management Salaries	5%	
Accountability		10%
Annual Report	10%	
		100%

I. Public Audit

From time to time, but not less than every 5 years, it will be necessary for regulatory bodies to conduct independent public audits on the water balance and on water service levels. This will establish clearly the elements of NRW, so they may be appropriately addressed, and ascertain where the focus should be placed with regard to capital works designed to connect those people not connected to piped water. It is important to conduct these audits at the same time, so that a check on compatibility of findings can be made.

Utility water audits should of course follow the elements shown in Box 9.2. But under “Authorized Consumption” there should be a further breakdown into (i) Illegal Connection for Own Use and (ii) Illegal Sale. Likewise, “Metering Inaccuracies” can be broken down into (i) No Meters, (ii) Meters Not Working, (iii) Meters Not Recording Accurately, and (iv) Meters Misread.

Audits of water service levels must start with total populations of cities and account for all people by noting their sources of water (often more than one), the quantities of water consumed monthly from each source, and the amounts paid for that water.

The different categories audited may include (on the source side) water utilities (legal), water utilities (illegal), groundwater (own), and groundwater (others). For service levels, there will be a range of possibilities, including house connection; shared house connection; purchase from neighbor, public tank, public tap (standpipe), tanker, or water vendor; public dug well; public tubewell; own dug well; and own tubewell. To have good public audits of service levels, it will be necessary to register all SSWPs.

Regulation and Benchmarking in a Nutshell

- Regulation and benchmarking should be based on transparent government policy.
- The objective is autonomy and good governance through accountability, transparency, equitability, and efficiency.
- Why, what, who, and how must be addressed.
- There are three options: (i) one regulator, (ii) body of experts, or (iii) body of stakeholders.
- Civil society is the ultimate regulator.
- PSP contracts should be based on policy, not on regulation by contract.
- PSP and public water supplies should be regulated.
- Information technology improves transparency.
- Operators need incentives based on performance.
- Stakeholders should design the journey, which is a dynamic process.
- Benchmarking is fundamental to regulation.
- Evaluating utilities on governance and performance is desirable.

Civil Society Involvement

Civil society includes all stakeholders with interests in the water sector (consumers, NGOs, academics, journalists, etc.). These stakeholders are important because, ultimately, the pressure (on governments) for necessary reforms is going to have to come from civil society, not development agencies. The first step in this process is for civil society to become much better informed, which was the main finding of *Water in Asian Cities—The Role of Civil Society*, the regional consultation held at ADB in October 2002. This chapter starts with what consumers are saying, looks at special findings from the regional consultation, then deals with issues of governance. It goes on to explore what can happen when the consumer is in control, expands on public awareness and transparency, then identifies some specific roles for NGOs, academics, and journalists. Appendix 1 contains views from civil society.

Water projects supported by ADB will incorporate carefully designed components that promote the participation of civil society in identifying needs and issues, designing solutions, and establishing mechanisms for monitoring and dispute resolution.

A. What the Consumers Are Saying

The following is a summary of the main points learned from numerous interviews with consumers in Asian cities conducted in 2001.

- Poor water quality is the main complaint.
- Intermittent supply (including power cuts) is the next complaint.
- Low pressure means household pumping—waiting in queues.
- They have difficulty in paying the water bill.
- Connection fee is high (corruption).
- There is a lack of consumer awareness about the issues and solutions.
- Groundwater levels are falling.
- Piped water service coverage is low, but there are tens of thousands of applications.

- People are willing to pay for good service—up to \$10 per month.
- There are too many standpipes and not enough connections.
- Illegal connections abound.
- Meter reading is sometimes inaccurate.
- Utility staff fear they will lose their jobs if privatization comes.
- Unions and NGOs are against privatization—they say it will bring higher tariffs.
- High benefits to utility staff result in fewer illegal connections.
- Those not connected have no idea when they will get piped water.
- Paying the connection fee over 6–12 months is OK.

The conclusion is that governance and tariffs are the core problems, and promoting public awareness of the problems and solutions is the first requirement.

B. Regional Consultation Findings

Special findings from the ADB regional consultation in October 2002, *Water in Asian Cities—The Role of Civil Society*, are given below to further enhance stakeholder understanding and awareness.

