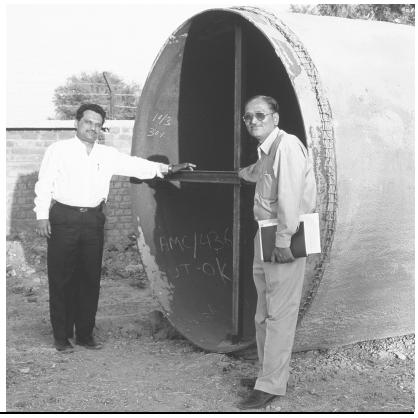
Urban Water Supply and Sanitation Programming Guide





April 2001

Prepared by:
PADCO, Inc.

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DISCLAIMER

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The Guide was prepared by Mark R. Brown, Anthony Van Vugt, James Wright and Surendra Bhatta (PADCO, Inc.), and Richard Middleton (Sheladia Associates, Inc.) under the direction of James Franckiewicz of the USAID Urban Programs Office. The views expressed herein are those of the authors and do not necessarily reflect the views of the U.S. Agency for International Development.

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PREFACE

A recent UN survey showed that 183 million urban people worldwide lack water services and 418 million are without sanitation. This alarming situation occurs despite a 20-year effort by governments and multiple donors to provide basic water and sewer service for all. Today the picture is worsening. Urban population growth is exploding while donor grants and loan funding are shrinking. Central governments in developing and developed countries do not have funds to supplement urban budgets for utilities and services. Decentralization means that city leaders must assume new responsibilities, including the autonomous planning, packaging and financing of basic services.

Yet most municipalities lack expertise to plan and implement capital investment programs. Their ability to raise money in either local or international capital markets is poor or non-existent. They may not be aware that a wide range of technical, institutional and financial options is available. Correcting these deficiencies will require concerted action over a sustained period, and in many cases may depend on outside support for institutional strengthening. But a little knowledge in the right hands can make a big difference. The Urban Water Supply and Sanitation Programming Guide provides information to help officials and senior managers prepare better water and sanitation programs.

The Guide first outlines key strategic issues associated with program planning. After covering these basics, the scheduling and organization of planning and implementation are introduced and briefly discussed. The final section contains multiple references to useful sources of information on each topic. Decision makers and technical managers can use the reference section to locate and obtain a wealth of detailed information on program planning and implementation. Much of the referenced materials are freely available on the Internet.

Questions. Plans. Solutions. The Guide will help leaders and practitioners to ask the right questions, plan for the best use of scarce resources, and craft appropriate solutions to the unique problems of each city. By spreading accessible knowledge and information, the Guide will contribute to Making Cities Work—to respond better to the challenges of urbanization and improve life in the cities of the world.

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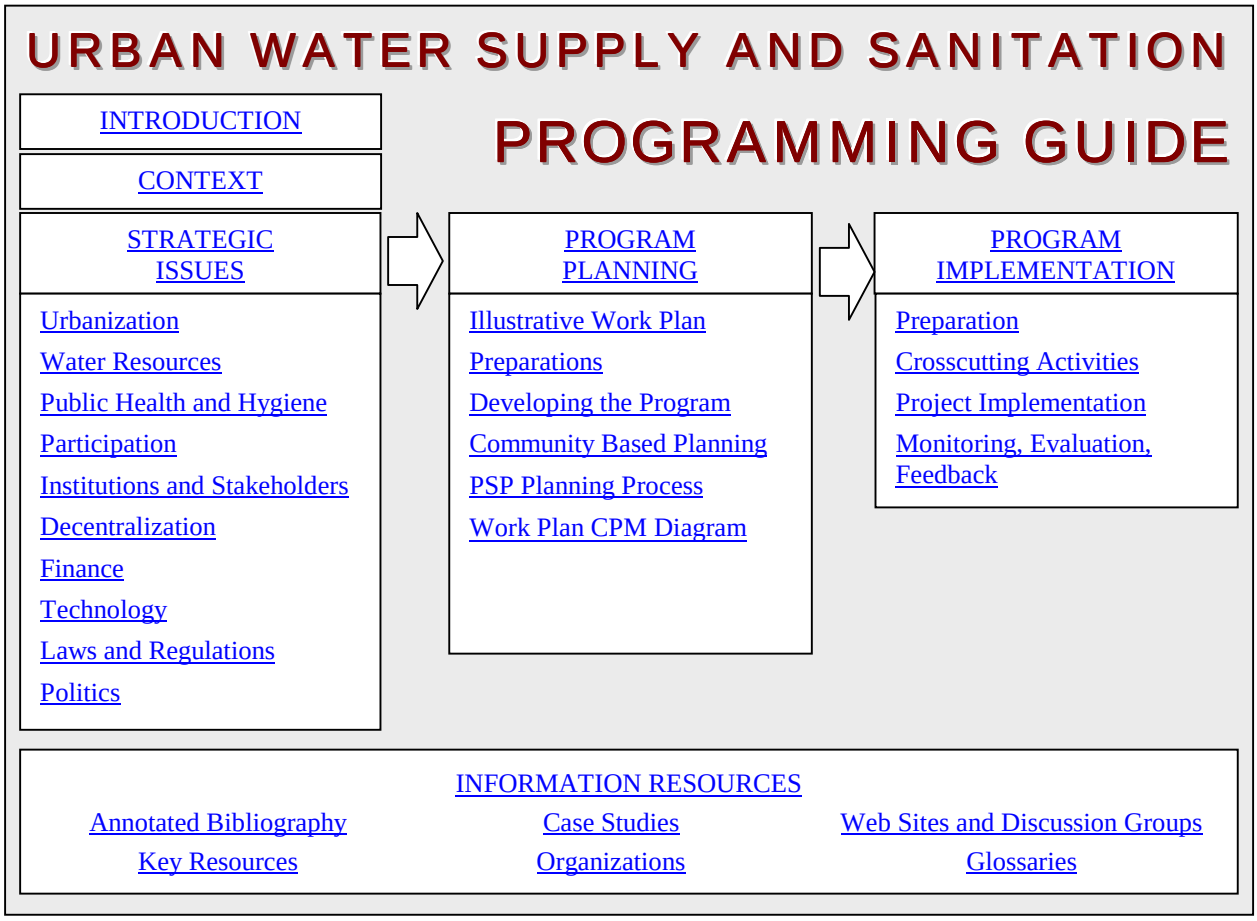
ACRONYMS

List of Acronyms Used in the WS&S Guide

BOT	build-operate-transfer
CBO	community-based organization
CBP	community-based planning
CPM	critical path method
DFID	Department for International Development (UK)
EA	environmental assessment
EHP	Environmental Health Project (USAID Project)
EIS	environmental impact statement
ESA	external support agency
IEE	initial environmental examination
IWRM	integrated watershed resources management
MEF	monitoring, evaluation and feedback
NGO	non-government organization
NRW	non-revenue water
PSP	private sector participation
SFS	solids-free sewer
STEP	septic tank, effluent pump and SFS (system)
UFW	unaccounted-for water
UN	United Nations
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VIP	ventilated improved pit (latrine)
WASH	Water and Sanitation for Health (USAID project)
WS&S	water supply and sanitation
WTP	willingness to pay

TABLE OF CONTENTS



INTRODUCTION

Cities are growing rapidly, yet they are falling short in providing water supply and sanitation (WS&S) services. According to UNICEF, more than 1.1 billion people lack access to safe drinking water and 2.9 billion people lack access to adequate sanitation.[1] In the period 1990-96, some 21% of urban people worldwide lacked access to safe water, while 27% lacked adequate sanitation.

It is clear that conventional approaches to providing these essential services do not reach all residents, are inefficient and costly, and are not integrated. “Business as usual” is not working. [United Nations, 2000]

Objective

This WS&S Guide provides a concise overview of strategic issues, planning processes and implementation practices. The objective is to identify major activities and components of successful programs and some

[1] *The State of the World’s Children 1998* [online]. 1998. [Cited in April 2001.] Available on Internet: <http://www.unicef.org/sowc98/>.

Objective

This WS&S Guide provides a concise overview of strategic issues, planning processes and implementation practices. The objective is to identify major activities and components of successful programs and some first-order principles to guide the design and implementation of WS&S programs. The Guide is intended for those who are making plans and decisions for the provision of WS&S services and the policy makers who must establish the enabling environment for successful program implementation.

It is an enormous challenge to provide adequate water supply and sanitation services in rapidly growing urban centers. The Guide aims to facilitate this task by providing an orientation that will help planners and decision makers to identify and focus on the most important steps. It is a starting point for action, assuming that users will select and adapt elements as appropriate to local conditions. Detailed operational information is not included, for the sake of clarity. However, many citations and Internet links are identified to enable readers to pursue each topic in greater depth, as needed.

