



UNDP-World Bank
Water and Sanitation
Program

Toward a Strategic Sanitation Approach:

Improving the Sustainability of Urban Sanitation in
Developing Countries

Albert M. Wright

©International Bank for Reconstruction
and Development/The World Bank
1818 H Street NW
Washington, DC 20433
November 1997

This document is an internal working document published informally by the UNDP-World Bank Water and Sanitation Program. Copies are available from the Program, telephone: 202-473-3970, fax: 202- 522-3228, e-mail: wsp@worldbank.org or www.wsp.org

The World Bank does not accept responsibility for the views expressed herein, which are those of the author and should not be attributed to the World Bank or its affiliated organizations. The findings, interpretations and conclusions are the results of research supported by the World Bank. The designations employed and the presentation of the material are solely for the convenience of the reader and do not imply the expression of any legal opinion whatsoever on the part of the World Bank or its affiliates concerning the legal status of any country, territory, city, area, or of its authorities, or concerning the delimitations of its boundaries or national affiliation.

Acknowledgments

This document reflects the collective experience and learning of many water and sanitation professionals at local, national, and international levels. It is based on operational experience and on the learning that took place in the Informal Institutions Group within the Water and Sanitation Division of the World Bank (TWUWS) and the UNDP-World Bank Water and Sanitation Program.

Many people have contributed to this document. Mike Garn was largely responsible for the adoption of a demand orientation and for the institutional economics underpinnings in the paper. The field work of Ato Brown, Vijay Jagannathan, John Briscoe, Luiz-Claudio Tavares, Aldo Baietti, Andrew Macoun, and of nongovernmental organizations like the Orangi Pilot Project helped in fine-tuning the concepts in the paper. Inputs were also made by Alain Locussol, Letitia Obeng, and Robert Roche. John Kalbermatten, Richard Middleton, Dale Whittington, Donald Lauria, Vijay Jagannathan, and Alexander E. Bakalian made significant contributions to the approach in this paper through portions of earlier versions of the paper which they wrote.

Earlier drafts of the paper benefited from comments from numerous World Bank staff, including Carl Bartone. Comments on the final version were provided by Robert Boydell, John Briscoe, Mike Garn, Brian Grover, Alain Mathys, Mike Seager, Tova Solo, and Luiz-Claudio Tavares. Special thanks are due to Brian Appleton, technical writer, for preparing the draft of the current document; Bonnie Bradford, who developed the outline for this document and helped to finalize the publication; and Suzanne Tesh for editing.

Contents

Foreword	1
Part 1: Past Approaches and Future Directions	2
Inadequate Urban Sanitation.....	2
The growing gap.....	2
Disease and environmental pollution.....	3
Investment shortfalls.....	4
Lessons from the Past.....	5
The supply-driven approach.....	5
Central or local management.....	6
Macro versus micro projects.....	6
Poor system performance.....	6
Unsustainable investments and illusory benefits.....	7
The Way Forward.....	7
Rethinking the approach.....	7
Goals of a strategic sanitation approach.....	8
Underlying principles.....	8
Expected benefits.....	8
Applicability to rural areas.....	9
Part 2: Toward a Strategic Sanitation Approach	10
Goals: Sustainability and Efficiency.....	10
Distinctive Features.....	10
Stakeholder participation.....	10
Incentives and the three Rs.....	11
Lessons of Perverse Incentives.....	12
Operational Implications.....	13
Providing technical support.....	13
Widening technological options.....	15
Assessing sanitation demand.....	19
Unbundling sanitation investments.....	21
Financing and cost recovery.....	22
Adopting a Strategic Sanitation Approach.....	27
Formulating a demand-based policy.....	27
Institutional frameworks.....	29
Strategies for institutional design.....	32
Separation of institutional functions.....	34
Conclusion	37
Notes	38

Foreword

Providing poor urban dwellers with adequate sanitation facilities is a challenge of enormous importance—over half a billion people in urban areas have no services, and much larger numbers have services that provide little protection and degrade the environment. The consequences in terms of health and environmental degradation are enormous with the poor, as always, suffering most severely.

The traditional approach to addressing this problem has been one in which planners and engineers assess the needs of the poor, and then decide what type of service will be provided. This supply-driven approach has seldom been successful.

In recent decades many different approaches have been taken to address the problems of sanitation for the poor. Most approaches calling for radically different technologies have failed. There have, however, been some successes such as the Orangi Pilot Project in Karachi, and field experiences with condominal sewers in Brazil. Surprisingly these have, to a large degree, not involved major departures from traditional technologies. They have been radical in terms of relating to people as consumers, and paying greater attention to the importance of process and institutions.

As documented in this book, these successes have the following common elements:

- paying attention to users' preferences and providing users with the services that they want and for which they are willing to pay;
- unbundling sanitation services into discrete parts (such as household services and trunk services) and providing these components in the

sequence that the users prefer (typically starting from the household level);

- involving the creative use of both non-formal institutions (such as neighborhood associations and nongovernmental organizations) and formal institutions (such as municipalities and utilities) in co-producing services, with each institution providing that part of the service for which it has a comparative advantage (typically feeder services managed by informal institutions, and trunk infrastructure by formal institutions).

The strategic sanitation approach described in this document draws on the experiences and inspiration of a number of "activist technicians"—individuals whose technical training enables them to deliver services, whose creative minds enable them to make projects work in the real world, and whose human commitment makes them the servants of those they serve. Prominent among these are Arif Hasan from Pakistan, José Carlos de Melo from Brazil, and Albert Wright, author of the innovative approaches in Kumasi, Ghana. This document by Albert Wright is an attempt to draw out some of the lessons from the successful sanitation experiences of these and other pioneers, and to make them understandable and, hopefully, replicable by those of us who follow in their footsteps. I hope that we are up to the task.

John Briscoe

Senior Water Advisor
The World Bank

PART 1: PAST APPROACHES AND FUTURE DIRECTIONS

Inadequate Urban Sanitation

During the past several decades, effective strategies have been developed for delivering affordable sanitation services to people living in urban areas in developing countries. In developing countries worldwide, it is becoming increasingly urgent that these strategies be put into practice to close the growing gap between those who have sanitation services and those who do not. The urban poor, the largest group lacking sanitation services, make up more than half the population in many cities of the developing world. The unhealthy conditions of those lacking sanitation cannot be ignored because sanitation-related diseases and polluted water sources often have devastating social, economic, and environmental effects on all urban residents.

The growing gap

Developing country governments and city authorities face a sanitation crisis that is becoming more critical every year. Despite a spotlight on the plight of the urban poor and on provision of clean water for over a decade, both the number and the percentage of people without access to sanitation services continue to increase. In 1990, at the end of the International Drinking Water Supply and Sanitation Decade, 453 million urban people—33 percent of the urban population in developing countries—had no sanitation services. During the next four years investment programs brought new or improved sanitation to 70 million city dwellers, or 48,000 people a day. But in the same four years the urban population in developing countries rose from nearly 1.4 billion to nearly 1.6 billion people. By 1994 the number of unserved people had risen to 589 mil-

lion, or 37 percent of the urban population (see Box 1).¹

While overall urban sanitation coverage (63 percent) may appear high and strides have been made in the past two decades, coverage rates are much lower for the urban poor. Inadequate sanitation is one of the key indicators of urban poverty, and overcrowded and unhealthy living conditions of the urban poor in developing countries are made even more degrading and life-threatening by the lack of adequate systems to dispose of human wastes (see Box 2).

Other characteristics of life in areas where the urban poor live—also known as peri-urban areas, informal settlements, squatter areas, slums, and shantytowns—make the provision of sanitation services particularly difficult. In many cases the poor live in neighborhoods without legal tenure on land that authorities have deemed unfit for habitation. Thus peri-urban neighborhoods often remain officially invisible. Their illegal status means that many of the urban poor are excluded from census counts and live with the daily threat of eviction or slum clearance. The urban poor often are not taken into account in municipal programs to improve or extend services such as water, sanitation, garbage collection, roads, flood protection, fire fighting, health care, and education.

Cramped and precariously constructed housing also creates physical problems in infrastructure development. For example, construction of latrines or conventional sewers is much more difficult in the congested narrow streets and alleys of many peri-urban settlements. Often the land is flood-prone or threatened by landslides, adding to the construction risks.

BOX 1 GLOBAL SANITATION COVERAGE 1990-1994								
	1990 (POPULATION IN MILLIONS)				1994 (POPULATION IN MILLIONS)			
	Total Pop.	Pop. Served	Pop. Unserved	% Coverage	Total Pop.	Pop. Served	Pop. Unserved	% Coverage
URBAN								
SANITATION	1389	936	453	67	1594	1005	589	63
RURAL								
SANITATION	2682	536	2146	20	2789	505	2284	18
TOTAL	4071	1472	2599	36	4383	1510	2873	34

Source: World Health Organization, Water Supply and Sanitation Collaborative Council, and United Nations Children's Fund, *Water Supply and Sanitation Sector Monitoring Report 1996: Sector Status as of 31 December 1994* (Geneva: World Health Organization, 1996).

Disease and environmental pollution

Living conditions in most peri-urban areas put people's health at much higher risk than people living in middle- and upper-class urban neighborhoods. Coping strategies adopted by poor people excluded from public services can increase the health risks and the spread of disease. More than 50 communicable diseases are associated with poor sanitation, resulting in disease and premature death to millions of people, especially children, every year. With no facilities for disposing of garbage and excreta, and limited access to water for basic hygiene, the urban poor are especially vulnerable to epidemics of water-related and vector-borne diseases.

Death rates in urban slums are substantially higher than in wealthier city suburbs or even among the rural poor. Wherever they have been measured separately, health indicators such as infant mortality and the incidence of diarrhea have been shown to be much worse in crowded tenements and squatter settlements than in other urban areas. For example, statistics from Bangladesh suggest twice as many infant deaths per 1,000 live births in urban slums than in urban areas as a whole.²

But the effects of unsanitary conditions in peri-urban areas are not confined to people living in peri-urban neighborhoods. Middle- and high-income residents also have been excluded

from public services and have taken matters into their own hands (see Box 3).

Human and domestic waste from any area has the potential to contaminate not just the local environment, but also groundwater, lakes, and rivers used by many others for supplies of freshwater. Thus the sanitary crisis can take its toll on all city residents, and on the national freshwater resources of developing countries.

Pollution of the urban environment is now seen as one of the major obstacles to sustained economic growth. As agricultural and industrial demand for water continues to grow, the progressive degradation of water resources and the inability to treat and recycle water mean that demand is outpacing supply at an accelerating rate. In industrial countries where treatment is routine, river water may well be reused many times on its journey from the source to the ocean. In most developing countries treatment is minimal or nonexistent and polluted wastewater can render rivers unusable once they have passed through the first city.

Most inland cities have some sewer networks, but few have functioning treatment plants. In Latin America, for example, only about 2 percent of collected sewage receives any treatment. In Mexico more than 90 percent of wastewater treatment plants are nonfunctional, and in cities like Bogota, Buenos Aires, Mexico City, and Santiago some 50 to 60 million cubic meters of

BOX 2 MEASURING THE SANITATION TOLL

The impact of inadequate sanitation on health is illustrated by the findings from a study by the Water and Sanitation for Health Project (now the Environmental Health Project) of the U.S. Agency for International Development. Six diseases were examined that are either widespread in developing countries or are serious problems where they exist.

The results showed that each year there are:

- 875 million cases of diarrhea diseases, of which 4.6 million end in death, mostly among children.
- 900 million cases of ascariasis, of which 20,000 end in death.
- 500 million cases per year of trachoma, of which 8 million end in blindness.

In addition, each year there are 800 million cases of hookworm, 200 million cases of schistosomiasis (bilharzia), and 4 million cases of Guinea worm.

Source: Steven A. Esrey, James B. Potash, Leslie Roberts, and Clive Shiff, *Health Benefits from Improvements in Water Supply and Sanitation: Survey and Analysis of the Literature on Selected Diseases*. WASH Technical Report 66. (Arlington, Virginia: Water and Sanitation for Health Project, July 1990).

mostly untreated sewage is discharged every day into nearby bodies of water.³ Wastewater disposal and sanitation projects for peri-urban populations are often given low priority (see Box 4).