- Large water supply projects can be completed by the private sector within 18 months.
- Use city forums (coalition of civil society groups).
- Consider rainwater harvesting in cities (India's Chennai is an example).
- Civil society can give a voice to the poor.
- Filmmaking can help, but target the audience and message.
- It is not just government boards that interfere in water utilities.
- Remove the biggest polluters from the cities.

- There is a need to protect watersheds—users must pay for this.
- Correct public utilities and be careful not to jump to PSP.
- Operators must have a social dimension and involve their customers.
- The rich and middle class get subsidies, not the poor.
- We must recognize SSWPs.
- Utilities should get involved in bottled water.
- Water and human values and water and culture are important.
- Property titles should never be an impediment to piped water.
- Development agencies should work with local governments and help attract local financing.

C. Issue of Governance¹⁷

If poor governance is at the root of the problem and government is in control, government cannot be asked to reform itself. There is too much vested interest, and people are too comfortable with the status quo. Efforts must be made to go outside government to the people who are most affected, such as the urban poor not being served who pay \$5/m³ to water vendors. Civil society must put pressure on government, if reforms are to happen. This can be done when issues are understood and civil society is interested in doing something for the poor and the ill-served. **We can begin with a transparent policy and a civil society that holds government accountable for implementing that policy.**

D. When the Consumer is in Control

Information technology has allowed consumers to make informed choices and hold governments more accountable. In this context, the word “consumers” refers not only to those already receiving a service but also to those with the potential to receive that service.

Customer relationships count. Their experience matters. And they are in control when they have access to information. (Seybold, 2001)

When consumers are in control through paying the full cost of water service delivery, (i) corruption is minimized, (ii) there is more accountability for finances and water, (iii) there is more efficiency in water service delivery, (iv) there is more transparency regarding information, (v) there is more staff responsibility, (vi) service is more equitable, (vii) a consumer society will likely be formed, (viii) service levels will be reviewed, (ix) performance benchmarking is encouraged, and (x) there is pressure to improve service.

E. Public Awareness and Transparency

ADB will promote wide-ranging public awareness and community education programs—especially among women, youth, and farmer groups—to broadcast the message of water being a resource that needs prudent management. In particular, education that helps communities understand the links between water, sanitation, health, and productivity will be encouraged. ADB will incorporate components that educate industrial consumers on the efficient use of water and the need for higher prices for water use and efficient treatment and discharge.

The Internet helps civil society become better informed about the world. Once it is informed, civil society can help create the necessary public awareness to pressure governments into the right policies (those that will ensure that water is provided equitably) and encourage leaders to use the right strategy to implement these (for example, tariff reforms). Civil society can include all stakeholders—development agencies, served consumers, the urban poor not being served, utilities, the private sector, unions, civil servants, politicians, NGOs, journalists, and academics.

Objectives of Public Awareness

These may include the following:

- helping the public understand water service levels;
- educating the public about water use, including how to reduce waste in the home, and promoting good hygiene;
- educating the public about water conservation;
- helping the public understand where the cost of water comes from and why tariff increases are necessary;
- keeping the operator on its toes in terms of performance responsibilities;

¹⁷ There is some repetition here from other parts of the book, but this ensures that due emphasis is placed on important matters and that this chapter can be more readily understood by itself.

- letting the public know about government policies and plans;
- informing the public about development agency funding and its requirements; and
- encouraging people to compare their water utility with others in the region.
- publishing comparative data from other utilities;
- publicizing activities and views of the principal regulator; and
- encouraging consumers to write to newspapers and regulators.

Scope of Public Awareness Activities

These may include the following:

- appointing a public relations firm to prepare materials and programs;
- undertaking consumer and school surveys to test public knowledge and awareness;
- using media (radio, television, newspapers, and the Internet) at least monthly;
- explaining tariffs to the people;
- publishing the main findings of water utility annual reports;
- preparing textbooks for schools and educating teachers;
- forming consumer associations;
- explaining the role of the regulatory body to the public;
- explaining PSP to the public;
- surveying homes for water use and waste;
- establishing a consumer complaint response center;
- maintaining a utilities Web site and updating it daily on news and status of services;
- establishing a service for low-income consumers, which gives special attention to the poor;
- inviting the public to follow up on leak repairs;
- conducting public meetings with special interest groups;
- making short videos on different water supply situations to encourage public discussion;
- hiring an independent consultant to check operator performance;
- publicizing widely and continuously government policy and the status of its implementation, especially with regard to serving the urban poor;
- proactively preparing feature articles on water supply issues for the media;

F. Role of NGOs

NGOs have a vital role to play in ensuring that the interests of the poor, those not connected, and the ill-served are safeguarded and that their voices are heard in public and private sector debates. NGOs can be initiators of consumer societies. In cooperation with academics, journalists, and regulators, they can monitor the implementation of government policy. The example of the NGO Forum for Water Supply and Sanitation in Kathmandu (Nepal), which was initially established with support from WaterAid, is one that could be replicated elsewhere. This organization has clearly demonstrated that, when they are well informed on the subject, the views of NGOs will be respected.