In most cities and towns in developing countries the provision of adequate WS&S services will take many years of dedicated and disciplined hard work, not to mention good luck and political will. Even under the best conditions the implementation of a sectoral development program is rarely faithful to the plans and principles laid out in advance. It is particularly difficult to change the long-standing habits of individuals and institutions. Nevertheless, it is important to begin taking local action even though the national and local enabling environment may be discouraging. It is better to design and implement programs and projects that may be “sub-optimal” but provide opportunities to introduce incremental changes to the enabling environment and implementing agencies.

Key Concepts

Water supply refers to a system of delivery of potable water to customers.

In this Guide, *sanitation* refers to the management of excreta and wastewater (not the disposal of solid wastes).

Some topics in the Guide may not apply equally well in every setting. Rather, the Guide is a starting point for action, assuming that users will select and adapt elements as appropriate to local conditions. Key concepts include the following:

- The importance of supportive political will and establishing a suitable policy, legal and regulatory enabling environment.
- The use of participatory processes that engage diverse stakeholders in the planning, implementation and operation of WS&S systems.
- The capacity of participating communities to become directly involved in the planning, construction, operation and maintenance (O&M) of water supply and sanitation systems.
- The demand for services by the community and customers as a determining factor in technology selection.

- The encouragement of planning that is strategic, realistic and action oriented, avoiding the high cost of rigid "master plans" that are beyond local powers to implement.
- The creation of affordable WS&S programs by adopting goals and plans that correspond to the financial reality of limited capital and operating budgets—rather than designing sophisticated, expensive systems that cannot be built or sustained without continuing external financial assistance in the form of central government subsidies or foreign development finance.
- The establishment of a proper balance between water supply and sanitation services.

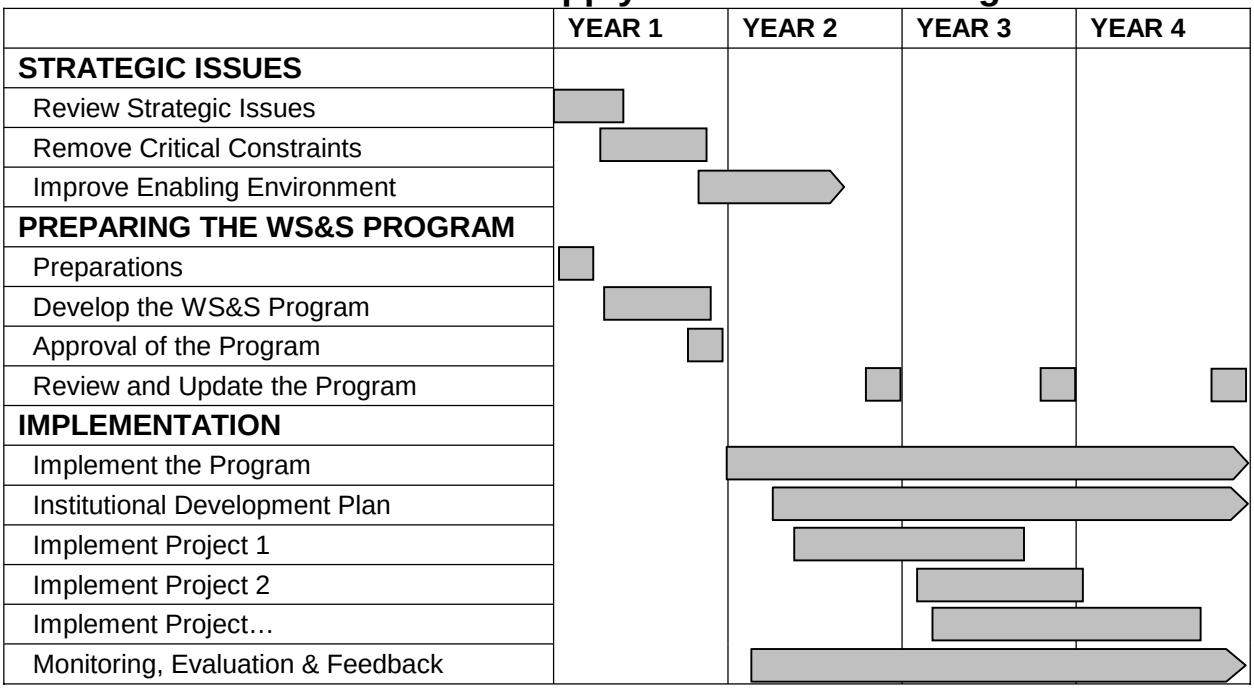
Scope of the WS&S Guide

The Guide focuses on urban WS&S systems and is designed to be generally applicable for small and mid-sized urban settlements, over short- and mid-term planning horizons. Some topics in the Guide may not apply equally well in every setting. For example, large-scale engineering projects are not specifically addressed, nor are the special problems of megacities—local authorities facing these situations are likely to have access to highly specialized expertise exceeding the scope of this Guide.

There is a delicate balance between addressing long-term regulatory and institutional needs to establish and maintain WS&S systems and moving quickly to implement practical local solutions.

The following diagram provides a conceptual overview of the process described in the Guide.

Main Steps in Preparing The Urban Water Supply and Sanitation Program



The Guide is organized in four sections:

I. **Strategic Issues—**A review of critical issues concerned with the planning and implementation of urban water supply and sanitation programs.

II. **Program Planning—**An overview of the process of preparing a WS&S program, including a generic planning process and alternatives that are adapted for substantial community or private sector participation.

III. **Program Implementation—**Guidelines for the implementation of the WS&S program and projects.

IV. **Information Resources—**A collection of print and Internet resources that provide detailed information to supplement the overview provided in the WS&S Guide. The following types of resources are included:

- **Annotated Bibliography—**books, articles and reports, some available only in print, but many available via the Internet.
- **Key Resources—**a selection of handbooks and manuals that support the design and implementation of WS&S programs. These valuable documents are accessible via the Internet and are included in their entirety on the CD-ROM version of the WS&S Guide.
- **Case Studies—**descriptions of real projects and approaches, with critical analysis to highlight the "lessons learned."
- **Organizations—**a list of organizations that provide expert knowledge and assistance to support water supply and sanitation programs.
- **Web Sites and Discussion Groups—**a list of selected web sites that provide information or host discussions to promote improved water supply and sanitation services.

How to Use the Guide

The Guide is designed to assist in preparing and implementing a water supply and sanitation program for an urban area. It provides an orientation to many of the critical issues that are likely to be encountered and the essential activities that must be performed when preparing an urban WS&S program, but it does not give a high level of detail on any specific task or methodology. Rather, it is intended to provide an easily accessible orientation for mid-level and senior decision makers in local and central government who need a comprehensive understanding of the process and issues but do not have a high degree of technical knowledge or the time to become intimately involved in preparing and implementing the program. The Guide should serve as a useful reference to improve their understanding and help avoid common pitfalls.

There is a tendency to expect that a manual or guide will provide easy solutions to development problems. While this Guide deliberately presents a simplified view of WS&S development, the fact remains that planning and implementation, if done properly, is a fairly complex task that will take time and resources.

The Guide is also intended as a broad conceptual framework for the preparation of technical assistance projects. For example, USAID program staff in the field can use the Guide as the basis for discussion with government counterparts, to identify opportunities for the strategic or catalytic introduction of international technical assistance and other resources.

Readers who need additional detailed information on specific topics should refer to the extensive annotated bibliography in the Information Resources section of the Guide. Many of the resources are available on the Internet and should be accessible with little effort or expense to most readers worldwide.

The WS&S Guide is available in print and electronic formats:

Print Version of the Guide

A limited number of printed copies of the Guide were produced and distributed by USAID. Additional copies can be obtained by accessing and then printing the electronic copy of the Guide, available in the Adobe Portable Document Format from

- USAID's Development Experience Clearinghouse (DEXS): go to www.dec.org and use the option to "Search the Development Experience System." Locate the Guide by conducting a search using the title "Urban Water Supply and Sanitation Programming Guide."
- USAID's Making Cities Work web site (www.makingcitieswork.org). Look for the Guide in the "Tools & Resources" section.

Electronic Versions of the Guide

The Guide is also available from USAID on CD-ROM. The contents of the CD-ROM version are essentially identical to the print version, with the following differences:

- Sections and sub-sections of the Guide are hyperlinked to the Table of Contents and Index for ease of navigation.
- Selected information resources such as reports and web sites that are cited in the narrative are hyperlinked to annotated bibliographic citations contained in the Information Resources section of the Guide.
- Many of the entries listed in the Information Resources section contain hyperlinks to web sites that contain the full text of the referenced material.
- The CD-ROM contains complete copies of several of the information resources, including handbooks and guidelines containing detailed information on WS&S planning and implementation. These are in the form of Adobe Portable Document Files that may be viewed or printed in their entirety from the CD-ROM.
- A copy of the Adobe Acrobat Reader is also included on the CD-ROM.