In China, inadequate sewerage and a meager 4.5 percent coverage of municipal wastewater plants have resulted in widespread water quality deterioration. In Jinzhou, Liaoning Province, pollution rendered water from the existing wells undrinkable, necessitating the construction of new well fields at a cost of \$18 million.⁴ Shanghai had to move its water supply intake 40 kilometers upstream at a cost of US\$300 million because of degradation of river water quality around the city.⁵ In Mexico City and Amman (Jordan) new water supply sources have been located far from service areas because nearby sources are polluted.

Investment shortfalls

While the costs of sewerage systems and treatment plants are high, not investing in basic sanitation and wastewater treatment can be extremely expensive. Inadequate sanitation can greatly impact industries like tourism and seafood. Along with overfishing, pollution of coastal waters in northern China is thought to be responsible for a

sharp drop in prawn and shellfish harvests.

Contamination of seafood by sewage has been implicated in a serious outbreak of hepatitis A in Shanghai and in the 1991 outbreak of cholera in Peru. In just ten weeks following this outbreak of cholera, Peru lost US\$1 billion from reduced agricultural exports to the United States and from the collapse of tourism. This loss was more than three times what Peru invested in water supply and sanitation during the 1980s.⁶

The challenge is to invest in programs that bring maximum benefits in health, productivity, and sustainability. In Chile the principal justification for an investment in sewerage in Santiago was to reduce the city's extraordinarily high incidence of typhoid fever in the city and to maintain access to the markets of industrial countries for Chile's increasingly important exports of fruits and vegetables. This paid off. By the time cholera arrived in nearby Peru, Santiago had 95 percent coverage with sewerage and was able to avoid the epidemic.

Access to a convenient source of safe water is often one of the top priorities for the urban poor, and demand for improved sanitation often follows soon afterwards, including ways to dispose of wastewater. Willingness to pay for basic

BOX 3 DAMAGING IMPACT OF SELF-SERVICE

Manila (Philippines) and Jakarta (Indonesia) both have populations of about 10 million. Faced with an inadequate supply of public sewers, middle-income households in both cities have been putting in their own septic tanks. Building regulations require that septic tanks have soil adsorption systems, but this regulation is not enforced. Septic tank owners discharge their effluent into inland waterways through storm drainage systems.

About 1 million septic tanks serve about 6 million people in each city. The capital costs of these systems are high: assuming that each tank costs US\$100, an estimated US\$200 million is invested in these alternatives to public services. The environmental costs are also high. Overflows from septic tanks have polluted the waterways in both cities. In Jakarta, where many industries rely on ground-water supply, there is an increasing risk of groundwater pollution.

While self-provision has addressed private sanitation needs, it has also created costly environmental pollution. Both cities are struggling to find cost-effective solutions to their sanitation problems.

Sources: (Manila) The World Bank, "Manila Second Sewerage Project," Draft Staff Appraisal Report (Washington, DC: The World Bank, February 20, 1996); (Jakarta) Vijay Jagannathan, World Bank, personal communication, 1994.

water and sanitation services is often high in peri-urban neighborhoods, provided that the services are appropriate, effective, and affordable. However, in many developing countries, poorly run urban water utilities have invested in sewerage schemes that do not have any of these characteristics and are unable to operate and maintain services with the inadequate revenues generated.

Lessons from the Past

While past efforts to solve urban sanitation problems have had mixed results, both positive and negative experiences have been used to develop a strategic sanitation approach that is demand-based and incentive-driven.

The supply-driven approach

The most common failing of urban sanitation programs in the past has been failure to take into account the expressed needs of the users (see Box 4). Traditionally, utility planners developed demand projections based on demographic and economic progress indicators. Sector professionals then translated these projections into hypo-

thetical demand for new services and converted this hypothetical demand into project designs based on sewerage and treatment technologies commonly used in industrial cities of Europe and the United States.

Reliance on this supply-driven approach has too often led to investments by governments and donor agencies that suffer from several critical defects:

- The investments are costly both in absolute terms and in relation to the number of people served.
- The main beneficiaries are the richer neighborhoods that can afford the high connection charges, sometimes with the help of subsidies; poorer communities tend to be excluded for both cost and technical reasons.
- The environmental and water resources implications of planned investments are not compared with those of other options, and this can lead to unsustainable projects or projects that are not environmentally sound.
- Investment costs are not recovered, with the result that operations and maintenance, and expansion of services to meet future needs, become impractical.

Central or local management

Institutional approaches have also been dominated by inappropriate models from industrial countries. City water and sewerage utilities in developing countries generally suffer from lack of financial or managerial autonomy, are often overstaffed and underskilled, show unacceptable financial performance, and have little contact with their customers. Budgets are often restricted by central or city governments and agencies may not have the freedom to make use of their own revenues.

Emerging alternatives involve much greater participation of users and other stakeholders in the planning and implementation of water and sanitation projects. For the urban poor, formal or informal partnerships among service providers, nongovernmental organizations (NGOs), community groups, and private sector enterprises offer other ways to develop more realistic and more sustainable programs. The Orangi Pilot Project in Karachi, Pakistan, and experiences with service provision in the *favelas* of Brazil demonstrate the potential for adequately supported communities to introduce, sustain, and expand effective sanitation improvements.

Macro versus micro projects

A major handicap hindering progress in meeting sanitation needs, especially those of the urban poor, has been the scale of projects addressing urban sanitation problems. The high initial cost of such large-scale projects restricts competition for construction contracts to large-scale operators and may inhibit private sector participation.

Costs for connections, sewers, and treatment tend to be bundled together, with cost recovery depending on cost-sharing across many different categories of beneficiaries. The result of bundling together all the elements of sewage collection, treatment, and disposal is that only a small proportion of the investment is used to meet the immediate needs of the unserved. The bulk of the investment is used for trunk sewers or treatment plants that are often underutilized. To recover these costs, charges are high or unsustainable

subsidies are sometimes used to stimulate additional requests for connections. The peri-urban poor are often omitted from such schemes since they cannot afford the high charges.

Urban sanitation programs can be “unbundled” so that smaller-scale projects can bring benefits at an affordable cost to those in greatest need. Investments in expensive trunk sewers can then be financed more equitably through general taxation, sometimes in conjunction with user charges. In addition to benefits in expanded coverage, smaller projects tend to open up competition to more contractors and therefore encourage lower prices.

This does not mean that the macro picture should not be considered. On the contrary, the unbundling should take place after an adaptable strategic macro framework has been defined to sketch out the overall direction for sanitation service provision in the project area. It is important that the strategic plan be done within the context of overall development in order to safeguard the sustainability of vital environmental and socioeconomic resources. It is within such an overall flexible sketch of the future that the unbundling should take place, with sequencing and details of investments in different service zones driven by demand.

Poor system performance

An inevitable result of past approaches to project design and investment patterns has been poor sanitation system performance. Central governments have not had the outreach capacity to handle local operations and maintenance of installed systems. Municipal water and sewerage agencies lack the power and the resources to manage systems effectively on their own. Local users, having been excluded from the planning process, have no vested interest in looking after the systems. Thus well-intentioned projects fall into disrepair and disuse. Through neglect of maintenance, blockages, and breakdowns make services unreliable. Customer complaints cannot be properly handled because of lack of resources, so payments are hard to recover. The

BOX 4 WHOSE SCHEME IS IT?

The supply-driven approach of the traditional sanitation agenda means that investments are wasted because intended consumers simply ignore the resulting systems. For example in Accra, Ghana, after 20 years, only 130 connections were made to a sewerage system designed for 2,000 connections; in Howrah, India, no one was connected to a sewerage system built for workers; in Ma'an, Jordan, there have been only 690 connections to a system designed for 6,000 connections; and in Addis Ababa, Ethiopia, after 10 years, only 10 percent of the expected connections have been made to the new sewerage system.

Sources: Vijay Jagannathan, World Bank, personal communication, 1995; and E.K.V. Dovlo, Managing Director, Ghana Water and Sewerage Corporation, personal communication, 1995.

end result is a downward spiral in service quality, cost recovery, and attention to maintenance, which makes many schemes practically worthless only a short time after completion

Unsustainable investments and illusory benefits

In most urban sanitation programs the combination of inappropriate designs, neglect of user requirements, inadequate maintenance, and ill-equipped operating agencies create a continuous drain on government resources and a disincentive to governments and donors contemplating further sector investment. Users become disillusioned when promised improvements fail to materialize. Malfunctioning or inappropriate systems are unlikely to yield optimum results; disenchanted users who revert back to unhygienic practices because improvements are unreliable will not enjoy optimum health benefits; and projects that continue to drain national resources long after completion will not contribute to economic growth.

But there are some urban sanitation improvement programs that have provided dependable services to a satisfied group of beneficiaries and that have proven sustainable and self-financing. Successful programs have generally relied on extensive user involvement in planning, choice of service levels, scale of investments, charges, and cost recovery structures. These experiences show the way to developing a new agenda. Sustained community involvement should begin at the initial planning phase and should continue through implementation, moni-

toring, and evaluation. Lessons should be fed back into ongoing projects so that corrective changes and adjustments can be made. Women need to be included in all discussions about water, sanitation, and hygiene in order to have an impact at the most important level of all—the household.

The Way Forward

The urgency of the urban sanitation crisis, past failures to respond to the crisis, and the emergence of some successes in the water and sanitation sector have prompted the United Nations Development Programme (UNDP)-World Bank Water and Sanitation Program to consider how to address urban sanitation problems in the future.

Rethinking the approach

The strategic sanitation approach promoted by the Water and Sanitation Program is meant to be flexible and adaptive so it can incorporate lessons from new experiences and innovations in the sanitation sector worldwide. This strategic sanitation approach involves:

- a wider choice of technology options;
- recognition and analysis of consumers' willingness to pay for perceived benefits;
- methods of matching service levels to affordability so as to achieve optimum coverage with economic efficiency;
- innovative financing mechanisms and institutional frameworks, including unbundling of investments into affordable parts; and

- capacity-building initiatives to enable all levels of government and other stakeholders to implement responsive and sustainable programs.

Adoption of strategic sanitation principles has already been seen to deliver results. The examples highlighted in this publication demonstrate that adoption of strategic sanitation principles can generate better projects. As well as enhancing communities' capacities for self-help, the successes achieved have helped build capacity within implementing agencies. Development of skills in participatory approaches equips these agencies to mobilize support in more communities, motivates staff and community members, enhances job satisfaction for agency staff, and helps people to obtain sustainable sanitation services.

Goals of a strategic sanitation approach

The primary goal of a strategic sanitation approach is the sustainable expansion of sanitation coverage. Expansion of coverage has been a major goal of sector investments from the start of the water and sanitation decade in 1981. By adding the word sustainable, strategic sanitation draws immediate attention to a major problem of past approaches—the pursuit of rapid improvements in coverage statistics with little regard for how facilities would be operated and maintained in the long term.

To achieve sustainability, a strategic sanitation approach adds two objectives to sanitation coverage: investment efficiency and operational efficiency. By demonstrating investment efficiency, implementing agencies are more likely to be successful in seeking investments from governments, donors, and private sector financing institutions. To improve investment efficiency, agencies need to transform their procedures to be responsive to customer needs. The starting point is often to recognize that the users of improved sanitation systems are indeed customers. Operational efficiency also requires substantial reform in order to meet targets for cost recovery and produce expected benefits. With operational efficiency, resources can go farther and coverage can be extended.

Underlying principles

Strategic sanitation differs from past approaches in that it is demand-based and incentive-driven. These two key principles reflect experiences in the World Bank and elsewhere that the old supply-driven agenda followed by governments and donors cannot meet the challenges created by rapid urbanization, population growth, industrial development, and concern for the environment. A demand-based approach requires implementing agencies to find out what potential users want and what resources they have to finance and manage installed systems, and to design systems, financing mechanisms, and support structures that are best suited to their needs.

Users may be motivated to select a particular level of service because they are aware of perceived benefits in terms of health, convenience, or environmental improvement; they may also be encouraged through local credit systems, grants, or cross-subsidies. Incentives for operators include a range of rewards and penalties linked to system performance. These may include financial, institutional, or regulatory measures designed to bring success and operator satisfaction and to motivate performance improvements.