G. Role of Academics

Academics can keep an eye on the big picture. They can analyze subsidies in particular and report the amounts going to the poor or the rich. They can analyze tariffs and tariff structures. They can discuss questions of governance and PSP. They can analyze the water balance to see where water is being used and lost. And they can analyze the service levels and payments for water by urban residents. Recent studies on SSWPs have clearly identified the need to investigate these areas.

H. Role of the Media

Journalists can focus on the poor, the people not being served, tariffs, water utilities and their efficiency, the performance of governments in implementing their declared policies, and private sector involvement. But first they should spend time and effort in becoming educated on the subject. In every major city, at least one journalist could become an “expert” on water. While much material is available on the Internet, including the Web sites of water utilities, it is up to the media to bring this to the attention of those who do not have access to computers, which can be done by passing on this information via newspapers or radio.

Civil Society Involvement in a Nutshell

- Consumers indicate governance and tariffs are core problems.
- Focal points are NGOs, academics, and journalists. City forums help.
- Civil society needs to be better informed.
- Starting point is involvement through key stakeholder consultation in formulating government policy.
- Public awareness and transparency are keys to civil society involvement.
- When consumers pay the full price of water, they will be in the driving seat, which is the objective.
- Civil society should interact with the regulator.
- NGOs can champion the poor and can form consumer societies.
- Academics can investigate facts, especially concerning subsidies.
- The media can be powerful, but first it must be well informed.
- Civil society involvement promotes good governance by monitoring the implementation of government policy.

Chapter 17

Research

For an organization, institution, or government agency to be effective, it must constantly engage in research as a part of striving to do better. Research is needed in the urban water supply sector to provide awareness and understanding that in turn will give a basis for sound decision making. This chapter identifies topics that can be further investigated and researched, and it suggests some focal points for that research. In general, there is a need for balanced research that takes into account social, economic, and environmental considerations. It is important that the results of research be shared, which can be done by posting these results on the Internet.

A. Topics for Research

Intermittent Supply

The subject of intermittent water supply in developing countries requires research. We need to know the real cost of intermittent versus 24-hour water supply. What are the pumping costs? What are the storage costs? What are the treatment costs? What is the volume and value of water wasted every day? How accurately can water consumption be measured? What is the quality of the water delivered? What is the value of time wasted waiting for water? What is the anxiety factor? How many days in the year does water not come? What is the prevalence of bottled water for drinking? What solutions to this situation do the stakeholders envisage? What is the extent of good hygiene practiced in homes? This research should be done in at least 10 cities in five countries to get a good understanding of the situation.

Income Profiles

Every water utility involved with a city in Asia with a population of over 100,000 should evaluate the household income profile for people living in the potential service area. This should be done on a sample basis and reported with reference to location. It should then be aggregated for overall results. This provides an upper revenue limit based on affordability. Of course, this information must be analyzed in the context of alternative

water supplies and the tariff structure to determine willingness to pay.

Alternative Water Supplies

Willingness to pay for piped water depends more than anything else on what alternative water supplies are available to consumers. Research should carefully evaluate this factor to ensure that demand is not overestimated in new water supply schemes. A factor in the use of alternative water supplies is hygiene education, so this too should be evaluated (see Health Factors on page 126). What is the quality of alternative supplies and for what purpose are they used? Is there a need for education and awareness programs?

Effective Subsidies

What are the subsidies being provided by governments to different water users, including farmers, urban domestic consumers, industrial consumers, and rural domestic consumers? Are there apparent or real cross subsidies from (i) high-volume domestic consumers to low-volume domestic consumers, (ii) industrial consumers to domestic consumers, or (iii) urban consumers to rural consumers? Consider the block tariff structure—who benefits most from subsidies, the rich or the poor? How many people are not connected (in their homes) to piped water?