How It Works

In the electronic versions of the Guide, every item of underlined text is a hyperlink. If the user picks the hyperlink with the mouse and cursor the following actions will occur:

- [resource citation]—The browser will jump to the text of the full citation contained in the Information Resources section of the Guide.
- <Internet Location>–The browser will try to open a web site on the Internet, which contains the full text of the document, and, in some cases, will open a document in Adobe Acrobat Reader. If the computer is not connected to the Internet or the linked web site no longer functions, a window containing an error message will appear.
- [CD-ROM]–The browser will open a key resources document stored on the CD-ROM using Adobe Acrobat Reader.

In some cases, the hyperlink takes the browser to a web site containing a further link to the document in Adobe Portable Document format. This usually occurs so that the document can be viewed in its proper context (for example, if it is one of a series of documents or if a single document has been split into several parts).

To save an Adobe Portable Document File (.pdf) on your local computer, rather than opening it immediately on your computer display, you may right-click the hyperlink to the document (on the web site, not in the WS&S Guide), and choose the option “Save target as …” that appears on the pop-up menu.

Broken Links

A broken link occurs when the address of a web site or document has changed, so that the hyperlink is no longer correct. Usually, an error message appears. Sometimes this means that the site or document is no longer available online, but often it has simply been moved to another location on the Internet. It is worth trying the same hyperlink once or twice because sometimes the problem is temporary. However, a missing site or document can often be located using one of these methods:

- “Peel back” the Internet address and look for the site or document on the parent web page. For example, if this (illustrative) address (www.site.org/water_docs/tools/index.pdf) does not work, try looking at (www.site.org/water_docs/) or (www.site.org). If successful, look on that web site for the name of the document or the “publications” section.
- Use an Internet search engine to search for the publication by title, author or publisher.

Software Requirements

A browser such as Microsoft Internet Explorer or Netscape Navigator and the Adobe Acrobat Reader are required to access the electronic versions of the Guide. All three can be downloaded free of charge from the Internet.

Internet Resources

The Internet enables global access to a remarkably rich, constantly growing body of information on water supply and sanitation issues. The following web sites and discussion groups are highly recommended. These primary sources offer widely useful information or serve as portals to other useful sites. This list is by no means exhaustive; additional information on these sites and others is given in the Information Resources section of this Guide.

SOURCE Water and Sanitation News Weekly

Internet address: <www.wsscc.org/source/>

The Sanitation Connection: an environmental sanitation network

Internet address: <http://www.sanicon.net/index.php3>

World Bank Water and Sanitation Program web site

Internet address: <http://www.wsp.org/English/index.html>

Low Cost Sewerage Discussion Group

Internet address: <http://www.mailbase.ac.uk/lists/lcsewerage>

The WaterWeb Ring Index Site

Internet address:

< http://nav.webring.yahoo.com/hub?ring=waterweb&list>

The Environmental Health Project (EHP) web site

Internet address: <http://www.ehproject.org/>

CONTEXT FOR WS&S PROGRAMS

Population growth and urbanization place increasing stress on water supply and sanitation systems throughout the world.

- The UN estimates that 2.4 billion people will be added to cities in developing countries from 1995 to 2025.
- The world's consumption of freshwater quadrupled between 1940 and 1990.[2] Humanity now uses, directly or indirectly, more than half of the world's accessible water supply, and per capita availability of fresh water worldwide fell from 17,000 m^3 in 1950 to 7,300 m^3 in 1995.[3]
- Rapid population growth and lagging rates of expansion of coverage have left more people without access to basic sanitation today than in 1990.[4]
- Between 90% to 95% of all domestic sewage and 75% of all industrial effluent are discharged untreated into surface waters that may be needed for drinking water in developing countries.[5]
- Inadequate sanitation has been implicated in contributing to about 3 million deaths and about 900 million illnesses per year.
- Pollution of rivers and lakes by the dumping of untreated wastewater causes widespread economic losses to public health, industry and agriculture, and can render these resources unfit for further use.

The provision of adequate water supply and sanitation is essential if urbanization is to make its full potential contribution to national development. However, the development of water supply and sanitation services nearly always lags behind the pace of urbanization. Residents lack convenient access to safe, affordable water. Sanitation is grossly neglected in many countries and, consequently, in far worse condition than water supply. The greatest needs are often in the poorest countries, yet these and the most rapidly urbanizing regions, particularly Sub-Saharan Africa and South Asia, do not or cannot allocate sufficient resources to adequately serve their urban populations.

The need to improve WS&S services is so massive that the continuation of current trends and practices will not suffice. Moreover, developing countries are currently urbanizing at much lower income levels than did

[2] Clarke, R. 1993. *Water: The International Crisis.* MIT Press.
[3] Report of the UN Secretary-General on a comprehensive freshwater assessment (E/CN.17/1997/9).
[4] *World Health Organization Fact Sheet No. 112*. 1996. Available on Internet: <http://www.who.int/inf-fs/en/fact112.html>.
[5] (1) Carty, W. 1991. "Towards an Urban World." *Earthwatch* (43):2-4; and (2) Allaoui, K. 1998. "Long-term Finance for Water Projects: The IDBs Approach." Presented at the International Conference of Water and Sustainable Development, Paris, March 19-21.

the now developed countries. Consequently, the funding available for public and private investment is extremely limited. Conventional Western water supply and sanitation systems are often capital intensive and dependent on costly technology; thus, they are difficult to finance and operate and often unaffordable and unsustainable in developing countries. Alternative technologies and community-managed systems may be less costly, but local authorities may not readily accept innovative approaches that do not immediately correspond to conventional plans, programs and standards. Nevertheless, practical solutions must reflect the reality that half of the world's population exists on less than $2 per person per day, and that more than half of new urban growth will occur in illegal slums or informal settlements. Approaches must be developed to serve these marginal households if cities are to be habitable and economically healthy.

Successful approaches are certain to require strategic thinking and concerted effort at national and local levels to improve institutions and financing methods, reform policies and standards, and increase customers' knowledge and willingness to pay. These issues are among those addressed by the Urban Water Supply and Sanitation Programming Guide.

Section I: WS&S STRATEGIC ISSUES

Successful design, implementation and operation of urban water supply and sanitation programs demands concerted strategic action by national and local stakeholders. Decision makers, practitioners and advocates (including politicians) involved in WS&S programs typically need to address the Strategic Issues identified in this section.

URBANIZATION	Urbanization is inevitable, but it can be harnessed for economic and social development. Urbanization places increasing strain on WS&S systems. Policy makers and planners need to accept and understand urbanization to exploit its opportunities and mitigate the negative impacts.
WATER RESOURCES	Water supply and sanitation are interlinked parts of the "water cycle." Wasteful patterns of allocation and consumption, and insufficient attention to conservation, overtax water resources. Inadequate collection and treatment of wastes may pollute water resources and severely limit their future use.
PUBLIC HEALTH AND HYGIENE	One primary objective of WS&S services is to improve public health. Health and hygiene education, such as encouraging hand washing, will almost always achieve greater health impact than the adoption of "advanced" technologies or high water quality standards. Most WS&S agencies lack the mandates and expertise to undertake hygiene education.
PARTICIPATION	Increased participation by the community, non-government organizations (NGOs) and the private sector is essential to marshal the resources needed to improve and expand WS&S services. Community participation leads to responsive, reliable and cost-effective services. Private sector participation can bring in much-needed expertise and provide access to private capital.
INSTITUTIONS AND STAKEHOLDERS	Institutions responsible for WS&S often lack technical and managerial capacity, but they may also resist change. Capacity building is needed, along with new attitudes toward stakeholder participation.
DECENTRALIZATION	Many countries are relocating power, authority and responsibilities from higher to lower levels of government. Decentralization can reduce administrative and bureaucratic costs while making services more responsive to customers.
FINANCE	Financial and economic constraints impose real limitations on the technical and institutional options that are available and sustainable. Although a wide range of technologies and approaches is available, the selection of specific solutions must reflect practical cost recovery strategies, as well as the ability and willingness of customers to pay for services.

TECHNOLOGY	A growing number of conventional and innovative WS&S technologies are available. The selection of “appropriate” technology depends on local physical conditions; user preferences; socioeconomic, cultural, financial and institutional factors; and the users’ ability to operate and maintain the facilities.
LAWS AND REGULATIONS	WS&S projects are governed by a wide range of laws and regulations covering technical, financial, institutional and environmental issues. Inappropriate laws and regulations often prevent innovation. It is important to improve the legal and regulatory framework to enable innovative, cost-effective and sustainable WS&S approaches.
POLITICS	Meaningful change in the provision of WS&S services is possible, but it requires political commitment and bold leadership at the highest levels of government. A favorable “enabling environment” cannot be achieved without strong political leadership and government support.

URBANIZATION

An increasing share of the world's people live in urban areas. This urbanization has profound implications for the supply of services, including water supply and sanitation. Decision makers must understand urbanization if they are to plan for and provide adequate, sustainable WS&S services.

Historical Trend

The urban population of developing countries grew from 300 million in 1950 to 1.3 billion in 1990, an average of 4% per year. Latin American countries are already as much as 75% urban and still experience urbanization rates of just below 3% per year. Countries of South Asia, East Asia and Sub-Saharan Africa are typically less than 35% urban, but their cities are growing faster than 3.5% per year, with the highest, cities in Sub-Saharan Africa, growing at 6%.