Expected benefits

Adoption of demand and incentive principles improves the prospects for enhanced and sustainable coverage, mobilizing previously untapped resources and stimulating productive partnerships among a wide range of stakeholders. By relating project investments to users' expressed needs, implementing agencies can expect better returns. Users who have been involved in making decisions and choosing service levels will contribute their own resources to projects and will pay for reliable services. Subsidies can then be directed at those who need them most, rather than benefiting the rich at the expense of the poor. Greater cost recovery improves the sustainability of the investments and makes it easier to justify further investments for upgrading or expansion.

User involvement also helps foster behavioral changes such as increased hygiene awareness and

BOX 5 THE CASE FOR USER PARTICIPATION

User participation in design, implementation, and management of water and sanitation programs is seen by the World Bank as a way of increasing efficiency, equity, and cost recovery and of facilitating extension of service coverage to poor communities. The Bank's rationale for user participation is summarized as follows:

- User participation makes services and service providers more responsive and accountable to beneficiaries.
- Cost recovery and the sustainability of services improve when technology choices and services correspond with what users want and are willing to pay for.
- Management of services is more effective when institutional arrangements are tailored to local practices.

A Water Supply and Sanitation Collaborative Council Working Group on Services for the Urban Poor highlights other positive aspects, including:

- Creation of new citizens organizations may lead to further independent self-help projects.
- Involvement of nongovernmental organizations can be an effective way of reaching and providing credit to the urban poor.
- Intermediaries can establish links between local stakeholders and water utilities or municipalities, whose function is to manage projects and secure user consensus.

Sources: Gabrielle Watson and Vijay Jagannathan, "Participation in the Water and Sanitation Sector," *Environment Department Dissemination Notes*, Number 15 (Washington DC: The World Bank, June 1995); Water Supply and Sanitation Collaborative Council Working Group on Urbanization "Citizen's Participation," Working Document No. 2 (Geneva: Water Supply and Sanitation Collaborative Council, March 1993).

better sanitation practices that lead to greater health benefits. Local environmental, social, and economic benefits are more likely to result when the intended beneficiaries use the facilities responsibly and ensure that they are properly maintained (see Box 5).

Applicability to rural areas

Do these strategic sanitation principles, developed by analyzing experience with urban sanitation, also apply to rural areas? The answer is a qualified yes. Differences may arise in the application of the approach to rural areas, but in the details rather than the principles themselves. For example, in small villages, the use of sophisticated techniques such as contingent valuation methods for ascertaining demand may not be necessary. The use of other techniques such as focus groups might be used instead. Potential beneficiaries of improved sanitation should still be given an opportunity to decide whether to participate in an

improved sanitation project, and they should be offered a range of feasible technologies with price tags so that they can express their preferences and their willingness to pay.

PART 2: TOWARD A STRATEGIC SANITATION APPROACH

A strategic sanitation approach provides a package of measures that help implementors and funders of urban sanitation programs get the best results from their investments. Such an approach provides guidelines on how to assess the true demand for services—what people want and are willing to pay for. It also stresses the importance of incentives to motivate and direct consumers, service providers, and regulators to act in ways that lead to more effective and efficient investments. Adoption of a demand-based, incentive-driven approach changes the design of finance, technology, and institutional arrangements for sustainable urban sanitation programs.

Goals: Sustainability and Efficiency

The main goal of a strategic sanitation approach is the sustainable expansion of sanitation coverage. The prerequisites for attaining this goal are investment efficiency and operational efficiency. Investment efficiency is a powerful argument for gaining funding support, while operational efficiency helps ensure that available resources are used to expand coverage as widely as possible.

The strategic measures for achieving investment efficiency are:

- Unbundling sanitation investments such as property connections, feeder sewers, trunk sewers, and treatment.
- Utilizing a demand orientation based on what users want and the resources they are willing to use to finance and manage installed systems.
- Designing and installing facilities so that they function according to the designs and cost-sharing arrangements agreed upon with users.

The strategic measures for achieving opera-

tional efficiency are:

- Helping to ensure that the installed facilities are used as they were intended so that beneficiaries gain optimum health and other benefits. This may require awareness raising and hygiene education to modify behaviors and to encourage proper usage.
- Providing for long-term and effective management of the facilities. This includes ensuring that sufficient resources will be available to cover operations and maintenance during the active life of the physical infrastructure.

The driving force for the strategic measures is the incentive structure defined through the institutional arrangements and the overall enabling environment. When all these measures are in place then benefits should match expectations and the expansion of coverage is most likely to be sustainable. In other words, sanitation projects should have the expected health, social, environmental, and economic impacts both for the community and for the public good. Even with optimum cost recovery, benefits should continue to be felt, justifying the cost of sanitation investments and ensuring that they have positive impacts for users and for the environment in which they live.

Distinctive Features

The two key principles of a strategic sanitation approach are that it is demand-based and incentive-driven. In operational terms, the demand-based approach requires stakeholder participation, and the incentive-driven approach requires rules, referees, and rewards.

Stakeholder participation

A demand-based approach is responsive rather than prescriptive. In successful urban sanitation programs, the users and the service agency have

BOX 6 NEW ROLES FOR WOMEN AND FOR MEN

Considerable work has been done during the last ten years on gender issues in water and sanitation. Guidelines from the Promotion of the Role of Women in Water and Sanitation Services (PROWVWESS), the United Nations International Research and Training Institute for the Advancement of Women (INSTRAW), and others emphasize that full benefits only accrue when women have more influential roles in management committees, financial arrangements, and maintenance of installed facilities, and men are encouraged to become more involved in activities such as hygiene education and sanitation. A key point here is that extending women's influence should not also increase their burden. Project contributions in time, labor, and money need to be shared fairly and not expected just of women.

Because it is the potential scope of women's involvement and influence that has been neglected in the past, programs need to concentrate on ways of stimulating and facilitating greater participation by women in decisionmaking, planning, and management. At the same time, the appropriate roles of men need to be taken into account.

Source: Water Supply and Sanitation Collaborative Council, *People and Water: Partners for Life, Meeting Report*, Third Global Forum, Barbados: 30 October - 3 November 1995 (Geneva: Water Supply and Sanitation Collaborative Council, March 1996).

common goals, developed through a consultative process involving all stakeholders. Stakeholders may include local, regional, or national government, public utilities, private service providers, NGOs, local community associations, industrialists, special interest groups, and users of different types of sanitation services. The challenge for governments and donor agencies is to motivate and build the capacity of the different stakeholders to participate in appropriate and productive ways.

For example, peri-urban residents know the problems of inadequate sanitation since they live with them daily, but they may need intermediaries to work with municipal authorities in order to develop trust in other stakeholders and to overcome the fear that formal recognition will lead to sanctions or other institutional interference. With clear guidance on technological options, and freedom to make arrangements for payments and local management of facilities, residents are usually able to help develop affordable and effective solutions.

Women, in particular, need to be involved. They are the principal users and managers of household water and sanitation services. Their

nearly universal responsibility for family health and hygiene makes women critical change agents, but only if they are fully involved in the decisionmaking process. If women are excluded, or involved only indirectly, programs are usually not sustainable and the installed facilities will not be used or maintained in the intended way. Thus gender considerations need to be thought through carefully (see Box 6).

There is growing field experience with successful projects emerging from such participatory approaches. The Orangi Pilot Project in Pakistan (see Box 7) was an early example. The history of the *favelas* of São Paulo, Brazil, also provides evidence that there is a strong intrinsic demand for water and sanitation services among the poor and that with the right financing and institutional arrangements, sustainable services can be provided at affordable costs. The World Bank has provided funding for a growing number of other relevant case studies from countries in Africa, Asia, and Latin America.

Incentives and the three Rs

The second underlying principle of the strategic approach is that incentives can stimulate the

behaviors required from key actors—including users, suppliers, service providers, and government staff—to achieve sustainable expansion of sanitation coverage. Incentives work because they shape the reasons why individuals behave the way they do. Behavior is driven by a perception that the benefits obtained from an action exceed the costs of the resources required to perform it or that the risk of suffering from the behavior is negligible compared to the benefits, so the risk is worth taking.

Incentives can involve the promise of financial rewards or the threat of penalties. They can also involve delivery of new information to change people's perceptions about the benefits of investing in sanitation improvements or about the costs and benefits of breaking rules and regulations. In some instances, they may include opportunities for an individual or community to gain distinction, prestige, or power.

By putting together an incentives package that helps ensure investment and operational efficiency, governments or municipal agencies create an enabling environment for the primary goal: sustainability. The tools used to do this are the three Rs:

- *Rules* governing the interactions within and between enterprises;
- *Referees* who monitor and enforce compliance with the rules; and
- *Reward* and sanctions systems for rewarding compliance and penalizing infringement of the rules.

All three are part of the institutional framework. The challenge of developing a suitable framework for managing investments in urban sanitation improvements is to make sure that each of the three Rs is adequately reflected in the institutional framework and that the combined effect of all three is consistent with the goals of strategic sanitation. Through the three Rs, incentives need to be developed to encourage:

- participation of users at all stages;
- involvement of all stakeholders in appropriate ways;
- competition and private sector participation;

- optimum cost recovery through a sense of ownership;
- management at the lowest appropriate level; and
- transparency and accountability.

Demand-based eligibility criteria for communities include rules that create incentives to participate in government-sponsored projects, as do required commitments by governments, users, communities, and regulations governing the formation of non-formal institutions and access of private and public service providers to sanitation markets. Removing barriers to participation by small private sector enterprises increases competition and creates a financial incentive to reduce complacency and the lack of responsiveness often found with monopolies. This also lowers costs.

Favorable risk-sharing arrangements between government and private enterprises may be seen as a helpful incentive to keeping down costs, but need to be accompanied by appropriate sanctions to maintain the accountability of suppliers to users. Regular reporting of achievements, perhaps accompanied by annual awards or other types of rewards, should not be underestimated as an incentive. The achievement indicators need to be carefully chosen, to avoid the pursuit of coverage at the expense of sustainability.

Lessons of Perverse Incentives

Since the right three Rs package with its incentives depends on local conditions and culture, strategic sanitation does not try to produce a blueprint for universal use. Institutional arrangements, career structures, eligibility criteria, and management approaches should be checked individually and as a whole to ensure that they foster sustainability and economic and operational efficiency. Some guidance may be found in past failures, many of which can be attributed to behaviors driven by perverse incentives.

Incentives are said to be perverse when they are incompatible with the goals of an enterprise or program, and they include misdirected subsidies, unrealistic coverage targets, career struc-

tures based on high-technology designs, credit restrictions on the poor, and bureaucratic and institutional barriers to stakeholder participation. They cease to be perverse once they are corrected, as the following examples show.

- **Misdirected subsidies:** Well-intentioned subsidized tariffs, meant to make it easier for low-income groups to obtain access to improved services, often end up favoring higher-income people who are better equipped to take advantage of them. *Corrective action:* If subsidies are considered necessary, they should be closely targeted, demand-based, and temporary. There will sometimes be a role for subsidies in sanitation programs, for example, if one community's improved services would yield secondary benefits to other communities or contribute to wider goals of health or environmental improvements.

- **Free riders:** Individuals who benefit from public or shared facilities may avoid contributing their fair share to the costs of those facilities, especially when it is difficult or costly to prevent non-payers from gaining access. *Corrective action:* User fees may be charged to the beneficiaries of trunk sewers or treatment plants. If individuals cannot be denied the service when their neighborhood sewers are connected, other sanctions are needed for non-payment. Where sanctions are impractical or costly, the upkeep of common services may be better financed through general taxation than user fees.

- **Shirking:** Similar in its effect to free riding, shirking occurs when some individuals do not contribute their fair share of effort or resources. The result is underinvestment, or, in the case of operations and maintenance activities, a threat to sustainability. *Corrective action:* The shirking problem may be curtailed by creating small work teams and an element of competition. Regular monitoring can encourage careful record keeping and penalties in the form of fines that are assessed at public meetings.

- **Bureaucratic inflexibility:** Public monopolies often have little incentive to improve performance. The result can be poor economic efficiency and lack of responsiveness to consumer needs.

Corrective action: By applying commercial principles, broadening competition, and involving the formal or informal private sector, governments have the opportunity to reduce costs, improve productivity and generate a demand-driven expansion of service capacity. However, the business approach needs to be tempered with accountability, regulation, and regular reassessment of service quality and price.

Operational Implications

In using strategic sanitation as an approach for urban sanitation investments, central and municipal governments need to review the way that they work with urban communities in five areas:

- providing technical support;
- widening technological options;
- assessing sanitation demand;
- unbundling sanitation investments; and
- financing and cost recovery.