Price Elasticity of Demand

There is a need to look at per capita water consumption and the cost of water. Does a tariff increase result in a temporary or permanent reduction in the volume of water used? This is now easy to evaluate, if a computer sampling of accounts is used. To what extent is demand influenced by income, by tariff level, and by alternative source availability?

Service Levels and the Water Balance

In any major city there are gray areas relating to statistics on service levels and the water balance. If the NRW rate is 60%, what is the basis for assuming

that 10% is due to metering inaccuracies, 30% to illegal use, and 20% to leakage? If there is 30% illegal use, how much of that comes from illegal sales? How much results from illegal connections? If there are 10 million people in a city and only a million connections, how do those not connected get water? Do they use shared connections? Do they purchase from neighbors or vendors? Do they use groundwater? What is the volume of water used by each category, and what do they pay for it?

Small-Scale Water Providers

There needs to be more research on these entrepreneurs. All should be registered and officially recognized to understand how they fit into the overall water supply system. The sources of their water, the amount of water distributed, the method of distribution, the source cost, the consumer cost, and the quality of the water delivered need to be recorded. The results need to be compared for compatibility with the research (above) on service levels and the water balance. The profit element for SSWPs needs to be examined. Then the long-term role of SSWPs vis-à-vis government policies and formal piped water development plans needs to be assessed. This is big business, and it is important to know as much as possible about it.

Health Factors

There is a need for research into the extent of the knowledge and practice of hygiene, especially among the more informal settlements in Asian cities. What are the sources and quality of drinking water? Is it boiled or filtered? What is the practice concerning hand washing? What is the practice concerning sanitation? Since major improvements in hygiene practice can be made at little cost, this is an area where research can quickly lead to action. Research should be conducted on the stunting of child growth and its links to the quality and quantity of drinking water.

Pollution

Research is needed on big industries that pollute waterways. What is the nature and quantity of effluent produced? What pretreatment or treatment is done on-site? What type of treatment is required by law? Are industries properly zoned? What are the official government policies on zoning? What are the regulatory arrangements? What are the consequences of uncontrolled pollution? Who benefits? Who pays?

Groundwater Monitoring

As mentioned elsewhere in this book, groundwater has been overexploited in the past and continues to be overexploited now. There is a need to control extraction, to ensure that the resource remains sustainable and usable. Research is needed to establish the amount of the current extraction and compare it with the sustainable yield. Research must cover the incidence of falling groundwater levels, the incidence of saline intrusion in coastal environments, and ground subsidence.

The Urban Poor

There needs to be, for public review, an independent annual report on the water supply and sanitation situation of the urban poor. This should include poverty mapping of the city, water supply and sanitation service levels, and costs (both direct and indirect) to the urban poor. The annual progress in improving the plight of the poor should be highlighted. To what extent are government policies on water supply and sanitation services to the urban poor being implemented? Are modifications or improvements to those policies needed?

Private Sector Participation

After 10 years, the jury is still out on PSP in urban water supplies in Asia. There is a need to supply those governments considering PSP with independent and objective assessments of ongoing PSP activities in the sector. The research should identify (i) attempts that failed to get off the ground and why, (ii) problems with ongoing PSP contracts, (iii) success stories, and (iv) the prognosis. The research should take a look at how well the objectives of increased efficiency, more investment funds, and greater autonomy are being realized.

B. Focal Points for Research

It is fine to suggest lots of research, but who is going to do this, and how is it going to be funded? First, there is the need to determine focal points for research. In this regard, it must be determined if research will be done on a regional or national basis. At a regional level, institutions like ADB, Japan International Cooperation Agency, World Bank, UN-Habitat, World Health Organization, Economic and Social Commission for Asia and the Pacific, and the Asian Institute of Technology (Bangkok) can be focal points. At a national level, the

Marga Institute (Sri Lanka), the Ateneo Center for Social Policy and Public Affairs at the Ateneo de Manila University (Philippines), the National Institute of Public Finance and Policy (New Delhi, India), and PERPAMSI (the association of water utilities in Indonesia) are examples of potential focal points. Institutes aside, any university in Asia that wishes to undertake research on Asian urban water supply issues in connection with a thesis for a master's or doctorate level degree could be a potential focal point. The University of Tokyo has been working with ADB for several years on such topics. Where regional institutions like ADB are involved, it is more natural for the research assignment to be undertaken by selected consultants.