Projected Trend

From 1990 to 2010, more than 95% of world population growth will take place in cities. Most of this growth will occur in the developing world. There will be 26 megacities with more than 10 million inhabitants each. Twenty of the megacities will be in developing countries. By 2005, more than half of the population of the developing world is expected to live in cities. [PRB, 2001]

Factors Causing Urbanization

Urbanization is caused by natural increase and in-migration. Natural increase is the excess of births over deaths in the existing population. It is influenced by fertility and mortality rates resulting from a variety of cultural and biological factors. Rural to urban migration is primarily driven by rural peoples' expectations that cities offer better economic opportunities, including jobs, education and healthcare.

Around the world, efforts to slow urbanization have generally proven unsuccessful and often served only to constrain economic growth. Ignoring urbanization, or failing to provide services to urban residents, puts public health at risk and may cause political backlash.

Urban Problems

Urbanization is often haphazard and uncontrolled. In-migrating people settle on unsuitable vacant parcels (for example, on land that is prone to flooding or is reserved for roads or industries). They establish informal settlements in urban centers or along access roads at the periphery of urban areas. It is costly to provide infrastructure and urban services to peri-urban and unplanned areas, but residents in these areas often pay higher costs for water, through illegal connections and private water sellers, than residents of regular communities.

Governments are often unwilling to provide WS&S services to informal settlements for fear that doing so will strengthen the tenancy claims of illegal residents. Yet, the lack of tenure is a disincentive to investment by households in improving their WS&S infrastructure. And formal service

providers have no incentive to provide services because of high costs relative to low anticipated revenues and difficulty making collections.

Politicians and decision makers need to understand the economic and social advantages (not to mention political benefits) of regularizing informal and illegal settlements. Training in land management can be linked to anticorruption and community-based planning initiatives to overcome policy obstacles to regularization and the subsequent provision or upgrading of community infrastructure.

Urban Opportunities

Cities and towns provide great opportunities for economic and social development. They are "engines of economic growth," producing a significant share of national gross domestic product. Because urban industrial and commercial activities are usually more economically productive than rural activities, highly urbanized countries and urban people typically have higher average incomes. The provision of water supply and sanitation services improves health and labor productivity and can therefore contribute to improved income generation, poverty alleviation and economic development.

Urbanization also increases the supply of services available to rural areas and small towns, including secondary and higher education, specialized medical services, financial services and cultural amenities. Furthermore, well-planned urbanization enables economies of scale in the provision of services.

Water Supply

A supply of potable water is essential to human health and survival and a vital economic input or factor in the economic and commercial life of cities. However, in urban areas it is difficult or impossible for people to be self-sufficient in obtaining water or disposing of wastes. Residents of dense urban environments have little choice but to rely on institutional and technical infrastructure rather than natural systems and individual effort. Urban people, and especially the newly urbanized, may need to learn new practices and behaviors to properly use urban water supply and sanitation services. [de Sherbinin, 1998]

To better cope with growing demand, municipal authorities and community development practitioners need to promote and support unconventional water delivery systems, such as local community-managed systems, and direct wholesale/retail relationships between water utilities and community organizations.

Sanitation

Effective sanitation is important to maintain a healthy living environment and to protect the water supply, including surface waters, catchments and groundwater reserves. Yet, other than cleaning the home and immediate surroundings, sanitation is generally a low priority for people and governments. [WHO, 1998]

Link between Water Supply and Sanitation

Water supply and sanitation are linked. Water enters an urban area as a resource but often leaves carrying sewage and industrial effluent. In the past, natural systems were capable of cleaning water polluted by

humans. Today, population densities have surpassed the earth's natural cleaning capacity, and some chemical pollutants are not readily broken down by natural processes. People living downstream are now burdened with the cost of cleaning the water before they use it.

In many locations, the proper treatment of industrial effluents may be a more critical and cost-effective means to protect freshwater resources than the secondary treatment of municipal wastewater.

Planning

Growing cities require carefully planned and well-managed infrastructure systems, including water supply and sanitation, housing, roads, power supply, education and public health services. Strategic planning is needed to chart the most appropriate course to minimize cost and maximize benefits. Plans also serve to coordinate inputs and the activities of stakeholders, including institutional actions and physical construction. Planning should be a continual process that guides physical, economic and institutional development.

For cities that lack a culture or tradition of planning or possess limited authority to prepare and implement their own plans, the preparation of a WS&S program is an opportunity to promote and demonstrate the benefits of decentralization and local capacity building.

Section II of the Water Supply and Sanitation Guide provides specific guidelines for planning WS&S programs and projects.

WATER RESOURCES

Global Abundance, Local Scarcity	Although water is globally abundant, many countries have very limited renewable freshwater resources. More than 270 million people live in 11 countries that are currently water stressed,[6] and an additional 166 million people live in 18 countries affected by water scarcity. The percentage of people living in countries facing water stress or scarcity is projected to increase three to five times by 2050.[7] [Falkenmark, 1992] [Gardner-Outlaw, 1997]
National Water Resources	As cities expand, they require more water for industrial, commercial and household use. But urban people are not the only claimants on countries' limited water resources. Agriculture is by far the largest user of water in most countries, especially in developing countries where, on average, irrigation accounts for about 80% of water use, followed by industry and households. [United Nations, 1997] Typically, additional water resources need to be tapped at ever-increasing distances and proportionately greater costs to meet growing demand in urban places.
Allocation of Water	Competition for water and inefficient distribution and use of water resources are common where different government agencies make allocation decisions for different types of users. Historically, because it has been treated as a "social good," the pricing and allocation of water did not reflect rational economic principles. Although water is today increasingly viewed as an "economic good," its allocation and pricing are still influenced more by vested interests and historic decisions than by economic or market factors. [Briscoe, 1998] In the long term, countries should adopt more comprehensive approaches to water resources management to guide intersectoral allocations of water, to increasingly reflect environmental constraints and economic pricing and to incorporate the needs and views of all stakeholders. For example, relatively small improvements in agricultural efficiency could satisfy foreseeable urban needs. However, long-standing, powerful vested interests seek to preserve agriculture's share of water resources. Though highly desirable, it may be unrealistic to expect that integrated watershed resources management (IWRM) approaches will offer any relief in the short or mid-term.

[6] Falkenmark and Widstrand, 1992. As defined by Swedish hydrologist Malin Falkenmark, *water stress* occurs where available renewable freshwater is between 1,000 to 1,700 m^3 per capita per year; *water scarcity* occurs between 500 and 1,000 m^3 per capita per year.

[7] Gardner-Outlaw, T., and Engelman, R. 1997. *Sustaining Water, Easing Scarcity: A Second Update.* Population Action International, 1997.

Urban Water Resources

Rapid urbanization places local water resources and delivery systems under stress. The least-cost water sources are usually already fully used, and the development of new sources will be costly. The high capital costs of developing water systems highlight the need to conserve water resources at the city level, to limit consumption through demand management, especially for industrial use, and to focus on maintaining distribution systems to minimize leakage.

Reduction in water losses, sometimes referred to as unaccounted-for water (UFW) or non-revenue water (NRW), is usually the cheapest "source" of additional supply. The problem is often not limited to physical leakage: under-billing and illegal connections may be equally or more important.

The highest costs of water treatment fall on cities—they require clean water but receive polluted water owing to ineffective or nonexistent treatment by upstream urban and rural users. Nonpoint source pollution such as agricultural and stormwater runoff may make surface water unusable or very difficult to treat to safe standards. Industrial discharges are often unregulated and untreated and may contain a cocktail of unknown, potentially hazardous chemicals.

Urban leaders should therefore become vocal advocates of integrated watershed resources management, including laws, policies and programs to curb water pollution and clean up surface waters. Because this is a long-term prospect, additional precautionary measures may be needed to safeguard the quality of the water supply in the short run. These measures could include raw water storage and additional treatment stages. [Visscher, 1999]

Water Management

The importance of water resources, the high capital costs to develop water resources and the need to regulate water use among user groups justify a continued government role at the national and local levels. It is important that governments adopt taxes and regulations that will enhance competition and correct distortions in water resource allocation. But government agencies have limited capacity for planning, financing and implementation. Thus, beneficiary groups must become more involved to increase the efficiency of water resource use. Participation is also essential to develop popular awareness and support for strategies to recover costs, reduce subsidies and rationalize allocation of water resources.

Water Security

The "life-giving" uses of water are ultimately the most critical. Where water is scarce, the protection and expansion of water systems may become issues of national security. As a political and practical necessity, cities need to know what resources they can count on, that is, water resources that other users cannot preempt. For example, urban areas should know that their surface waters will not be diverted by upstream users, and that aquifers supplying groundwater will not be over-abstracted or polluted by agriculture or industry.