Providing technical support

To participate fully in a demand-oriented community-based approach, communities need information, guidance, organizational support, and capacity building. Communities need a clear explanation of the scope of proposed programs, the eligibility criteria, the technical options, the achievable benefits, the financial implications, and the maintenance commitments expected from sanitation system users. Technical support to communities should include organization of community meetings to discuss sanitation problems, allowing residents to reach their own conclusions about the importance of those problems, what they want to do about them, and how the proposed project can help them.

Support agencies also need to explain the range of technology options and the implications of each option in terms of what benefits users will get from each option, the financial and organizational costs, and how their decisions may affect wider environmental improvements on a district- or city-wide basis. Criteria for support must be clear, as must the conditions and period

BOX 7 PAKISTAN: ORANGI'S PEOPLE POWER

The Orangi Pilot Project (OPP) in Pakistan has become a famous example of people empowerment. With the help of an innovative community organizer, Akhtar Hameed Khan, the OPP has built up local organizations able to plan and finance their own latrines and house drains and also to bring pressure on the Karachi municipality to provide funds for secondary and primary sewers.

Initially, the project focused on developing low-cost solutions to the people's strongly expressed wish to rid their environment of excreta and wastewater. Aided by committed OPP architects and engineers, and by providing their own labor, the communities installed in-house sanitary latrines, house drains, and shallow sewers in the lanes and streets at an average cost of about US\$25 per household. Householders contribute their share of the costs, participate in construction, and elect a "lane manager" to represent about 20 to 30 households.

The OPP has led to the provision of sewerage for over 90 percent of the households in Orangi, the largest squatter settlement (900,000 people) in Karachi. It has also demonstrated how people's demands for improvements grow incrementally as the benefits of each step are realized.

Source: Arif Hasan, *Working with Government: The story of OPP's collaboration with state agencies for replicating its Low Cost Sanitation Programme*. (Karachi: City Press, 1997). Copies available from the UNDP-World Bank Water and Sanitation Program, Regional Water and Sanitation Group-South Asia (RWSG-SA), Pakistan Office (P.O. Box No. 1025, Islamabad, Pakistan), or RWSG-SA Regional Office (c/o The World Bank, P.O. Box 416, New Delhi 10003, India).

of any incentives or subsidies. Then it is up to the community, using its own decisionmaking processes, to decide whether to participate and how.

A key message to be communicated to the community at this stage is that incremental improvement is often the most reasonable and realistic option. A choice of a latrine or septic tank is not necessarily a permanent decision. For example, while individual connections into a neighborhood sewer system may not be affordable to community members initially, residents may be interested in and willing to pay for this option in the future.

The importance of understanding operations and maintenance needs is illustrated by the problems experienced by the acclaimed low-cost sanitation project in the Baldia settlement near Karachi. Residents found that the open drains provided to dispose of sullage water were also a convenient outlet for the contents of the vaults of their pour-flush latrines. By discharging these foul wastes into the open drains, households saved on

emptying costs, but created an odoriferous public health nuisance—a high cost to pay.

Once communities understand the options available and the upkeep commitments expected from them, the support team will normally need to help build the capacity for users to look after the installed facilities. This may include helping with the organizational arrangements for local management committees, training local artisans in latrine construction and basic plumbing, sensitizing health workers to the operational needs of household sanitation systems and the behavioral changes needed to obtain optimum health benefits, and providing guidance on financial management to ensure accountability and transparency.

In many cases, government agencies may not be equipped to provide the type of support communities need throughout this process. Experience is needed in community development, low-cost technologies, innovative financing, and participatory approaches. Those skills are more likely to be found in intermediaries such as NGOs or specialist consultants. Many NGOs are

used to working in a participatory way. They can play a useful role in bringing together agency staff, private sector representatives, funding institutions, and community members in focus groups and other community-based fora. The potential of NGOs as supporters of community action has been well demonstrated in the Orangi Pilot Project (see Box 7). The Dominican Institute of Integral Development's neighborhood improvement program in La Zurza, Santo Domingo is another example of the pivotal role of NGOs (see Box 8).

There is a growing and welcome trend for governments and donors to collaborate with NGOs on peri-urban improvement programs and to be willing to adjust their own procedures to accommodate a partnership approach. The World Bank increasingly views NGOs as effective intermediaries on projects that depend on participation and capacity building at the community level. The intermediary functions include:

- facilitating communication between project beneficiaries and government;
- helping to identify and voice community needs;
- supporting participation and group formation;
- training and building the capacity of community groups; and
- helping to channel resources to the community level.

Box 9 lists criteria that can be used to help determine whether a particular NGO is likely to be a suitable intermediary for governments and donors seeking to implement sanitation programs.

Widening technological options

It was once thought that if lower-cost alternatives to conventional sewerage could be found, the problems of sanitation would be solved. One of the lessons from the last two decades is that a lower-cost technology by itself is not sufficient for sustainable investments in sanitation services. There are examples of successful sanitation projects involving high-cost technologies like conventional sewerage, intermediate-cost technologies such as simplified sewerage, and low-cost tech-

nologies such as ventilated improved pit (VIP) and pour-flush latrines. There are also unsuccessful sanitation projects covering the same range of technologies.

Strategic sanitation's emphasis on demand requires consideration not only of lower-cost technologies, but also a wider choice of technological options across the full cost range than was generally the case in the past. A wide range of technologies is already available. The World Bank, bilateral agencies, national governments in industrial and developing countries, and research organizations have done considerable work on innovative technologies, leading to options spanning a broad cost range and with recognized merits and disadvantages depending on local conditions. The comparative cost implications of the three levels of sanitation infrastructure (in-house, feeder, and trunk) and the levels at which demand needs to be assessed and investment decisions taken are shown in Box 10.

Within these categories are some innovative technologies, like the condominal system of small, shallow neighborhood sewers that are being replicated on a large scale in Brazil, and the solids-free sewerage systems used in a number of developing countries, and in countries such as Australia and the United States to reduce sewer diameters, gradients, and consequent costs.

Low-cost options include on-site systems such as VIP latrines, pour-flush latrines, and septic tanks. Communal latrines reduce the land area required and can be sited where geology is most favorable. Pay-per-use communal latrines do operate successfully in some places, though they generally require a subsidy and can present maintenance problems unless responsibilities are clearly defined. In addition to being comparatively inexpensive in capital and running costs, these technologies are well-suited to community management. Latrines remain a popular option where land is available and there is no risk of contaminating groundwater.

However, the congested nature of many peri-urban settlements restricts the space available for pits and soakaways. Geological condi-

BOX 8 DOMINICAN REPUBLIC: NGO DRIVES LA ZURZA IMPROVEMENTS

La Zurza (population 50,000) is a low-income settlement built along the river banks of Santo Domingo, the capital of the Dominican Republic. As in many other low-income neighborhoods, its residents suffer from poor water quality, lack of sanitation, and inadequate food supplies. In addition, a ravine in La Zurza is used as the dumping ground for chemical wastes by 54 industries.

The residents have migrated into the city from all over the Dominican Republic, presenting a real challenge in terms of collective action and community organization. That challenge has been taken up by the Dominican Institute of Integral Development (IDDI), the largest NGO working in urban development in the country. With IDDI's help, the La Zurza residents created their own organization for integrated development of the neighborhood, SODIZUR. A democratically elected non-profit organization, SODIZUR has become a channel for support to self-help activities. It undertakes training and institution building and manages revolving funds on behalf of income-generating micro-enterprises.

IDDI and SODIZUR have mobilized and supported La Zurza residents in a three-stage program to improve their basic services and infrastructure. Based on the residents' own priorities, the program began by consolidating the physical environment, stabilizing slopes, improving pedestrian walkways and storm sewers, and cleaning the ravines. The second stage was physical improvements, including water supply, drainage, waste disposal, housing, and latrines. In the current third stage, new sanitary services are being provided, including communal latrines, showers, clothes washing facilities and public taps.

SODIZUR is coordinating sewer construction and the government has agreed to increase the number of hook-ups for water services and to improve garbage collection. The joint activities of IDDI and SODIZUR have led to the first serious attempt in the Dominican Republic to control and treat industrial wastes. Pressure from the La Zurza collective has resulted in the government agreeing to build a large-scale waste treatment plant near the neighborhood. Industrialists will be forced by a new law to treat their wastes before discharging them into the rivers, under threat of closure for non-compliance.

Alongside the construction program, SODIZUR has its own health program built around the efforts of 86 health promoters from the community. Its objectives include improving environmental sanitation conditions and preventive health care which includes education on personal hygiene.

Source: David Scott Luther, "IDDI: Integral Urban Development in the Dominican Republic," *Voices from the City*, (Arlington, Virginia: Environmental Health Project March 1993).

BOX 9 NGOS AS INTERMEDIARIES

Partnerships involving NGOs, governments, and donors depend on several preconditions. NGOs are often called upon to help implement participatory approaches. Indicators that a particular NGO meets this precondition include:

- a flat management structure with decentralized authority;
- organizational structures at the community level for decisionmaking;
- use of iterative planning, involving consultations with local communities;
- contributions of cash, labor, raw materials, or local facilities by community members and organizations, making them clients rather than beneficiaries of the NGO;
- staff recruitment criteria, incentives, and training that support participation;
- strong field presence outside metropolitan areas with a high proportion of staff of local origin;
- positive perceptions of the NGO by community leaders and members; and
- turnover of client groups as they “graduate” over time and intensive field attention is turned to new groups.

In some cases the qualities that make NGOs suitable as intermediaries are incompatible with government and/or donor requirements. In the Zambia Squatter Upgrading Project, for example, it was agreed in principle to pursue long-term community development goals by promoting active beneficiary participation. However, a stipulation was included that if the collective self-help approach to be used by the two intermediary NGOs interfered with the predetermined project schedule, then contractors would be employed to carry out the work.

Unless procedures are made more flexible and both the government and its donors are committed to supporting participatory processes, the NGO is pressed into a service delivery rather than a capacity-building role. Project priorities need to be changed to provide greater flexibility in the timing and scale of implementation and alternative procurement procedures which allow NGOs to design and implement their own programs.

Source: Thomas Carroll, Mary Schmidt, and Tony Bebbington, “Participation and Intermediary NGOs,” The World Bank, *Environment Department Dissemination Notes*, Number 22 (Washington, DC: The World Bank, June 1995).

tions such as rocky ground, steep slopes, too much clay, or a high water table, may also mean that on-site household systems are inappropriate. In some cases, it may be possible to organize an effective system of latrine emptying and waste disposal (see Box 11). However latrine emptying technologies are generally not appropriate for peri-urban areas and the handling and transport of fresh excreta can be a public health hazard.

In crowded low-income areas, conventional sewer construction is difficult and costly. Few peri-urban communities can afford it, and there

are many examples of well-intentioned sewer schemes that have proven ineffective. Alternative, intermediate cost sewers are increasingly seen as the most appropriate choice for carrying away the effluent from household systems such as pour-flush toilets or septic tanks.

Innovative technologies include the condominal systems (see Box 12) that have proven highly successful in northeast Brazil and are being replicated on a large scale. Other innovative options include simplified sewerage in which modified design parameters allow the use of

	In-house Infrastructure	Feeder Infrastructure	Trunk Infrastructure
Examples	In-house plumbing Pour-flush toilets Septic tank systems House sewers	Public sanitation facilities Street sewers (lateral or feeder sewers) Single neighborhood treatment plants	Trunk sewers Interceptor sewers Multi-neighborhood sewage treatment plants
Ownership	Households	Public or neighborhood	Public
Beneficiaries	Households	Households served or connected Neighborhood served	Neighborhood served or connected Local government, city, or municipality
Transaction costs	Low	Medium	High
Economies of scale	Low	Medium	High
Relative level of sunk costs	Low	Medium	High
Level for demand assessment	Household, independently	Neighborhood, collectively	City-wide, by local government
Level for investment decisions	Household, independently	Neighborhood, collectively; or local government	Local government

BOX 11 KENYA: LATRINE EMPTYING IN NAIROBI

The Kenyan Water for Health Organization (KWAHO) helped poor residents in a Nairobi informal settlement to establish a latrine emptying service for which they were willing to pay in advance.