C. Funding Research

Whether it is conducted by World Bank, ADB, or any other institution involved in urban water supply development in Asia, there is a need for research and for funding that research. In this way all stakeholders will be more aware of facts, and important policy reform decisions based on these facts can be made. The two institutions mentioned have access to special water cooperation funds, which are heavily supported by the Dutch Government. The World Bank's Water and Sanitation Program is supported by bilateral development agencies. ADB has its own budget for advisory technical assistance. Most important of all, however, is that the participating government or governments request support for research on the topics mentioned above. There has to be an expressed need. There will also be strong competition for funds, so the justification must be strong and well presented.

Research in a Nutshell

- Research is a part of the very necessary effort to increase awareness and understanding among all stakeholders.
- Researchers should balance social, economic, and environmental considerations.
- Research should target income profiles, subsidies, service levels, SSWPs, intermittent supply, alternative supplies, health factors, price elasticity of demand, the urban poor, illegal use, illegal sales, corruption, pollution, groundwater, and PSP.
- Focal points are universities, institutes, and water associations.
- Funding could be sourced from ADB, World Bank, and bilateral development agencies.
- Results should be posted on the Internet.

Chapter 18

Guiding Principles

The purpose of this chapter is to take a step back and see the big picture, so that the messages in this book may be viewed against broader perspectives.

- *We neglect history at our peril. Lord Raleigh once observed that a lack of understanding of history meant that the heights of technical achievement were reconquered again and again at great intellectual expense.*
- *Sensitivity and compassion must be at the root of any development project.*
- *Success in the past came because the people who ran (an undertaking) had a stake in it.*
- *Security of supply is important.*

Bob Norman, past President, Institution of Professional Engineers, New Zealand. *Engineering Heritage: Artifact or Instrument?* Keynote address, ALGENZ Conference, Dunedin, New Zealand. (Norman, 1998)

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- *In just the first 10 weeks of the cholera epidemic in Peru, losses from reduced agricultural exports and tourism were estimated at \$1 billion, or more than three times the amount invested in water and sanitation services in the whole country during the 1980s.*

John Briscoe, World Bank. *When the Cup is Half Full. Article for Environment—Water and Sanitation Success Stories.* (Briscoe, 1993)

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- *Our voice must be for those whose access is always threatened—the poor, the slum dweller, the dispossessed.*
- *We know that women are the key, even if we don't use the key yet. Women must be written into the water equation. It takes courage to break the mold.*

- *Data is not information. Information is not knowledge, and knowledge is not wisdom.*
- *There is enough water. It is only that we do not use it wisely enough.*

Margaret Catley-Carlson, former Chairperson, Water Supply and Sanitation Collaborative Council. (Catley-Carlson, 1997)

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- *What we did in Curitiba was essentially a partnership with the people.*
- *We planted one million trees.*
- *Separate used water. This represents a colossal economy and the possibility of treating effectively all the city sewage, avoiding river pollution.*
- *What will make cities different is their ability to reconcile with nature and their inhabitants.*

Mayor Jaime Lerner of Curitiba, Brazil. *Intervention in Curitiba, Brazil. Paper presented at the Water Supply and Sanitation Collaborative Council Meeting, Rabat.* (Lerner, 1993)

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- *The Asian vision requires urgent action to reach the underserved and unserved population.*
- *It requires good governance and compassion for transparency and accountability and corruption-free practices.*
- *We agree on a gender-sensitive, people-centered, and self-reliant development model that promotes consultation and dialogue between and among all stakeholders, empowering those who are socially and economically disadvantaged.*

Vision 21 of the Water Supply and Sanitation Collaborative Council. (Water Supply and Sanitation Collaborative Council, 2000)

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We need a water ethic, a guide to the right conduct in the face of complex decisions about natural systems we do not and cannot fully understand. The essence of such an ethic is to make the protection of water ecosystems a central goal in all that we do. It is no more radical a notion than suggesting that a building be given a solid foundation before raising it 10 storeys high. Water is the basis of life and our stewardship of it will determine not only the quality but the staying power of human societies. Living by such an ethic would mean using less whenever we can and sharing what we have. The challenge is to put as much human ingenuity into learning to live in balance with water as we have into controlling and manipulating it. The last oasis is conservation, efficiency, recycling, and reuse.