PUBLIC HEALTH AND HYGIENE

Hygiene Education and Behavior Change

All water supply and sanitation technologies, if properly applied, will improve public health: sophisticated technologies have no inherent advantages over simple ones. Regardless of the technologies adopted, however, it is usually necessary to conduct hygiene education, leading to changes in behavior, to reduce water- and sanitation-related diseases. [EHP. 1999b.]

Water Quantity vs. Quality

Most "waterborne" diseases are in fact caused by poor hygiene. Increasing the availability allows people to keep themselves and their surroundings clean and reduces disease. Although engineers and public health officials often believe otherwise, water quality is usually less of an issue than the quantity of water delivered, unless the water supplied poses an immediate health risk or is otherwise unacceptable to customers.

Threshold for Effective Programs

The fact that an individual has access to improved water and sanitation facilities, and uses them properly, does not guarantee health benefits. It is necessary to reach a certain threshold of coverage (perhaps 75% of all households) to affect individual health. This fact clearly has implications for the level of hygiene education and promotion required and the type of resources needed for wide-ranging community outreach. [Feacham, 1983]

Impact and Sustainability

In the absence of changed behavior, construction of standpipes, household connections or latrines does not in itself guarantee the desired impact. WS&S programs must be designed for sustained use, to ensure that

- facilities are built;
- they are sufficiently well maintained to remain in operation; and
- they are properly used. [8]

Urban WS&S Agencies Lack Capacity

Typically, WS&S agencies have no budget or specialized staff devoted to hygiene education, are uncertain how to contract for or manage such services and offer no career path for such specialists. Developing capacity for hygiene education is an important part of necessary institutional reform.

Priorities for Hygiene Behavior Change

In descending order of priority, the most important changes in hygiene behaviors are typically

- safe disposal of feces (especially those of young children);

[8] WHO. February 1983. *Minimum Evaluation Procedure [MEP] for water supply and sanitation projects.* Document ETS/83.1, World Health Organization, Geneva, Switzerland.

- proper handwashing at appropriate times; and
- safe source selection, transport, storage and use of water.

Hygiene Education Is Cost-Effective

Once basic WS&S services are in place, hygiene education costs little in comparison to the resulting incremental health benefits. Conversely, saving small amounts of money by foregoing hygiene education can make the entire expenditure on WS&S a waste of money. Hygiene education is a highly cost-effective means to reduce diarrheal disease.

PARTICIPATION

Historically, the provision of water and sanitation services was "supply driven," responding primarily to the plans and programs of government bodies and municipal enterprises. In some places the public sector has successfully met the demand for services. Yet elsewhere it has proven unable to adequately plan and manage WS&S services. In developing countries, the shortcomings of government bodies are compounded by rapid urbanization and inadequate infrastructure finance systems. It is apparent that public institutions and financial resources are insufficient to meet the challenge of expanding and upgrading WS&S services. Increasing participation by individuals, communities and the private sector holds great potential to mobilize substantial resources for WS&S services.

Community Participation

Community participation can occur at different levels and stages of WS&S planning and implementation. When communities and customers participate in a substantial way, a shift to "demand-driven" provision of services can occur, with several important advantages, including better fit between customer preferences and the technical and financial characteristics of WS&S systems, improved willingness to pay and increased commitment to water conservation. Community participation strengthens the capacity of individuals, the community and local authorities to jointly meet demand using available resources. The net result is more successful project implementation and sustainability. [Dayal, undated]

Early community involvement in the planning process can help disseminate information about feasible services and their likely costs. Raising public awareness is a key element of "demand-driven planning" and the creation of "effective demand" for WS&S services. Effective demand means the ability and willingness to pay for goods or services. In the context of WS&S options, potential users can speak meaningfully about their willingness to pay only when they possess sufficient information about the characteristics of the service. Knowing more about the features and benefits of specific options may interest users to pay more for the service. [IRC, 1999]

Costs and Benefits of Community Participation

The study of "Lessons Learned in Water, Sanitation and Health" conducted by the Water and Sanitation for Health (WASH) Project of USAID showed that "Most water and sanitation projects underestimate the costs of community participation. The November 1987 global consultative meeting on the Water Decade…concluded on the basis of 'scarce data' that community participation activities could add 'from 3 percent to 17 percent to project costs.'" The study also concluded that "involving the community in developing water supply and sanitation projects improves the chances that the users will accept their responsibilities and that the project will be sustainable." [WASH. 1993]

Private Sector Participation (PSP)

There are many opportunities for PSP in WS&S planning and implementation. In most places, there is already enormous involvement of the private sector, including small private water vendors, firms and individuals who build and repair household WS&S facilities, empty septic tanks and construct distribution networks and other infrastructure under municipal contracts. Virtually all WS&S services in informal settlements are in the private sector. [Brook Cowen, 1997a, 1997b]

In addition to these traditional roles, the private sector may be capable of managing the operations and maintenance of entire WS&S systems and of financing upgrading and expansion. Recently much attention has been given to partial or full privatization of WS&S services in urban areas, for example through long-term management concessions. This large-scale PSP demands a suitable policy, legal and regulatory enabling environment, plus political will and knowledge of the relevant contracting mechanisms and instruments. However, large-scale commercial companies may also find it challenging to operate under urban conditions that are typical in developing countries: low affordability and willingness to pay may undermine profit as an incentive to private sector involvement; informal settlements may pose significant challenges for billing and collection; and political interference may be unavoidable. [World Bank, 1997] [Seldon, 1998]

The amount of time, energy and expertise needed to overcome these challenges should not be underestimated.

INSTITUTIONS AND STAKEHOLDERS

Successful WS&S programs depend on the active participation of diverse stakeholders, including individuals and organizations in both public and private sectors. Inclusion of stakeholder groups is essential to build broad support for new policies and programs. Policy makers and planners must understand the following:

- Who is involved or has an interest in WS&S programs?
- What goals do stakeholders pursue? What motivates them?
- How do stakeholders operate and interact?
- What authorities and powers do stakeholders possess?
- How are they controlled (by regulation or governance structures)?

Typical stakeholder groups important to WS&S projects are briefly identified below. It is common for stakeholders to "belong" to more than one of these groups. [MIT, 2000c].

Customers

Customers are not necessarily homogenous. Rather they include numerous sub-groups with wide-ranging interests. For example:

Households typically desire convenient access to a reliable, continuous supply of potable water. They desire clean homes and workplaces but normally do not place much value on the offsite elements of sanitation systems. They spend their own resources—money and effort—to build and maintain the in-home components of WS&S systems. Hygiene education may be needed to help them understand why they should adopt new health and hygiene behaviors.

Businesses and industries require safe, reliable water supplies, though some do not require potable water for their processes. The cost of water is generally a small fraction of manufacturing inputs. Industries often extract their own groundwater or use surface water independently from municipal water supply systems.

Industries are also normally the most significant polluters. Safe disposal of toxic and other wastes can be very costly, so industries seek to minimize investments in facilities to treat effluent and to reduce the cost of goods they produce, thus increasing competitiveness and profitability.

Institutions such as schools, universities and healthcare organizations depend on potable water and effective sanitation services. When these institutional customers are in the public sector, they commonly receive services at subsidized rates, yet they are also often delinquent in paying for services.

The Urban Poor	The urban poor are mentioned as a separate category of stakeholder. Often without access to piped water supplies, they may depend on multiple sources, including public standpipes, vendors and illegal connections to mains and factories; they sometimes use surface water sources. [Kessides, 1997] The poor are rarely served by formal sewer systems. The special needs of this category of stakeholder demand careful and sympathetic treatment by planners and decision makers. [Solo, 1993]
WS&S Enterprises	The management and staff of WS&S enterprises, often represented by organized labor, have strong vested interests. Both management and staff are likely to fear the unknown and will often resist change—even if it is clearly in the public interest. It is important to fully involve these stakeholders from the earliest stages of policy or program design to build understanding and support for change.
Government	National and local government stakeholders are in the best position to consider WS&S needs, resources and programs in the broad context of other—possibly "competing"—programs and priorities. Yet the task is complicated because often there is no "Water and Sanitation Ministry." Water resources may be the purview of a Ministry of Environment and Natural Resources. Sewers and bulk water transmission lines may be the responsibility of the Ministry of Public Works. Emptying septic tanks may be a municipal mandate under the Ministry of Local Government. Programs to subsidize construction of latrines may be operated by the Ministry of Health. The Ministry of Finance usually regulates foreign aid and investments, allocates national funds and may even get involved in tariff setting. The Ministry of Economic Development may influence or control national and foreign investment and decisions on industrial location with consequent impacts on local infrastructure. Coordinating these stakeholders and reconciling their diverse interests are potentially very rewarding, yet challenging to accomplish.
Politicians	Elected officials need to be involved in planning and implementation of WS&S programs. They can inform the government about the needs and desires of constituents and may figure strongly in policy and program design. It is important to understand that politicians are also at great risk from inappropriate or poorly implemented programs and policies. Experience shows that it is essential to actively engage politicians in the planning process to raise their understanding and acceptance. Politicians also provide another means to inform the public.
Non-Government Organizations (NGOs)	NGOs can be valuable partners in the planning and implementation of WS&S programs. They can be particularly effective links to households and community groups by obtaining input concerning demand for services, affordability and willingness to pay; disseminating information and training; and mobilizing and organizing self-help labor. "Water users groups" are specialized NGOs that play an important role in local management—especially promotion, distribution and fee collection—of

small-scale water supply projects. A vast range of other NGOs may be interested to promote WS&S programs, including those representing

- women and youth;
- socially disadvantaged people, the urban poor;
- religious and cultural organizations;
- community groups, homeowner associations;
- environmental interests;
- public health and humanitarian assistance; and
- business associations and chambers of commerce.