Kibera is Nairobi's largest peri-urban settlement, with a population of 400,000 located on 110 hectares of high-density rental housing. With KWAHO's help, residents built ventilated improved pit (VIP) latrines and needed a way to dispose of the resulting waste. The Norwegian Agency for Development Cooperation (NORAD) provided support for a special suction truck able to maneuver its way through the narrow streets and empty the pit latrines regularly. A 13-member community management team oversees the operation. During the first half of 1991, more than 6,000 households paid the US\$9 advance fee to have their home latrines emptied.

Source: David Kinley, "KWAHO's Urban Challenge." *Source*, (New York: United Nations Development Programme, July 1992).

smaller, shallower pipes, and buried boxes to replace manholes, as well as solids-free sewerage in which an interceptor tank, designed like a septic tank, discharges only liquid waste into pipes that can therefore be small and use shallow gradients. Regular upkeep of these systems is as critical as for low-cost options. Simplified sewer systems do become blocked and need periodic clearing out; solids-free sewerage involves regular emptying of the interceptor tanks.

Assessing sanitation demand

A demand-based approach to planning is responsive rather than prescriptive. Stakeholders must be drawn into all stages of the decisionmaking process, starting with the assessment of sanitation demand. Instead of governments or service utilities deciding which peri-urban communities should be provided with what type and level of service, the decision is made jointly. The initiative may come from the communities, the utilities, or the government; but, as a rule, the decisions on investment choices are best reached through consultations and negotiations among all interested beneficiaries. Even where the investment costs are entirely borne by a private entity or by users, local government consent is imperative to ensure that vital public interests are safeguarded by ensuring that adequate downstream structures are installed to avoid environmental pollution.

The desired end result of the participatory planning phase is that all stakeholders agree on a package of investments that they are convinced will be sustainable. The Kumasi Sanitation Project (see Box 13) and many other programs have shown that users are willing to make significant contributions to programs that they have helped to design and that meet their needs.

In one scenario, implementing agencies set demand-based eligibility criteria. For example, communities may be required to contribute to project costs and to finance or manage operations and maintenance. Other need-based criteria such as health and poverty indicators or distance to water sources may be used to prioritize regions, but only for communities that have indicated a willingness to meet the demand-based criteria. Incentives may also be used to stimulate demand in less enthusiastic communities if there is a wider public interest in improving sanitation services.

To gain fully from the participatory process, all participants have to understand the implications of the options open to them. The implementing agency should be the one responsible for making clear what technology options are feasible, at what costs, the financing packages that may be appropriate, and the kinds of institutional arrangements needed to manage the different options. The first step is to identify which tech-

BOX 12 CONDOMINIAL SEWERAGE

Developed by the Brazilian engineer José Carlos de Melo, the condominial system saves on both household and trunk sewer costs. It replaces the conventional house connections into deep main sewers with shallow feeder sewers running through the backyards of neighborhoods. Because the feeder sewers are shallow and there is only one main sewer connection per block, the main sewers can also be much more shallow, saving on time and costs.

In northeast Brazil, families are being offered choices to continue their present system (usually a holding tank discharging into an open street drain) or to connect to the conventional waterborne sewerage system, or to connect to the condominial system. Charges for the conventional system are about three times those for the condominial system. The business-as-usual option tends to become unworkable as more and more residents join the condominial system, because once connected, the residents fill in their sections of the open drain and the outlet for holding tank waste is no longer available.

A big attraction of the system is that it has a self-motivating element in terms of system operations and maintenance. If one household drain blocks, neighbors quickly bring it to the attention of the user and the blockage is quickly cleared. In fact, actions such as putting solid waste down the toilets become much less frequent as users get used to the system. The formal sewerage agency remains responsible for looking after the trunk sewers, but in northeast Brazil, where the condominial system is being widely replicated, users are well able to look after the plot systems. That brings the agencies' operational costs down substantially.

Source: The World Bank, *World Development Report 1992: Development and the Environment* (New York: Oxford University Press, 1992).

nologies are technically feasible and what each feasible option would cost. Fortified with details of each possible technology package, the implementing agency needs to guide and motivate target communities through participatory consultations. The question of how the costs may be shared is also critical. Circumstances often vary widely across a project area and judgments on the affordability of the project depend on how much intended beneficiaries are thought to be willing to pay for various potential levels of service.

Well-designed willingness-to-pay (WTP) surveys in representative communities can help answer these questions, although they do require considerable expertise. People are asked to compare and put values on services of which they may have little or no experience; views may vary widely between and within areas of cities. Researchers have to be sure that they are obtain-

ing realistic responses rather than optimistic aspirations. Care is needed in sampling and in extrapolating the results to the city beyond the communities surveyed. As experience with WTP surveys grows in sanitation and other sectors, it is becoming more clear that a range of methods can be used to produce dependable results. For small homogeneous communities, a formal WTP survey may not be needed. Other community consultation methods such as focus groups, key informant interviews, and participatory evaluations may be used to obtain this type of information more economically.

From the WTP data, stakeholders can develop an overall sanitation plan covering household services, neighborhood services (feeder sewers), and city-wide services (trunk sewers). Within that plan, proposals for individual communities can be based on cost options for discussion with

intended users. The next part of the process is to enable the users to determine for themselves which options they want to see implemented, accepting the financial and institutional implications of that choice. It is not enough to discuss investment options with local civic leaders. All members of the community need to have input into the discussions.

Unbundling sanitation investments

One major constraint hindering expansion of conventional sewerage services is the “lumpiness” of the necessary investments—property connections, feeder sewers, trunk sewers, and treatment. Big projects incorporating all elements of the process also restrict competition to large-scale operators and may inhibit private sector participation. Unbundling is a way of dividing investments into more realistic and more manageable components. A balance is needed between achieving economies of scale and benefiting from increased competition, but the evidence is that unbundling can lead to progress on different elements of a city-wide sanitation program that would likely have been stalled if financed and implemented as a single package.

There are two forms of unbundling: horizontal and vertical. In horizontal unbundling, services are subdivided geographically. A large city may be divided into two or more zones, each with its own self-contained sanitation services. Unbundled systems may also be linked, for example, at a treatment works or long outfall. Decentralized sewerage is an example of horizontal unbundling that is particularly appropriate in areas with flat terrain and high groundwater tables. Dividing such areas into self-contained zones eliminates the need for expensive pumping stations and interceptor sewers required to serve the whole area with a conventional sewerage system.

An example of horizontal unbundling occurs in the Philippines. In the course of privatizing water supply and sewerage services for the capital city of Manila, the metropolitan area has

recently been horizontally unbundled into two parts for the supply of both water and sewerage services. The bid documents stipulated that bidders were free to submit bids for both service zones; however, only one of the two service areas would be awarded to any one bidder. Accordingly, the concessions have been awarded to two different companies. In another World Bank-financed sanitation project in the Philippines, it has been stipulated that the sewerage systems should be horizontally unbundled in order to reduce the number of pumping stations and pumping costs (see Box 19).

In other sectors, the principal benefit of unbundling is creating more competition in a free market. In the sanitation sector, there is another big advantage of horizontal unbundling: division into zones reduces the average diameters and average depths of sewers when compared with a single centralized system. As these are the two major cost elements (along with the length of sewers), it follows that horizontal unbundling is likely to be sound economically wherever it is technically feasible. The example of sanitation districts in Los Angeles County in the United States demonstrates both horizontal and vertical unbundling (see Box 14).

In vertical unbundling, programs are divided according to the scale and cost of the components. Vertical unbundling has been used successfully in other types of infrastructure such as electricity supply and telecommunications. In the sanitation sector, a good example is the condominium sewerage schemes in Brazil (see Box 12). Items such as trunk sewers, which have high sunk costs, are financed separately from lower-cost neighborhood feeder sewers. The division may apply both to the design and construction phase and to the operations and maintenance of the systems. There may be further subdividing to permit community-managed schemes to connect into publicly or privately operated sewerage systems. This type of unbundling can add considerable flexibility to the methods of financing urban sanitation, and make connection affordable for poor communities through an equitable form of cross-

BOX 13 GHANA: STRATEGIC SANITATION IN ACTION

Since 1991, the Kumasi Sanitation Project in Ghana has applied a strategic sanitation approach to develop a flexible strategy for urban sanitation in a city of 770,000 people in which 75 percent lack adequate sanitation services. With assistance from the regional UNDP-World Bank Water and Sanitation Program office in Abidjan, the Kumasi Metropolitan Assembly has adopted a demand-oriented approach that differs from previous agency-led initiatives by:

- tailoring recommendations on technical options to each type of housing in the city;
- considering user preferences and willingness to pay;
- using a relatively short planning horizon (10-15 years), emphasizing actions that can be taken now; and
- breaking the overall plan into projects that can be implemented separately but incrementally providing total coverage.

The starting point was a pioneering survey on willingness to pay for improved sanitation services. The survey showed that most Kumasi households were willing to pay more for improved services, but that potential revenues were not large. Massive subsidies would be needed for conventional sewerage, but relatively large coverage could be achieved with modest subsidies by installing KVIPs (Kumasi Ventilated Improved Pit latrines). The survey also revealed that the poorest people, who used public latrines, were paying more for sanitation than those with household systems. They were willing to pay even more to have improved home sanitation.

The resulting US\$28 million sanitation plan (1991-2000) includes US\$15 million for home latrines (10 percent financed by users), US\$9 million for sewers in tenement areas (no user finance), US\$3 million each for school and public facilities, and US\$1 million for support to the Waste Management Department. Unit costs are US\$31 per capita in the lower density housing area (population 470,000) and US\$53 per capita in the tenement housing area (population 170,000). Public latrines are to be under private sector management franchises.

Source: Dale Whittington, Donald T. Lauria, Albert M. Wright, Kyeongae Choe, Jeffrey A. Hughes, and Venkateswarlu Swarna, *Household Demand for Improved Sanitation Services: A Case Study of Kumasi, Ghana*, UNDP-World Bank Water and Sanitation Program (Washington, DC: The World Bank, May 1992).

subsidy. Residents of low-income peri-urban communities need not share in the costs of a trunk sewer system when their immediate priority is the privacy, convenience, and amenity value of household sanitation.

In strategic sanitation, vertical unbundling is particularly useful in reaching the urban poor with affordable sanitation services in an incremental way. By separating decisions on in-house improvements from those on neighborhood feeder systems and on city-wide trunk systems, unbundling allows a clear link to be made between immediate benefits and costs. Investment can be made one step at a time, starting with the

home. Three vertical technology levels exist in an urban sanitation project (see Box 15).

Financing and cost recovery

User charges are at the core of strategic sanitation finance. That does not necessarily mean that user charges provide the bulk of the financing. It means that users are encouraged to contribute according to their willingness and ability to pay for the services that they have chosen as best meeting their needs.

In contrast, past approaches to urban sanitation improvements have usually been based on city-wide, donor-financed megaprojects that

attempt to address all the problems at once with little recognition of true priorities or user demands. In such projects the assumption that users do not have the means to pay for the full costs has generally gone untested and widespread subsidies have been provided in order to get projects off the ground. The result has been unsustainable programs achieving only minimal increases in coverage. When users were charged, expected levels of user payment were often based on rules of thumb, for example, that households could afford to pay up to 5 percent of their income for water and sanitation services combined. Experience and research have shown that such rules of thumb are unreliable and do not provide a sound basis for estimating revenues or residual financial requirements.

The demand-driven approach of strategic sanitation provides a way to think through how the costs of sanitation can best be shared. It also provides reliable information on the value that users place on sanitation improvements and on their willingness to pay for those benefits. This information generally shows that individual households place a relatively high value on sanitation services that provide them with a private, convenient, and odor-free facility that removes excreta and wastewater from the property or confines it conveniently within the property. Because of this, many peri-urban residents are willing to pay to cover the costs of on-site systems or a combination of private sanitary facilities and connection to a sewer close to the dwelling. There is also frequently sufficient value attached to removing the waste from blocks and neighborhoods for groups to justify organizing collective payments for these improvements or even for treatment to render the wastes innocuous. Similar reasoning applies at the city and water basin level.

This way of thinking about cost recovery leads to a model for financing sanitation improvements.

- Households pay the bulk of the costs incurred in providing on-site facilities such as bathrooms, toilets, septic tanks, and on-site sewer connections.