Sandra Postel. *Last Oasis—Facing Water Scarcity*. (Postel, 1997)

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Guiding Principles in a Nutshell

- Learn from history. Success in the past came because the people who ran an undertaking had a stake in it.
- Partner with the people and civil society.
- Plant a million trees.
- There should be a sustainable water ethic for all.
- Good governance is at the core.
- Target the underserved and those not served.
- Remember the epidemics.
- Write women into the equation.

Strategy for Action

There is no blueprint for improving urban water supplies in Asia. Every country and every city have their own unique social, political, physical, and economic environment that will determine what is appropriate in regard to development. Nevertheless, it will be useful for governments and utilities to have a general strategy for action. The purpose of this chapter is to condense the findings of this book into one “nutshell,” representing a framework for action. **Remember that all solutions are dependent on the resolution of the core problems of governance and tariffs, which can be accomplished by introducing transparent policies, independent regulatory bodies, and involvement of civil society.**

One way of involving civil society is to hold stakeholder consultations as a basis for formulating government policy. First comes the identification of key stakeholder groups. These may include (i) urban poor using vended water, (ii) small-scale water providers, (iii) domestic consumers, (iv) industrial consumers, (v) utility staff, (vi) utility management, (vii) unions, (viii) government officials, (ix) politicians, (x) the private sector, (xi) development agencies, (xii) NGOs, (xiii) academics, (xiv) the media, (xv) consultants, (xvi) contractors and suppliers, and (xvii) professional associations. Second come separate stakeholder consultation meetings, convened by the government, with each group. Ideally these would be 2-day meetings and *Asian Water Supplies* would be used as a sourcebook throughout. The first day would be for

listening to ideas of stakeholders regarding problems and solutions. The second day would be for responding to findings and offering further solutions. A representative of the stakeholder group should be elected. After the proceedings of the first stakeholder consultation meeting for all stakeholder groups have been documented, they should be analyzed as a whole and one report prepared for dissemination to all stakeholder groups. A second phase stakeholder consultation should then be held with representatives of stakeholder groups to discuss the findings. At this meeting, experts from successful water utilities in the region (for example, those from Bangkok, Dalian, Malé, and Phnom Penh) could be invited to tell their stories. Finally, a draft government policy statement would be prepared, based on the views of stakeholder representatives.

In this book there are chapters on specific topics, and at the end of these chapters the solutions in a nutshell are presented. This chapter brings all these together in one place. It is best to view this as a menu from which selections can be made as appropriate for a given enabling environment and location. All the solutions from the chapters are unlikely to be applicable in any given situation, but many can be. It is also important to remember that none of these solutions will work unless the core solution of good governance (policy, regulation, and civil society involvement) and a paradigm shift in tariffs (funding investments out of tariffs) are first addressed.

Realities

- Coverage with piped water does not always require major urban water utilities to seek funds from external sources.
- Shortage of water is not the reason for intermittent water supply.
- The poor are willing and can afford to pay the full cost of piped water.

- It is not possible to run a \$20–100 million per year commercial operation (selling water) with civil servant rules and salaries.
- Reducing NRW below 20% of production is economically justified.
- The private sector will not always bring much needed funds for development to the table and improve water utility efficiency.
- In answer to rapid urbanization, it is not necessary to go farther and farther afield to find more water sources.

- Intermittent water supply is not OK.
- Appropriate legislation does not always allow a water utility to operate with autonomy.
- Water utilities suffer when the money trail runs through governments.
- Households in Asia do not need 200 l/c/d.
- Private operators are not always the cause of higher tariffs.
- Regulatory bodies are not only needed because of private sector contracts.
- Private operators are not always eager to serve the urban poor.
- Private sector participation does not always bring competition.

Problems and Solutions

- An individual problem, such as NRW, cannot be solved in isolation. It can only be addressed after the core problems have been resolved.
- The core problems are poor governance (including corruption) and low tariffs.
- The core solutions include a transparent policy, an independent regulatory body, a paradigm shift in tariffs, and the involvement of civil society.

Water Resources Management

- Water policies and social auditing are needed.
- Have long-term planning horizons.
- Introduce demand management through awareness and pricing.
- Plant more trees to rehabilitate watersheds.
- Plant crops that use much less water than do rice, cotton, and sugarcane.
- Do not subsidize water management.
- Remember the triple bottom line: environmental, social, and economic development.
- Develop rainwater harvesting in cities.
- Remember the beavers—build check dams.
- Trade customary water rights.