In many places, NGOs with good experience in community development exist, but their knowledge of water supply and sanitation is limited. WS&S programs may be designed to include orientation and training to build their capacity as effective partners.

Media

Though it has no major direct interest, the media can be influential in supporting or opposing WS&S projects and is an effective means of stakeholder outreach. Frequent media briefings can assist in building public support for government and community-based programs, legal and regulatory reforms and privatization initiatives.

Institutional Framework

The institutional framework consists of formal and informal arrangements and links between stakeholders. WS&S programs must work within existing frameworks that are well established and powerful. It is important to understand the roles, mandates, limitations and structures of these related organizations. Many WS&S projects have failed because of poor coordination among stakeholder institutions.

WS&S programs may also establish new roles, responsibilities and links between stakeholders, and they often result in formal restructuring of the institutional framework. Care must be taken to clearly define roles and responsibilities and to establish and maintain accountability. For example, responsibility for strategic planning and regulation should be separated from responsibility for WS&S operations.

DECENTRALIZATION

In most places, water is found and consumed locally. Unlike many other commodities, it is not normally transported over long distances. Sanitation services are similarly local in nature. Nevertheless, because of their importance, water resources and supply systems are often tightly controlled and administered by central government. Although centralization offers some economies of scale—for example, making available specialized expertise—the trend in many countries is to place the responsibility for service delivery at the lowest capable level of government or the community and to partner with NGOs and the private sector. [IADB, 1999] [Linares, 1999]

Principles of decentralization can be applied to physical infrastructure and institutions alike, and there can be useful combinations of centralized and decentralized systems. Decentralization is a general term that may encompass a number of quite different concepts, including the following:

Deconcentration—relocation of central decision-making closer to the location of activities, for example, by opening regional or branch offices of central government ministries or agencies.

Delegation—assignment of specific decisionmaking authority to subordinate government bodies or parastatal organizations.

Devolution—transfer of central authority by granting independent political, fiscal and administrative powers to sub-national governments.

Decentralization

Decentralization is the process of relocating power, authority and responsibilities from higher to lower levels of government. Decentralization can reduce administrative and bureaucratic costs while making public services more responsive and accountable by closing the gap between providers and customers. Global experience indicates that decentralization increases the likelihood that policies and projects will reflect local need and conditions. A decentralized WS&S sector enables management to develop unique local solutions and provides greater flexibility in decision making. [Fragano, 2001]

A realistic assignment of WS&S functions to the levels of government might locate broad policy-making and regulatory powers at the highest levels of government. State, provincial or municipal governments would be responsible for implementing sector programs and monitoring and enforcing regulations. Local or regional water supply and sanitation companies would be responsible for implementating plans and managing and operating infrastructure systems. It is important to communicate clearly to all stakeholders the division of roles and responsibilities and mandates for the WS&S sector. [Edwards, 1997]

In decentralizing WS&S services, it is equally important to ensure that the assignment of responsibilities is matched by appropriate powers, for

example, by giving cities the statutory authority to raise and manage finances.

Enterprise Reform and Capacity Building

WS&S enterprises can be only as good as the people they employ and the environment in which they operate. Political interference is a common constraint to their performance. Decentralization highlights the need for capacity building and institutional development, including the following:

Management—The management of water supply and sanitation is a specialized function and therefore requires appropriately qualified managers. In addition to having technical expertise, managers should understand business management, including the analysis and interpretation of financial reports.

Staffing—There should be an adequate number of appropriately qualified staff, including engineers, operations and maintenance personal and accountants. The ability to recruit and retain suitably qualified individuals depends very much on the size of the institution and its ability to pay attractive wages. By reducing the size of WS&S organizations, decentralization and corporatization may in fact make it more difficult to afford and retain skilled specialists. WS&S program design must account for this risk, possibly by contracting with the private sector for specialized services or by arranging to share expertise between several cities.

Accountability—The lack of clearly defined responsibilities, performance targets and reporting requirements and poor internal or external audit procedures for WS&S enterprises makes it difficult to hold them accountable. Enterprises should be given clearly identified performance targets and held accountable to them.

Autonomy—Lack of autonomy is a serious impediment to good institutional performance in the WS&S sector. Perhaps more than any other public service, water and sanitation enterprises are constrained by “political interference.” This frequently affects the selection and appointment of key personnel and the ability to make plans and set priorities and to increase tariffs when required. Inability to take effective measures against government and public sector institutions that fail to pay their WS&S bills or abuse the system (for example, by making unauthorized modifications) also jeopardizes the autonomy of many WS&S enterprises. Increased autonomy, within a framework of standards, targets and accountability, has the potential to significantly improve performance.

Training—When public institutions are privatized, the new owners often provide extensive training for staff retained from the public sector, which suggests that the public sector typically devotes inadequate resources to developing the workforce. A training needs assessment and program can lead to cost-effective improvements in performance, but the effectiveness of training efforts in bringing about on-the-job improvements must be carefully monitored.

Rewards—Salaries and wages in municipal enterprises are rarely related to the performance of the enterprise or the individual employee. Efficient work is not necessarily rewarded. Some governments make performance contracts with institutions that reward the achievement of targets and base promotion and wage levels on performance rather than on seniority.

Funding—Most of the suggested performance enhancements are not capital intensive and can be funded in the long run by the savings they generate through improved efficiency.

Local Government Capacity Building

Good governance is essential for smooth operation of water supply and sanitation projects, regardless of the degree of decentralization. Good governance encompasses appropriate accountability, responsiveness, transparency, adherence to the rule of law and public participation in the development process. These are general themes for strengthening local government as part of the decentralization process.

Local governments often need to acquire new technical, management and administrative skills specifically related to decentralization of WS&S services. Capacity building is the process of strengthening organizations and individuals to improve their performance, which usually involves the transfer of skills, improvement of organizational structures and management and administrative processes.

When planning for decentralization of WS&S services, it is important to assess the existing capabilities of important local government bodies and to design and provide sufficient funding for capacity-building programs. Enterprise reform, too, is often subject to oversight by a large number of superior government institutions, often resulting in insistence on inappropriate or unachievable standards or procedures. Gaining the acceptance of institutional reforms and the adaptation of standards and procedures can also be considered as a capacity-building activity, and one that may take years to implement.

Community and Household Capacity Building

Communities and households already contribute a large amount toward the construction of local and in-house facilities. Capacity-building programs are needed that target their needs, including how to finance and repay construction costs and how to design, build and operate onsite or community-based sanitation systems. To support these community-based approaches, governments need to establish realistic standards and monitor their application.

FINANCE

Introduction

Water supply and sanitation projects are costly and require creative, innovative financing arrangements to assemble sufficient funding and to make the costs affordable for customers.

Ability and Willingness to Pay

First and foremost, the quantity and quality of services provided must be at a level that is *affordable* and for which customers are *willing to pay.*

Affordability refers to the income level in the community as a whole and to household incomes and expenditure patterns. It is particularly important for poor households who frequently pay a large proportion of their income for water supply and sanitation. The cost of service is somewhat less important to most industrial and commercial customers because water and sanitation charges are a relatively small part of the cost of doing business. *Willingness to pay* must be considered in light of other competing demands on household income and the value customers place on the services provided. When these principles are ignored, the services cannot be sustained without continuing subsidies.

People and governments are normally willing to pay for the purification and delivery of water but much less willing to pay for sanitation services. More specifically, households show relatively high willingness to pay for on-site improvements and some willingness to pay for community-level infrastructure, but they are typically much less willing to pay for trunk infrastructure and offsite sanitation. Thus, while cities typically make substantial investments in developing water supply systems, much less investment has been made in offsite and downstream sanitation systems.

Willingness to pay depends only partly on ability to pay. It may also be strongly influenced by existing levels of customer satisfaction (or dissatisfaction) with WS&S and other municipal services and by general perceptions of local government's performance. Residents often assume, frequently with politicians' encouragement, that higher levels of services can be provided without commensurate tariff increases. A long history of subsidized WS&S services may also undermine willingness to pay, particularly if new customers are asked to pay a greater share of the capital costs than existing customers who have received substantial subsidies. It is important for planners to understand what customers will pay, and the determining factors, before deciding on service levels.