- Residents of a block collectively pay the additional cost incurred in collecting the wastes from individual houses and transporting these to the boundary of the block.
- Residents of a neighborhood collectively pay the additional cost incurred in collecting the wastes from blocks and transporting these to the boundary of the neighborhood (or in treating the neighborhood wastes).
- Residents of a city collectively pay the additional cost incurred in collecting the wastes from blocks and neighborhoods and transporting these to the boundary of the city (or in treating the city wastes).
- The stakeholders in a river basin or groundwater source—cities, farmers, industries, and environmentalists—collectively assess the value of different levels of water quality they wish to pay for, and agree on the assignment of financial responsibility for treatment and water quality management costs.

These financing principles are now being closely followed and selectively implemented in a number of countries. Most frequently, the financing challenge is to identify appropriate cost-sharing arrangements for strategic sanitation plans for some neighborhoods in a city. Examples of such investment programs for service provision and for broader river basin management of water quality are in place in Brazil, Ghana, Pakistan, the Ruhr River Basin in Germany, and in all major river basins in France.

Direct user payments. Are users willing to pay for sanitation improvements? Experience and research give a qualified yes to this question. The major qualification is that user willingness to pay extends to those benefits that users perceive and are able to internalize. User willingness to pay may not be sufficient to pay the full costs of systems, including trunk sewers and treatment. In these cases, complementary finance will be required to ensure the sustainability of services.

In urban areas where users have played a significant role in the determination of costs through their own choice of levels of service—

BOX 14 UNITED STATES: UNBUNDLING

The Sanitation Districts of Los Angeles County (SDLAC) is an alliance of 27 special districts under one administration. The basis of the special districts is the county Sanitation Districts Act of 1923, which provides that geographic drainage areas, rather than political boundaries, should be the determining factor delineating sanitation districts. A sanitation district may include single or multiple municipalities and unincorporated areas, or combinations of both. The sewer service area of the SDLAC is about 770 square miles (1970 sq. km) and encompasses 79 cities and unincorporated areas. It has a population of five million and wastewater flows ranging from 0.1 mgd (million gallons per day) to 365 mgd.

Community-level sewer systems (laterals) are the responsibility of individual communities that may take care of the systems themselves or enter into a contract with the LAC Department of Public Works. There are 11 satellite sewage treatment facilities treating sewage from some of the communities. The treated wastes are used for such things as irrigation of highway landscaping and golf courses.

Most of the effluent flows to a sewer network that has about 1,000 miles (1,600 km) of trunk sewers and 48 pumping stations. Wastes are treated in a joint wastewater treatment plant and five water reclamation plants. This is an example of vertical unbundling. In the same area, horizontal unbundling also takes place. Two separate agencies operate trunk sewer systems. The City of Los Angeles takes care of wastes from communities within the city boundaries; the SDLAC looks after the area outside the city and a number of smaller communities surrounding the city.

Source: Office of Information Services, Sanitation Districts of Los Angeles, "Joint Outfall Systems, Master Facilities Plan," Volume 1, Issue 1, March 1994.

such as the Orangi project in Pakistan, the Kumasi project in Ghana, and the PROSANEAR project in Brazil—user willingness to pay has generally been sufficient to cover the costs through direct payments and complementary payments through block and neighborhood groups. These experiences point to one major conclusion regarding user payment: user willingness to pay should be tested before considering cross-subsidies from other user groups or external provision of funds.

Is it necessary that all direct user payments be in cash? The answer is a qualified no. The qualification is necessary because in-kind payments need to meet two additional conditions to be as good as cash. First, the provision of in-kind services must be voluntary to count as a valid indicator of willingness to pay. In practice it is

sometimes difficult to determine whether or not this condition is met. Second, the provision of in-kind services must tangibly reduce the real financial cost of providing the service. The value to be assigned to in-kind contributions is the cost-reduction achieved. There are numerous examples of the willingness of users to provide in-kind services during construction of facilities and their subsequent operation. The willingness tends to be greater during the construction phase and becomes more difficult to sustain in the operations phase.

Is household borrowing to finance user payments acceptable? Yes, and in fact the most effective systems for ensuring appropriate user payments for sanitation improvements have been those that insist on front-end payments for construction and access to the service. Availability of

BOX 15 VERTICAL TECHNOLOGY LEVELS

- In-house infrastructure involves household level systems such as latrines, toilets, septic tanks, and house drains. The facilities are located at the point where the waste is generated and the benefit is to the individual householder. There are many separate installations scattered throughout the community. In comparison with other levels of investment, in-house systems have the lowest sunk costs. Household value judgments are straightforward, because benefits are direct. Market forces apply and there is great scope for privatization of service provision, with competition bringing cost savings. In some peri-urban settlements, lack of secure property rights may be an important issue inhibiting individuals from making investments.
- Feeder infrastructure relates to the neighborhood sewers or collection systems shared among occupants of a street or block of houses. The users have common interests in ensuring that the systems function properly. Decisionmaking and payment for feeder systems needs to be shared among the beneficiaries. Sometimes this may come about through a local agency responding to collective demands from groups of users. Incentives may be relevant as a means of stimulating demand, particularly if there is a need to spread the costs of trunk sewerage at a later date. Economies of scale begin to emerge, but sewer systems have higher costs than household sanitation. Market forces and private sector involvement help to keep down costs. Peer pressure encourages reluctant neighbors.
- Trunk infrastructure includes mains sewerage and treatment works serving an entire city or region. The large scale of the operation means high costs and appropriate economies of scale, but savings can be offset by restricted competition. Trunk systems are remote from users, who may not readily appreciate the benefits. Accordingly, user charges may not be the best way to recover investments. Decisions generally need to be made at the city government level, and operations and maintenance may be best funded through general city taxation. Privatization or other forms of private sector involvement are possible, with a need for regulatory safeguards.

credit to spread the front-end costs over time contributes to the willingness to pay for improvements or to seek access to existing improved systems. Though it relates principally to rural water supply, the Grameen Bank in Bangladesh is an example of such a system working to everyone's advantage (see Box 16).

One very successful example in the sanitation sector is the credit system in Lesotho's low-cost urban sanitation scheme (see Box 17). That system is based on treating a VIP latrine as a consumer item to be purchased through commercial credit. It is operated by the parastatal Lesotho Bank, which borrowers recognize as an efficient commercial institution. Poor repayment rates on other credit schemes were attributed to

borrowers recognizing the government's inefficiency in pursuing defaulters.

Unfortunately, borrowing does not work well in all cases. Credit is not available at a reasonable cost to many of the people who need it most. Where credit is available, repayment experience may be sufficiently poor that the capital base of the lending organization becomes depleted and needs periodic replenishment. The risk premium may be so high that the cost of the funds outweighs the advantage of borrowing.

Collective payments from block and neighborhood groups. Either traditional, non-formal kinship groups or non-governmental civic organizations may be effective in providing

BOX 16 BANGLADESH: GRAMEEN BANK'S CREDIT FOR THE POOR

The Grameen Bank is well known as a provider of credit to more than 2 million poor and landless people in Bangladesh. A large proportion of the clients are women. The bank's great innovation has been to find an alternative to traditional forms of collateral. The key principle is that if any borrower defaults, the group to which that borrower belongs is no longer considered creditworthy and is no longer eligible for loans.

In recent years, the lending of the Grameen Bank for rural water supplies has risen dramatically. Since early 1992. The bank has provided loans for about 70,000 tubewells. In 1993, it lent about US\$16 million. The interest rate charged on loans for tubewells is 20 percent, repayable over two years in weekly installments. The handpumps are procured locally by the borrowers, either from the Public Health Engineering Department or from local private manufacturers.

Source: UNICEF data as cited in: Ismail Serageldin, *Water Supply, Sanitation, and Environmental Sustainability: The Financing Challenge*. Directions in Development. (Washington, DC: The World Bank, 1994).

communal services and organizing collective payments. Some institutional researchers point to difficulties in exercising group decisionmaking and in interpreting group decisions. For example, how representative are the decisions of group consensus, and how strong is the commitment of individual members of the group to the group's decisions?

In the Orangi case, neighborhood groups helped provide finance for neighborhood collection systems. They also became strong enough to encourage additional government financing for trunk sewers to supplement the neighborhood systems. In both Orangi and PROSANEAR, the groups were able to persuade more individual residents to sign on to the less costly neighborhood schemes, and to keep them clean, than the existing sanitation organizations had been able to do. Neighborhood groups were also instrumental in convincing the technical staff of these organizations that cheaper systems could work well, at costs that households were willing to pay.

Collective payments from local and national governments. Directly or indirectly, the government participates in the financing of sanitation services in virtually all countries. Governments supplement user payments for sani-

tation through direct and indirect financial support to users and through allocations of funds for investments and operations. They mobilize financial resources for this support predominantly through taxes and by controlling credit allocations from financial institutions, internal and external borrowing, and external grant sources.

On average during the last half of the 1980s, governments allocated finances amounting to about half of one percent of GDP to the water and sanitation sector in developing countries, with less than half this amount going to finance sanitation.⁷ Whether this aggregate amount is the correct one will not be addressed here. What will be discussed are the rules under which government finances are utilized, how they are allocated, and their impact on achievement of sector objectives and sector performance.

The financial premise of the strategic sanitation approach is to base financial requirements on what is worthwhile to finance, rather than assuming that if something can be financed, it is worthwhile. Government finance has been extensively used in the past as a substitute for user charges and has benefited those who already have access to services, rather than compensating service providers for the external benefits of extending services to users who are not willing or

BOX 17 LESOTHO: CREDIT FOR VIP'S

The low-cost urban sanitation program in Lesotho has achieved a remarkable degree of sustainability by recovering all the costs of VIP latrine construction from users. It does so by promoting the latrines as valuable consumer items and by providing commercial loans through the parastatal Lesotho Bank.

Loans are arranged by the project team, which also helps users to find a qualified builder. Normal interest rates apply and loans are repaid in 20 installments over 24 months, leaving out December and January, when Christmas expenses and school fees often deplete household budgets.

Source: Isabel C. Blackett, *Low-Cost Urban Sanitation in Lesotho*. UNDP-World Bank Water and Sanitation Program, Discussion Paper Series, Number 10, (Washington, DC: The World Bank 1994).

able to pay the full cost. One outcome of this policy has been a continuing reluctance to extend service coverage to the poor. Somewhat paradoxically, this policy has also resulted in relatively little expansion of treatment facilities to protect water sources and insufficient maintenance of existing facilities for those with connections.

In most countries, more financial support has come from central government than from local government. This may be partly justified if central government tax collection is more efficient and if central government can mobilize greater external financial resources. On the other hand, when urban areas with waterborne sewerage systems do not pay the costs of the trunk networks that remove the liquid waste from the immediate urban environment, this benefit is being paid for by others who do not generally benefit from it. Local urban governments generally do not object to this arrangement because, if they are lucky enough or powerful enough to get these facilities paid for by others, they do not have to raise their own direct taxes, such as property taxes. This contributes to the inefficiency in sanitation finance, since such local direct taxes would more efficiently link payment to benefits received.

A further irony of this arrangement is that urban governments (since they do not generally repay the central government for the assets provided) consider any income from users in excess of operations and maintenance expenditures as net revenue, even though sanitation charges do not come close to full cost recovery. Since this net

revenue is often a discretionary fund for local government, it can be used to finance shortfalls in other local expenditures rather than being reinvested in the improvement of sanitation services.

Adopting a Strategic Sanitation Approach

Two sets of actions are required in adopting strategic sanitation: formulation of a demand-based policy, and development of an institutional framework to provide the incentive structure to induce the key players in the sector to implement the policy. The sectoral and project-level institutional framework should be in place before attempting to implement the demand-based approach. It should be adaptable and able to respond to new developments and lessons from experience. See Box 18 on the adaptive approach being used in the PROSANEAR project.

Formulating a demand-based policy

National and municipal governments and service utilities work within agreed-upon budgets. They need rolling programs and priority criteria to forecast investment needs and to assign funds. Some elements of the demand-based approach may appear to inhibit accurate planning: if investment is to be demand-driven, how can agencies know in advance where and to what extent investments should occur? The answer is that dynamic financial planning modeling (for

BOX 18 BRAZIL: APPLYING PLANNING INNOVATIONS IN PROSANEAR

The Water and Sanitation Program for Low-Income Urban Populations (PROSANEAR) project in Brazil is investing US\$100 million to provide water and sanitation infrastructure to about 800,000 people in low-income areas in eleven cities in different regions.