Water and Sanitation Service Coverage

- Compare the number of connections with the number of people.
- Examine the extent of intermittent water supply.
- Examine the extent of standpipe supply.
- Examine on-site sanitation versus sewerage versus treatment.
- Undertake independent professional audits of service levels.
- Analyze root causes of inadequate coverage.
- Promote awareness of the situation among civil society.
- Address as a priority the needs of those with no access to piped water.

Intermittent Water Supply

- Promote awareness among stakeholders.
- Address governance issues related to the autonomy of utilities.
- Introduce higher tariffs for 24-hour zones.
- Place moratoriums on new connections.
- Invest in hydraulic modification of distribution systems.
- Start with 24-hour zones, and then expand these.
- Enforce strict metering and collection.
- Reduce NRW.

Water and Poverty

- Public audits are needed to obtain facts about service levels.
- Policies are needed that focus on providing the poor with piped water.
- Raise tariffs to connect the urban poor.
- Employ a block tariff structure, but watch the sizes and prices of blocks.
- Soften terms of payment for connection fees.
- Eliminate standpipes wherever feasible.

- Encourage civil society (NGOs) to champion the poor.
- Detach land tenure issues from access to piped water.
- Governance is at the core of the solutions.
- Develop knowledge bases related to the water needs of the urban poor.
- Enable the poor to influence decision making.

Small-Scale Water Providers

- Services provided include distribution pipework for utility water and/or groundwater, kiosk sales, pushcart and tanker vendor deliveries, and neighborhood resale of utility water.
- Water sources (whether legal or illegal) are mostly water utilities, but also groundwater.
- SSWPs sometimes generate more revenue than formal utilities.
- In default of the water utility, SSWPs provide the urban poor with essential services. Many SSWPs are also poor.
- The great inequity: the connected can pay \$4 for 30 m³ and those not connected (supplied by SSWPs) can pay \$20 for 6 m³. The status quo is maintained by those with vested interests.
- In many cases, SSWPs are not formally recognized by utilities or local governments.
- Tariffs are higher than those charged by utilities but connection fees are lower.
- SSWPs provide more flexible arrangements for connections and payments than water utilities, leading to better relations with customers.
- Officials need to learn more by auditing existing utilities and SSWPs, so that SSWPs can be registered and recognized but not regulated (yet).
- Residents need to have clear policy statements from governments on piped water coverage and SSWPs. Governments should include SSWPs in water supply strategies.
- SSWPs need access to financing.

Management

- Policies must provide autonomy and revenue (tariffs).
- There should be accountability through regulatory bodies and annual reports.
- Organization development is necessary.
- If you cannot measure, you cannot manage.
- Incentives must be linked to performance.
- Use open market salaries for professionals.
- Give O&M prestige.
- Interface between staff and consumers should be given importance in the field.

Non-Revenue Water

- Governance and tariffs must be tackled first.
- Leak-detection equipment comes last, not first.
- Repair visible leaks.
- Make utility staff responsible for small zones (caretakers).
- Meter all production and consumption properly.
- Add district metering.
- Provide incentives for utility staff performance.
- Explore links to water vendors.

Sanitation

- There is a need for explicit government policies.
- In densely developed areas, conventional centralized sewerage systems are a must.
- In less densely developed areas, it may be possible to construct decentralized small sewerage systems with local, appropriately landscaped, sewage treatment facilities.
- On-site sanitation is OK, if the plot size and ground permeability are adequate and the groundwater table is low.
- Eco-sanitation (not mixing feces with water) has promise.
- Reed bed technology for treatment of wastewater is OK.

- Target the urban poor as a matter of priority.
- Divert development agency and government funding from major urban water supply projects to urban sanitation projects.
- Solutions must be part of integrated water resources management.
- Opt for community sanitation facilities, like those in Pune.
- Get the facilities and education in the schools first.

Tariffs, Subsidies, and Development Funding

- Tariffs begin with policy—analyze subsidies.
- Tariff reform is a manifestation of good governance—fewer subsidies.
- Alter the money source from governments to consumers.
- Those connected must pay more so that those not connected can get piped water.
- No question of affordability—the hidden economy proves this.
- Block tariff structures are best when income profile varies greatly.
- Fund investments directly from tariffs—the PRC is doing this now.
- Connection fees can be absorbed by tariffs.
- Tariff reform is needed to encourage PSP.
- Higher tariffs make good things happen in terms of water development options.