Tariff Levels

It is now generally recognized that WS&S services cannot be given free or indefinitely subsidized—these services should be paid for directly by the customers. Therefore, setting the proper *level* and *structure* of tariffs is vital to sustainability. Global experience shows that failure to properly address these principles has contributed significantly to the poor state of WS&S services. In respect to the *level* of the tariffs, sound economic principles prescribe that tariffs should be set so that the full current economic cost of providing these services is recovered from customers.

This principle is reflected in the typical covenant that might be negotiated for loans from multilateral development banks. It would require that the average tariff be set at a level that will earn a net rate of return (after meeting operation and maintenance costs and depreciation), of a specified percentage, on revalued net fixed assets in operation. The specified rate of return would normally be set at the opportunity cost of capital. Revaluations of net fixed assets in operation would be required periodically, perhaps every fifth year. Such an advanced approach to pricing can be applied only for large sophisticated public or private utilities serving metropolitan areas. [European Union, undated]

Smaller utilities often use a simpler approach, setting tariffs to recover: (a) operation and maintenance costs; (b) debt servicing (including the repayment of and interest on loans) *or* depreciation, *whichever is the higher,* and (c) contribution toward future investment. A more simplistic approach that is economically unsound but readily understood, and therefore often used for small community-based systems, prescribes that tariffs are set at a level to meet O&M costs and debt servicing requirements, the latter comprising repayment of and interest on loans. This approach can be inequitable when loans for long-lived assets have to be repaid over rather short periods of time or when part of the cost of development is financed by subsidies.

In extreme cases, existing tariffs charged by utilities may not even cover annual O&M costs. In such cases, raising tariffs to recover O&M costs would be a good first step before progressing to more realistic pricing.

Tariffs for sanitation services are often complex. Generally, sewer charges are based on the value of the property being served or related to water consumption and/or the degree of pollution discharged by the customer—particularly industry. Charges for onsite sanitation systems are usually lump sums (e.g., for emptying septic tanks), although they might be more affordable if converted to uniform monthly fees. Tariff levels that do not ensure financial viability of a utility or community-based system will lead to a further deterioration of the WS&S sector.

Tariff Structures

Tariff structures often include *increasing block tariffs* that charge successively higher rates for higher levels of water consumption. Also, the tariff may differentiate between residential and commercial or industrial customers, with the latter groups paying a higher average tariff for the same level of consumption. These approaches encourage water conservation and make possible cross-subsidies to low-income households.

Tariff-Setting Objectives

As can be gathered from the foregoing text, tariff setting requires a delicate balance between economic and social policy objectives. Typically, tariff-setting objectives include the need for long-term financial viability, the desire for universal access, water conservation and the provision of subsidies to make basic consumption affordable to the poor (though subsidies for operation and maintenance should be avoided, if possible).

Financing of Capital Investment

Funding for the construction of water supply and sanitation infrastructure can be sought from various sources:

Central government may provide grant or loan funding, especially when it has such major taxing powers as collection of income taxes, or when it identifies such external benefits as improved public health, economic growth or employment generation.

Local government is influenced by voters, and thus may allocate budget funds for water supply and sanitation in response to popular demand. Unfortunately, local government is often also responsible for the poor state of WS&S because it will often not support politically unpopular tariff increases even when they are clearly justified.

Customers pay the full cost of WS&S facilities in the house and on the land parcel and are often required to contribute directly to the capital cost of offsite infrastructure. For example, customers cover the cost of service connections to the home, business or factory.

Private water vendors who obtain water from public resources should share the financial burden of developing more costly distant water sources for public sector use. Their consumption can be metered and appropriately priced, and their selling prices can be regulated, if necessary.

External support agencies such as the World Bank, regional development banks and bilateral donors have provided low-cost finance for development in the past. However, the current trend is for such external support agencies to gradually phase out of direct project financing, instead focusing on technical assistance that will leverage funding from other sources such as local and foreign capital markets.

Private sector—works increasingly in partnership with government to provide capital and management resources. This applies particularly to the WS&S sector, in which many different forms of public-private sector participation have developed, each tailored to local needs and based on differential sharing of the benefits and risk of such partnerships. PSP is addressed more fully in a later section.

Financial Management

Long-term viability of WS&S services also depends on sound financial management by local governments and service providers. Cost control and efficient revenue collection are particularly important. Sound financial management requires the use of commercial accounting methods. Billing and collection systems are particularly important. When there are many customers, these systems should be computerized. Local authorities must be empowered and willing to take action against delinquent customers, including cutting off their water supply. Government agencies such as ministries, the army, hospitals or schools are often the greatest and most troublesome delinquents. It is highly desirable that governments should have and exercise the authority to deduct payments at the source—from any budget allocations due to chronically delinquent

agencies—and to transfer payments directly to the WS&S enterprises.

Water supply and sanitation enterprises need well-qualified financial staff and independent external auditing of operations and management. However, it is often challenging to attract and retain suitable personnel on government pay scales. Upgrading financial management systems, while essential, is nonetheless subject to such constraints as lack of funding, inability and unwillingness to pay, and regrettably, sometimes to a reluctance to make hard political decisions.

TECHNOLOGY

Technology Is Not the Objective

Municipalities and enterprises are responsible for ensuring safe, reliable, affordable and sustainable water and sanitation services. The function of technology is solely to help achieve this objective—there is no inherent advantage to any particular or "advanced" or any particular technology. For example, most cities in developing countries have leaky intermittent systems that cannot be trusted to deliver safe water. Highly – sophisticated water treatment processes will not solve this, but simple measures to control unaccounted-for water could double the supply available to users and make the systems much safer. Similarly, simple onsite sanitation can protect people's health as effectively as a sewer system. Generally, planners should aim for "robust" systems: technologies and institutional arrangements that depend on readily available local resources and expertise, rather than imported ones.

Local Factors Determine Technology Choice

There are many good technologies from which to choose, but to ensure sustainability, they have to be matched to local circumstances. Sound conventional engineering should ensure that the technologies considered would be suitable under given site conditions such as topography, climate, geology, available water resources and water table. Other factors affecting the suitability of a technology include the following:

- the size and density of the city and of its various communities and service areas;
- its stage of development, including institutional capacity and the sophistication of local manufacturing and service industries, and access to spare parts and specialized equipment (if required);
- local culture, which will often vary by community, and which greatly influences whether or not a specific solution is acceptable to users; and
- users' ability and willingness to pay.

Consider Conventional and Innovative Technologies

Water supply technologies can range from rainwater collection at the household level to fully reticulated distribution systems. Incentives for water conservation, reduction of UFW and incremental upgrades to existing systems should always be considered, as they are usually more cost effective than the construction of new waterworks.

Effective sanitation can be provided by systems ranging from household pit latrines and pour-flush toilets to conventional sewerage. If water is scarce (city-wide or locally), then extending conventional waterborne waste disposal may be inappropriate. In low-income, water-short areas in particular, which comprise the majority of those needing service, the "don't mix" principle should often be applied: keeping feces and urine apart and using a minimum of water (ideally zero) for waste disposal, thus reducing the amount of pathogenic material that has to be treated

and allowing nutrient recovery through activities such as urban agriculture. Although composting and separation of urine are widely considered impractical, the recent movement to introduce “eco-sanitation” seems to be having some success, for example, in China. These approaches should be considered when planning to service water-short informal settlements.

Ensure Acceptability to Users

There are many factors that affect whether a particular package of technology—and how it will be delivered, managed and paid for—will be acceptable on social, cultural, religious, financial or other grounds. Planners cannot assume that people will accept or desire the services offered; they need to find out firsthand what is appropriate. Social scientists may be needed to determine whether acceptability can be enhanced by small changes in design or other elements, whether promotion and education campaigns will be needed, how much demonstration and piloting will be required ahead of full-scale implementation or whether the obviously “correct” technical solution will run into serious problems for reasons that may be obscure to planners.

Link Water and Sanitation

Planning for WS&S programs should be holistic and realistic. A given population will produce a predictable amount of feces and urine, and this amount has to be managed properly by whatever means are feasible. A given amount of water used in a city each day will produce a corresponding amount of wastewater, and it is irresponsible to increase water supply without making provisions for its safe collection and disposal after use.

In many cities, a combination of inadequate sanitation, leaky sewers and leachate from septic tanks and other onsite systems has already irreversibly contaminated overdrawn urban aquifers (or will do so in the near future); prudent water supply planning would assume that these aquifers will have to be abandoned and other sources found.

Generally, project planners should always emphasize water conservation, which has the additional benefit that it will often make it possible to adopt local sanitation solutions and local management of pathogens.

Link WS&S to Other Services

Although this Guide deals solely with water supply and sanitation services, these services often cannot be treated in isolation. For example, in many cities combined sewers, carrying both stormwater and sewage, will persist in the foreseeable future, and planning will have to reflect the needs of both services. In some areas, the “least-worst” solution for the near future is that partially treated wastewater will be discharged to open drains; proper management of municipal solid wastes then becomes critical to ensure that blocked drains do not create health hazards.