Participation should be tailored to the population. The PROSANEAR project has taken a variety of approaches to involve beneficiaries in the design of subprojects. In one approach, leaders of community organizations are consulted on basic choices, and the details are then worked out with actual beneficiaries. In another approach, agreement is reached between design engineers and beneficiaries directly, in consultation with community leaders and organizations. In both approaches, conflicts of interest between the water company and community-based organizations are resolved through negotiation, with the project design consultant as facilitator. Preliminary data indicate that these two approaches have dramatically lowered per capita investment costs and increased the sense of project ownership among communities.

Engineers need to adapt. In PROSANEAR, the participatory process has directly affected the kind of engineering advice used. For example, water companies were required to award project design consultancies to a consortium of engineering firms or firms working with nongovernmental organizations that specialize in community participation. The supervision team at the national level encouraged project design consultants and water company engineers to discuss plans with beneficiaries before agreeing on final proposals.

Donors need to adjust their practices. The Brazilian project was approved by the World Bank without blueprints of targeted service levels or delivery systems. Instead, the appraisal reports provided broad principles for project execution and indicative targets for benefits and costs, leaving much of the design to be developed during implementation. The external donor must provide intensive supervision to work out details of the subprojects as chosen by the communities and to monitor and evaluate implementation. Experience so far shows that these learning-intensive, participatory projects can reduce capital costs, although they also entail increased investment of staff time from the donor.

Adapted from: The World Bank, *World Development Report 1994: Infrastructure for Development*, (New York: Oxford University Press, 1994).

local government demand), consumer demand studies (for demand at the household and neighborhood levels), and eligibility criteria linked to the strategic use of incentives not only overcome this apparent problem but in fact lead to more dependable forecasting of resource needs.

Willingness-to-pay consumer surveys provide planners with the type of demand-based data needed to assess likely user choices without prescribing solutions for individual communities. When the sample includes households from all income levels, planners can extrapolate with confidence. From the aggregated data, analysts can predict the take-up rate for different options accurately enough for preliminary budgeting and procurement planning, while still allowing individual communities to make their own decisions later. This helps planners to rule out inappropriate investment options and help avoid waster investments in expensive sewer networks for which cost recovery cannot be achieved.

The take-up rate for household systems, feeder networks, and trunk sewers is also a useful basis for unbundling proposed investments into affordable packages and for developing alternative financing methods for different services.

Though need-based criteria such as health and poverty indicators, water scarcity, and environmental degradation may still guide planners to selections of regions to be served first, the simultaneous occurrence of both user and local government demands in the same geographical area should be the main criterion for determining investment priorities within cities. Demand-based criteria may include commitments to pay a high proportion of costs, to undertake maintenance commitments, and to institute self-help hygiene improvement programs. This criteria helps planners to avoid risky investments and to forecast cost recovery and support needs.

Institutional frameworks

The key functions of agencies in the sanitation sector are policy formulation, regulation, investment, operations and maintenance of sanitation facilities, and the commercial activity of supply-

ing customers with desired sanitation services. Traditionally, these functions have been carried out in many developing countries in a supply-driven way with a high degree of centralized control, little local accountability, and little involvement of consumers. The consequence has been failure to cope with the growing problems of urban sanitation.

Until recently, capacity building and improvements in administrative procedures were considered the most important elements needed to boost institutional performance. Experiences at the World Bank and elsewhere suggest that such efforts may have little or no long-term effects on performance, unless they are accompanied by changes in the internal and external incentives and constraints that staff face. People need to be motivated to use their improved skills and improved administrative procedures.

A demand-driven approach requires new types of institutional arrangements. Roles and responsibilities need to be shared differently among the many stakeholders and with different regulatory and enforcement needs. The goal of the institutional framework in strategic sanitation is to create incentives that are compatible with the goals of investment and operational efficiencies. Incentives are needed for participation of users at all stages, for transparency and accountability, for management at the lowest appropriate level, for use of a step-by-step approach, and for competition and private sector participation. When institutional goals and incentives are well matched, individuals make decisions that produce outcomes that are both personally and institutionally rewarding, generating net benefits for all.

Minimizing transactions costs. In developing an appropriate institutional framework, one of the prime considerations has to be transactions costs, the operating costs of the institutions. Transactions costs are unavoidable; the aim is to keep them as low as possible consistent with operational goals. They include coordination costs, strategic costs, and information search costs.

Coordination costs arise from the time and effort used to negotiate, monitor, and enforce

BOX 19 PHILIPPINES: DESIGNING PROJECTS FOR STRATEGIC SANITATION

Project planners have built strategic sanitation features into the design of the Water Development District Project (WDDP) in the Philippines:

Demand orientation. The WDDP is designed to be demand-driven by consumers and by local and national government. Local government demand has been used to make final decisions about which cities to include in the project. The selection of communities and service areas within cities is based on local demand. The only exception is that connection to the sewer system is mandatory in the central business district.

Demand assessment. Household demand is assessed through use of the contingent valuation method and user consultations in neighborhoods. Local government demand was expressed through voting and resolutions by local government assemblies. The voting followed a number of presentations by project staff to the assemblies and to local government officials. Four of the six cities for which pre-appraisals were conducted decided to participate in the project.

Financing. The capital works in the project are to be financed from a loan from the World Bank. These funds will be channeled through a local financial intermediary, the Land Bank of the Philippines. Operations and maintenance costs will be financed by local water companies. These companies will enter into a concession arrangement for operations and maintenance of the installed systems.

Cost recovery and financial sustainability. The project is designed for full cost recovery of both the capital and operations and maintenance costs. Capital costs will be recovered partly from projected city revenues from local taxes and partly from an annual allocation of funds (IRA) from the central government to local governments. Operations and maintenance costs are to be recovered through a sewer tariff that is to be integrated with the water tariff.

Rules. The project is guided by a national policy and strategy that states that investments in sanitation should be demand driven. Sewer systems are horizontally unbundled whenever feasible to reduce the number of pumping stations needed and to reduce pumping costs. Decentralized treatment systems are to be used to prevent environmental pollution.

Referees. A national level agency, the National Economic Development Agency serves as the referee to ensure compliance with demand by local governments. The Land Bank of the Philippines is the referee for debt repayment of capital costs. Within cities, the Local Water Utilities Administration, through its Central Program Support Office for Sewerage and Sanitation is responsible for helping cities follow the demand-based approach in selecting neighborhoods and service areas for inclusion in city projects. The local water companies are empowered to enforce payment of sewer charges.

Rewards and sanctions. The Land Bank of the Philippines has the power to intercept the flow of IRAs to local governments that default in their debt servicing. Payments of the sewer tariff will not be separated from the water bill. This is intended to empower local water companies to cut off the supply of water to customers who default in paying the integrated water and sewer bills.

Source: The World Bank, "Staff Appraisal Report. Republic of the Philippines: Water Districts Development Project," Report No. 16526-PH, The World Bank, East Asia and Pacific Region, Urban Development Unit, Washington, DC, July 29, 1997.

contractual agreements among various partners. Coordination costs also include time and other resources spent in gathering information about local conditions, aggregating willingness-to-pay data, holding community meetings, publicizing the project, and seeking user feedback.

Strategic costs arise from the opportunistic behavior of individuals when refereeing is expensive and verification costs high. Free-rider and shirking problems are included in this category, as are problems that arise when stakeholder interests differ. For example in the Ghana Community Water and Sanitation Project financed by the World Bank, participating communities are to be given new equipment by central authorities on the condition that it will not be replaced if it has not been maintained. Since higher-level authorities are unlikely to have full information about local maintenance efforts, local leaders have little incentive to maintain their equipment. Strategic cost problems tend to lead to under-investment and faster rates of deterioration of sanitation infrastructure and so contribute to unsustainable facilities. They are more likely to occur with centralized institutional arrangements; decentralized arrangements with accountability to local authorities and consumers can help to reduce strategic costs.

Information search costs arise from the need to collect, aggregate, and analyze dispersed information on user preferences and technical aspects of the project, and to make this information available to relevant stakeholders. Monitoring and evaluation costs are also included in this category.

In seeking to keep transactions costs down, it is important to realize that trade-offs exist among the different forms of transactions costs. The more information that parties to a transaction have about one another, the lower the strategic and coordination costs. For example, in communities with good social networking, shirking and free-rider problems tend to be less common. Coordination costs are also likely to be low because members get to know and trust one another. Conversely, savings in information

search costs may lead to higher coordination and strategic costs. Inadequate coordination also creates incentives for strategic behavior and can lead to increased strategic costs.

Sector-and project-level frameworks.

The sector-level institutional and legislative framework provides the ground rules for all sanitation investments. It should define the roles of local governments and higher tier governments, beneficiaries, non-formal institutions, government utilities, private sector enterprises, NGOs, and external support agencies, taking care to include women's groups and women beneficiaries. The framework should address the implications of a demand-based approach for resource allocation, technology choice, and choice of financing arrangements.

This sector-level framework needs to be consistent with financing and cost recovery policies, which includes sources of finance for capital works—users, private sources, government, and external support agencies. It should also involve sources of finance for operations and maintenance of physical infrastructure. The framework needs to set out policies on fiscal equivalence, poverty alleviation, and local decisionmaking. Policies on the use of cash and in-kind contributions should be defined. In accordance with the policies on accountability and fiscal equivalence, the institutional framework should give users the authority to question investment choices and to examine financial statements of the provision and production entities.

Low-cost provisions are needed for monitoring compliance with sector rules and for rewarding compliance and penalizing those who violate the rules. The final step in the design for the institutional framework is a check to find out if the resulting incentive structure is consistent with the goals of investment and operational efficiency and to make necessary corrections if it is not.

Project-specific institutional frameworks are also needed to enable service providers to adapt the ground rules to local circumstances. The project-specific institutional framework should define

specific project goals and set policy on how boundaries of service areas are to be fixed. It should also define a mechanism for resolving disputes. At the project level, planners and designers need criteria for determining benefits, service areas, and technologies. The range of possible benefits includes coverage, health, economic productivity, and safeguarding environmental amenities. The project framework should specify in advance policies on technology choice, service zone selection, and cost recovery. Provision should be made for the application of graduated sanctions against free-riders and other breaches of the rules.

Strategies for institutional design

The challenge in developing an institutional framework for the sanitation sector is to achieve investment and operational efficiency with low transaction costs. The World Bank's 1994 World Development Report identified three strategies for addressing this challenge:

- applying commercial principles;
- broadening competition; and
- involving non-formal institutions.⁸

Applying commercial principles. The basis of this strategy is that sanitation is an industry producing services to meet the demands of users and should therefore be operated with a business orientation.

Performance objectives should be limited, well-focused, and defined to include quantitative targets such as coverage, capacity expansion, profitability, and productivity, and qualitative targets such as improvements in the management of information and internal control systems. A high degree of managerial autonomy with hard budget constraints should be maintained and an incentive system should ensure clear accountability to customers and the providers of capital. Sound financial and accounting systems should provide managers with clear objectives. Commercial principles call for good customer relations, demand-driven investment choices and tariff structures, and tariffs designed to cover at least the

costs of operations and maintenance. They also call for effective cost accounting and attention to staffing problems, particularly overstaffing.

One way of introducing commercial practices in public sanitation utilities is through performance agreements. A key element is a built-in incentive system that relates to the duration of the agreement. Experience in Korea and Mexico shows that short duration agreements—a year, for example—to be more effective because they allow for more frequent assessments. Under performance agreements, manager and worker performance is evaluated and ranked using such criteria as service quality, productivity, and administrative and financial efficiency.

Other key elements of such agreements are increased managerial autonomy and rewards for the manager and workers when agreed-upon targets are achieved. Rewards may include publication of performance-based ranking of managers and enterprises; monetary rewards and prizes for the best managers and the best enterprises; or annual bonuses and career prospects for managers linked to the ranking of their companies. Some agreements in India and Mexico have included bonuses of up to 35 percent of total wages.

Another mechanism for creating commercial operations is through corporatization or giving the enterprise the same independent legal status as a private firm. Corporatization insulates utilities from government constraints and pressures while allowing the government to continue to set basic goals. This is best done through explicit contracts.