Private Sector Participation

- Manage the process of change.
- Domestic PSP is preferred.
- Contracts should be based on policies.
- Consider exit strategies for internationals.
- Tariff reform is a prerequisite.
- Competition and transparency are musts.
- Public-private partnership has promise.
- Principles and guidelines are needed.

- Independent evaluation will help.
- SSWPs should be included.
- Regulatory arrangements must come first.

Governance

- Transparent policies and independent regulators are needed.
- Tariff reform to put consumers in control is necessary.
- Civil society involvement is a must.
- Good things happen when tariffs are raised.
- Governance is at the core of all solutions.

Government Policy

- Obtain good field data and analyze them.
- Consult with stakeholders and civil society.
- Address governance and tariff issues.
- Address NRW, service levels, SSWPs, and the urban poor.
- Address PSP and public utility performance incentives.
- Address the roles of institutions in the sector.
- Civil society will monitor policy implementation.
- Regulatory bodies will monitor policy implementation.
- NGOs and the media will bring policies to the people.

Regulation and Benchmarking

- Regulation and benchmarking should be based on transparent government policy.
- The objective is autonomy and good governance through accountability, transparency, equitability, and efficiency.
- Why, what, who, and how must be addressed.
- There are three options: (i) one regulator, (ii) body of experts, or (iii) body of stakeholders.
- Civil society is the ultimate regulator.

- PSP contracts should be based on policy, not on regulation by contract.
- PSP and public water supplies should be regulated.
- Information technology improves transparency.
- Operators need incentives based on performance.
- Stakeholders should design the journey, which is a dynamic process.
- Benchmarking is fundamental to regulation.
- Evaluating utilities on governance and performance is desirable.

Civil Society Involvement

- Consumers indicate governance and tariffs are core problems.
- Focal points are NGOs, academics, and journalists. City forums help.
- Civil society needs to be better informed.
- Starting point is involvement through key stakeholder consultation in formulating government policy.
- Public awareness and transparency are keys to civil society involvement.
- When consumers pay the full price of water, they will be in the driving seat, which is the objective.
- Civil society should interact with the regulator.
- NGOs can champion the poor and can form consumer societies.
- Academics can investigate facts, especially concerning subsidies.
- The media can be powerful, but first it must be well informed.
- Civil society involvement promotes good governance by monitoring the implementation of government policy.

Research

- Research is a part of the very necessary effort to increase awareness and understanding among all stakeholders.
- Researchers should balance social, economic, and environmental considerations.
- Research should target income profiles, subsidies, service levels, SSWPs, intermittent supply, alternative supplies, health factors, price elasticity of demand, the urban poor, illegal use, illegal sales, corruption, pollution, groundwater, and PSP.
- Focal points are universities, institutes, and water associations.
- Funding could be sourced from ADB, World Bank, and bilateral donors.
- Results should be posted on the Internet.

Guiding Principles

- Learn from history. Success in the past came because the people who ran an undertaking had a stake in it.
- Partner with the people and civil society.
- Plant a million trees.
- There should be a sustainable water ethic for all.
- Good governance is at the core.
- Target the underserved and those not served.
- Remember the epidemics.
- Write women into the equation.

Messages to Stakeholders

It is useful to summarize the main messages of this book as given in A and B below. And let us not forget the Problem Chart and Solution Chart in Chapter 2, which give a more visual explanation of these messages. Messages C and D place the urban water supplies of Asia into a broader context.

A. Creating the Enabling Environment (Governance)

We need transparent policies and an independent regulatory environment that will give autonomy to water utilities, equitability of service, and a paradigm shift in tariffs. None of this will be possible without the active involvement of civil society.

B. Hike Tariffs to Help the Poor

It may sound strange, but the best way to help the poor is to hike tariffs. In this way, the poor not being served can receive service, and those with an intermittent water supply can get 24-hour piped water in their homes. Questions of affordability and willingness to pay are best answered by the poor themselves, who invariably declare that they are willing to pay for water, if they get good service.

C. Water as the Entry Point for Development

Water is a basic human need. Improving the lives of the urban poor must start with water and sanitation. Success here will give these people hope and show the way to other development needs, including health and education. Water supply must be integrated into other urban development needs.

D. Water and Culture

The future rests with the young. It is time for them to learn about the ancient links between water, culture, and religion. In this way, they might find again the spiritual qualities of water, and give water—this precious resource—the respect and reverence it had in the past.