Broadening competition. Competition is a powerful instrument for promoting investment and operational efficiency, providing users with options in service and suppliers, and improving the accountability of service suppliers to users. Competition may be enhanced by creating equal access to production activities by a number of public and private enterprises as well as private voluntary bodies. This should be supported by equal access to an independent arbitration or

dispute resolution service. A number of instruments can also serve as competition surrogates. An example is transparency brought about through open decisionmaking processes, or by giving special interest and user groups the opportunity to voice their preferences and hold provision and production units accountable for the quality of their services. Decentralization and local decisionmaking are effective instruments for improving transparency and accountability. More explicit ways of introducing competition in the sanitation sector include service contracts, management contracts, lease contracts, and concessions.

Service contracts transfer to private enterprises the responsibility for delivering specific services for a period of a few years. They may also be used to obtain specific skills lacking in a local authority or a public utility, such as engineering skills needed to develop a new sanitation project for public or private funding. Contracts should be awarded through competitive tendering. They may also be awarded by auctioning off the service to the company that offers to deliver the desired service at the lowest price to consumers. In this case, the auctions may be repeated at short intervals to ensure that consumers obtain the best possible terms. The local authority or public provider sets performance criteria, evaluates bidders, supervises contractors, and pays fees that may be lump sum, unit costs, or based on some other contractual basis.

Service contracts offer a versatile means of carrying out many tasks. They have been used for meter reading and fee collection in the water supply and sewerage sectors in Chile since the 1970s. The Santiago public water company even encourages employees to leave their jobs to become independent and compete for service contracts. Service contracts may also be used for operations and maintenance of parts of a sanitation system, such as a neighborhood feeder sewer systems or a decentralized sewage treatment plant. When they are used for maintenance, consideration should be given to creating service contracts of sufficient duration and scope

to justify acquisition and capitalization of special equipment by the contractor.

Management contracts transfer the responsibility for a broad range of operations and maintenance to private contractors. Management contracts may be used for operation of an entire sanitation system or for major parts of it. Multiple suppliers may compete for contracts that may be renewed every one to three years. This can be a useful interim arrangement pending preparation of more comprehensive contracts for leasing or concessions while reform of the regulatory framework for the sector is underway.

In some cases, contractors receive a set fee for services rendered. If contractors cannot control key functions like staffing, procurement, and working capital, they should not be held fully accountable for overall results. Alternatively, when compensation is linked to performance, contractors take commercial risks and should be given autonomy in day-to-day management decisions. Management contracts work better when compensation involves incentive payments for such factors as increased connections and effluent quality.

In a *lease contract*, the government or a local authority develops and installs the physical facilities required to produce services and a private contractor pays for the exclusive right to operate them and generate a flow of services over an extended period of time. This right is sometimes called a franchise or a license. The contractor is generally awarded the lease for a period of six to ten years, and bears most of the commercial risks, but not the financial risk associated with large investments in physical plants. A successful small-scale example can be found in Kumasi, Ghana. Public toilet facilities in Kumasi belong to the Kumasi Metropolitan Assembly (KMA) but are leased to private operators who pay the KMA an agreed-upon monthly fee.

Concessions incorporate all the elements of leases, plus the contractor also assumes responsibility for capital investment. The contract is between the private contractor and a public authority; the public authority delegates its

authority to the successful contractor; and the contractor provides the service at its own risk and is paid by users. The assets revert to the public authority at the end of the concession period, which may be as long as 30 years. Three possible solutions may be considered at the end of the concession: extension of the contract, rebidding, or takeover by the public authority.

Concessions involve four parties: the concessionaire, the public authority, users, and a regulator to balance the interests of the other three parties. The system works well when consumers are willing to pay required tariffs, where there is commitment to protect the interest of the concessionaire, and where there is sufficient regulatory capacity. A national institutional capacity is required to design the appropriate incentive structure, prepare and implement bidding and re-bidding processes, and to monitor the concessionaire's performance.

Experience suggests that contractors should be allowed to construct and operate systems the way they want. Strong performance incentives are important. Incentives for concessionaires to maintain and expand physical infrastructure can include asking them to sign a performance bond and hiring an independent party to check compliance. This can have repercussions on the pricing of services—the higher the bond, the higher the pricing—but the problem may be reduced by including a clause that allows the private operator to recoup some of the bond money in return for good performance. Another option is to allow for compensation to be paid to the operator if the assets are found to be in good condition. If the possibility of rebidding is made clear at the outset, it may create an incentive for good maintenance of the assets.

Concessions are flexible but they may require lengthy negotiations. It is important to discourage early negotiations and identify strong operators. It is good practice for interested governments to start concessions with pilot operations so that they can learn from experience and establish successful precedents. This helps in building up trust and makes future negotiations easier.

Involving non-formal institutions. The application of commercial principles and the broadening of competition are important tools for improving the performance of formal institutions in the development and supply of sanitation services. But formal institutions often do not serve residents of peri-urban areas, and non-formal institutions step in even when the services they provide are more expensive or of poorer quality. Non-formal institutions make significant contributions by filling gaps in service in urban areas and in supplying services to rural areas.

Experience has shown that where such non-formal institutions exist, their involvement in the development and implementation of sanitation projects helps to enhance the chances of success. Non-formal institutions have several roles. As neighborhood or residents' representatives, they help to aggregate consumer demand and serve as intermediaries between consumers and service providers. In this capacity, they help to reduce the transactions costs incurred in negotiation and coordination because their involvement brings down information search costs and improves responsiveness to user preferences. In particular, non-formal organizations can help to minimize free-rider problems. By forming large pools of buyers with stronger bargaining powers, they can frequently negotiate better service prices for their members.

To be credible, non-formal institutions should have sufficient clout to be able to ensure that the communities they represent fulfill their commitments, particularly for in-kind contributions. They should also be seen as the true representatives of their consumers. Non-formal institutions may need support from NGOs or other intermediaries to organize themselves for effective action and to develop the skills they need for their assigned roles, as was the case in the Orangi Pilot Project.

Separation of institutional functions

An important aspect of the institutional framework for strategic sanitation is how the market for sanitation services should be structured. The

goal should be to improve competitiveness, which is a powerful incentive for improved performance. On the provision side, this calls for separation of services into multiple provision areas. One way to do this is through vertical and horizontal unbundling. Another is to separate provision functions from production functions and to assign provision functions to local governments in line with the policy on local decisionmaking and management at the lowest appropriate level. Water and sanitation utilities have often carried out provision as well as production functions, but assigning provision functions to one entity and opening up production to competition allows the efficiency gains to be captured.

So that agencies can respond better to user needs, multiple provision areas should be used for different types of sanitation infrastructure or for systems with different geographical impacts, wherever this is feasible. For example, households may serve as the provision areas for on-site sanitation; residents of a block or of a neighborhood may serve as the provision area of a feeder sewer system; residents of a city may be used as the unit for trunk sewer systems; and still larger jurisdictions for regional sewerage systems. Such an arrangement has the same structure as the financing model described earlier, and it widens the choices available to users. It also defines boundaries for demand estimation and revenue generation for cost recovery. What are the implications for the various tiers of government?

Role of local governments. In line with the principles of local decisionmaking and management at the lowest appropriate level, responsibility for provision functions should be assigned to local authorities. When appropriate, lower tiers of local government or user-based non-formal institutions may be assigned this responsibility. This arrangement enhances responsiveness to user preferences, improves accountability, and lowers transactions costs, especially those associated with strategic costs and shirking. It is sometimes argued that local

governments may not have the capacity to perform these functions, ignoring the fact that capacity can readily be increased if necessary by hiring consultants or through capacity building programs.

As a rule, local governments will be assigned responsibilities for provision of services whose impacts are confined to their jurisdictions. When a spillover of benefits or impacts occurs, the service boundaries need to be expanded accordingly. The costs of designing, building, operating, and maintaining facilities for such services should be borne by the residents of the provision areas through appropriate financing instruments. These may include user charges, local taxes, or other levies as appropriate.

A number of independent production entities may be invited to compete for each production function in a provision area. This may include production units from other parts of the local government, other local government units, higher-tier government units, and private sector units. Adoption of this new approach should raise questions about the role of public water and sanitation utilities.

Role of national government. A key role for national government is formulation of policies that will capture the benefits of strategic sanitation principles. This may include policies on the division of sanitation functions into provision and production, and the structuring of sanitation markets. Central governments need to introduce appropriate legislation to assign authority to local governments to serve as provision units for sanitation services. This should be accompanied by measures providing local governments with sufficient fiscal and budgetary discretion to raise enough revenue to perform the service provision roles assigned to them.

Legislation may also be needed to authorize local authorities to borrow from private financial markets. Central governments will generally also be involved in allocation of central resources for sanitation services among local governments. This means formulating eligibility criteria for

communities desiring government project financing. Central governments are also the ones to set out regulations governing private sector participation in the sector, and to decide what kinds of risks government will assume in dealing with donors, for example, foreign exchange transfer risk. Other central functions may include conflict resolution through the regular court system or through other mediation mechanisms.

Role of external support agencies.

The external support agencies (ESAs) active in the sanitation sector include bilateral agencies and multilateral agencies like the United Nations Children's Fund (UNICEF), United Nations Development Program (UNDP), World Health Organization (WHO), regional development banks, and the World Bank. ESAs have traditionally provided two major types of inputs into the sanitation sector in developing countries: financing and technical assistance. Financial support from the development banks has been in the form of loans, sometimes soft loans for the poorest countries, and funding from bilateral agencies has been mostly in the form of grants. It is hoped that future policies of ESAs can be structured to encourage incentives, including policies on cost recovery, conducive to improved investment and operational efficiency and to sustainable investments in sanitation.

Conclusion

The urban environmental sanitation crisis in developing countries is becoming increasingly more critical each year as rapid urban population growth continues to outpace investments in new or improved sanitation. The sanitary crisis is taking a large health, economic, and environmental toll on all city residents.

Access to convenient and safe water is often one of the top priorities for the urban poor, and demand for improved sanitation often follows soon afterwards, including ways to dispose of wastewater. Willingness to pay for basic water and sanitation services is often high in peri-urban neighborhoods, provided that services are appropriate, effective, and affordable. However, in many developing countries, poorly run water utilities have invested in sewerage schemes that have not been able to operate and maintain services.

The positive and negative experiences of a wide range of organizations and institutions worldwide have been assessed and analyzed in developing a strategic sanitation approach that is demand-

based and incentive-driven. This approach, promoted by the UNDP-World Bank Water and Sanitation Program, is meant to be flexible and adaptive so that it can incorporate lessons from new experiences and innovations in the sanitation sector.

A demand-based approach requires implementing agencies to find out what potential users want and what resources they have to finance and manage installed systems, and to design systems, financing mechanisms, and support structures that are best suited to their needs. Adoption of strategic sanitation principles has already been seen to deliver results.

The examples of the use of strategic sanitation principles included in this document demonstrate that such an approach can generate better projects. These successes have helped to build capacity within implementing agencies as well as enhancing the ability of communities to make sustainable sanitation improvements.

Notes

¹ Statistics and data in this section are from: World Health Organization, Water Supply and Sanitation Collaborative Council, and United Nations Children's Fund, *Water Supply and Sanitation Sector Monitoring Report 1996: Sector Status as of 31 December 1994* (Geneva: World Health Organization, 1996).

² Bangladesh Bureau of Statistics, *Bangladesh Demographic Statistics and 1991 Statistical Yearbook of Bangladesh*, as cited in World Resources Institute, United Nations Environment Programme, United Nations Development Programme, and the World Bank, *World Resources 1996-97: The Urban Environment* (New York: Oxford Press, 1996).

³ Guillermo Yepes, *Infrastructure Maintenance in LAC: The Costs of Neglect and Options for Improvement*, Volume 3, Water Supply and Sanitation Sector, Latin America and the Caribbean Technical Department, Regional Studies Program, Report No.17 (Washington DC: The World Bank, June 1992).

⁴ The World Bank, *China Urban Environmental Service Management*, World Bank Report No. 13073-CHA (Washington, DC: The World Bank, December 31, 1994).

⁵ The World Bank, *World Development Report 1992: Development and the Environment* (New York: Oxford Univeristy Press, 1992).

⁶ The World Bank, *World Development Report 1992: Development and the Environment* (New York: Oxford Univeristy Press, 1992).

⁷ The World Bank, *World Development Report 1992: Development and the Environment* (New York: Oxford Univeristy Press, 1992).

⁸ The World Bank, *World Development Report 1994: Infrastructure for Development* (New York: Oxford Univeristy Press, 1994).