Consider All Costs

For comparisons of technologies to be valid, all associated costs must be considered. For example, a substantial, but often ignored, part of the total cost of conventional sewerage is the cost of the toilet, the connection to the street sewer and the water used for flushing. Similarly, pit latrines need proper means of sullage disposal to be comparable with sewer

	systems. These are “hardware” costs. Just as important are “software” costs: the institutional support needed to ensure project success. Support includes activities such as training and other institutional development components, program promotion, hygiene education programs and establishing revolving funds to assist low-income homeowners. The software costs may range from 10% to 30% of hardware costs (higher percentages apply to options with low hardware costs, which are usually household- or community-based and need more support, but the total costs of such options usually still remain significantly below conventional solutions). For example, while donors may initially fund software costs, if these costs are not subsequently included in national planning, they will not appear in any agency budget and the project will not be sustainable or replicable. Other “unfunded obligations” often include regulation and enforcement, laboratory testing, monitoring and evaluation.
Plan for a Mix of Solutions	Any large urban area will need a mix of technologies. There is an intimate connection between technology choice, the institutional framework and sustainability. Each type of technology must be assessed in terms of its institutional requirements during the full project cycle—planning, implementation, operation and maintenance, regulation and monitoring and evaluation—and a corresponding range of institutions and institutional support mechanisms (such as training) ensured. WS&S program planners are usually familiar with the institutional needs of large conventional systems, but are far less clear about how to ensure success with lower-cost, community-based alternatives. They will often need to seek advice from other fields, such as social scientists and community development specialists.
Be Skeptical about “Economies of Scale”	Water and sewer systems demonstrate economies of scale: large installations generally handle greater flows at lower unit costs. However, the costs (for example, constructing sewer ring mains to permit centralized treatment plants) may more than offset any economies. Another risk is that large facilities may prove to be poorly sited if uncontrolled growth occurs elsewhere, thus increasing connection costs. In addition, failure of large systems (through poor operation and maintenance, or external factors such as unreliable power supplies) has much more severe economic, environmental and health consequences than isolated failures of smaller installations. The “Safe Water System” is an example of a technology “that employs simple, inexpensive and robust technologies appropriate for the developing world…to make water safe through disinfection and safe storage at the point of use.” [U.S. Department of Health and Human Services, undated]

LAWS AND REGULATIONS

The Need for Reform

A wide variety of laws and regulations govern water supply and sanitation projects. They are often based on best practices that have evolved in industrialized countries and are therefore inappropriate or unenforceable in many developing countries. Rather than protecting the public, they frustrate the sustainable delivery of services. Because laws and regulations usually take considerable time and effort to change, donor-supported WS&S programs often obtain exemptions or waivers. While doing so may resolve specific problems, it is important to set in motion a process of legal and regulatory change; otherwise, once the donors depart, it may not be possible to replicate the new approaches that are essential if conditions are to improve. [USAID, 2000c]

Acceptable Versus Optimal Solutions

Insisting on optimal quality of services and construction standards may simply result in there being no solution that is both legal and feasible. Given the urgent need for widespread improvements to WS&S services, policy makers need to show flexibility to enable the adoption and replication of new approaches. Sometimes this means permitting the "least-worst" approach—which is preferable to an "ideal" approach that cannot be achieved or sustained.

Adopting Appropriate Standards

Existing standards—including design standards and administrative requirements—may also be inappropriate. For example, requiring a sewer hookup or a septic tank before issuing a residential occupancy permit may be inappropriate or unaffordable. In some situations, other sanitation options would provide the same health benefits, and using water to flush excreta may not be sound practice if water is in short supply. The rationale behind performance standards and administrative procedures should be closely examined, and reexamined periodically, to achieve a reasonable balance between safety, economy and utility.

Effective Enforcement

Not all laws are enforced, and some are enforced selectively. When making or amending laws, it is important to be clear about what the law is intended to achieve and to be realistic about what is enforceable. Seeking reasonable widespread compliance with moderate standards through simple testing may have greater overall public benefits than trying to use sophisticated tests to impose higher standards. Penalties have to be commensurate with the risk or actual damage and imposed consistently.

Dealing with Vested Interests

Many ministries (such as environment, planning, water resources, local government and health) with power to regulate WS&S activities do not have direct responsibility for urban WS&S projects. It is essential to get them closely involved as stakeholders, or else they have little incentive to support and advocate legal and regulatory reforms. [Klein, 1996]

Project authorities will also need to work closely with other sectors. For example, the agriculture sector is often closely concerned with, and may

have some jurisdiction over, matters such as water abstractions, wastewater discharges and reuse of treated wastewater and biosolids.

Potential Obstacles to Reform

Planners need to be careful to identify the key constraints that may have to be addressed before a program can be implemented. For example:

- If private sector participation is envisaged, it may be necessary to clarify or modify constitutional provisions governing foreign ownership of assets, private ownership of assets constructed with public funds or the activities of foreign companies.
- If community-based management is proposed, it may be necessary to strengthen the legal status of community-based organizations (CBOs), their ability to enter into contracts, their authority to operate bank accounts or their powers to collect charges and impose sanctions. NGOs may be legally prevented from operating revolving funds for home improvements or may be taxed on funds that flow through their accounts.
- Institutional reform may be frustrated by civil service regulations restricting merit pay or performance incentives and depriving local managers of “hire and fire” powers, or by employment conditions negotiated with unions.

POLITICS

WS&S is a neglected sector. Sustained, widespread improvement is not possible unless customers—individuals and organizations—express demand through political processes. Only then will governments give WS&S services the attention they deserve and require. Declarations such as “water for all” or “health for all” that typically originate from the Ministry of Health rarely enjoy full cabinet support, nor do they cause serious or lasting reorientation of national policies or resources. Improved WS&S needs to be accepted as a national development priority.

The “Strategic Issues” identified in this Section emphasize the important role of government in establishing a suitable enabling environment for sustainable WS&S development. If national governments do not take the lead or do not support WS&S, then local initiatives are likely to be ineffective or unsustainable. Although the approach to mobilizing political support will vary from country to country, the issues identified below are common.

Commitment to Serve the Poor

Commitment to the water sector will contribute to poverty reduction, since poor households are the most likely to lack adequate services. This fact raises real political concerns, such as the potential for public backlash against price increases or concerns that the provision of services would legitimize the illegal occupation of land. Integrated programs may be called for to resolve such issues in tandem with WS&S programs.

National Water Resources Policy

It is unrealistic to expect local authorities to adopt and enforce innovative, sustainable water resources management policies unless they are supported by a sound national policy framework. This framework must address contentious issues such as efficient and equitable allocation, pricing of irrigation water, control of industrial and private abstractions, protection of aquifers from over-abstraction and conditions governing wastewater discharges.

Policies that Reflect the Role of Water

Government policy and plans should recognize the role of water as both a social and an economic good. This recognition should result in a more equitable and rational allocation of resources, for example, by reducing or eliminating subsidies to well-off customers and reducing the high cost of service often paid by the poor.

Acceptance of a Range of Standards

Imported performance targets, standards and technologies are frequently inappropriate (for example, requiring minimum plot sizes, water supply connections and either septic tanks or sewers). They are not enforceable and therefore are unevenly enforced, possibly contributing to corruption. Governments should support the development, adoption and use of locally appropriate standards that are designed to extend sustainable coverage while minimizing environmental and health risks.

Participation and Community Input	It is generally accepted that end users must be involved in all aspects of the planning of services if the resulting systems are to be appropriate, affordable and sustainable. The users may even become involved in operation and maintenance of the systems. Achieving this level of participation may require a considerable change in the "corporate culture" of WS&S institutions; the provision of resources to develop participatory processes, community-based skills and institutions and legal reforms to enable local bodies or community groups to act with greater power and authority.
Professional and Municipal Associations	Similarly, municipal associations and associations of professionals in the WS&S sectors can and should contribute actively to capacity building and institutional and legal reforms. They can be particularly effective in marshaling professional opinion to feed into national debate on policies, standards and legal/regulatory reform. However, care must be taken when working with associations, because they may also be "captured" by advocates of the status quo and therefore resistant to the adoption of new approaches, technologies and standards.
Reforms, Corporatization and Privatization Policy	There are widespread efforts to improve the efficiency of local WS&S institutions through reforms, corporatization and privatization. These approaches typically include granting considerable autonomy from central control, including civil service regulations. This may lead to radical restructuring, changing of accounting systems, outsourcing of services and adoption of incentive systems and improved personnel policies. Most important, it could empower local authorities to set tariffs based more on financial than political considerations. The extent to which these changes can be applied, and the preconditions to be met before central government will agree to them, need to be openly discussed and clearly defined. The potential for efficiency gains through reforms and corporatization should be thoroughly explored and tested before moving to privatization of WS&S services.
Donor Management	Donor coordination and collaboration is generally inadequate. Especially in countries with limited management capacity, this contributes to confusion at local levels. An important government responsibility is to control donor involvement and to ensure that the policies and solutions developed with external assistance are mutually consistent and appropriate to the application.

Section II: WS&S PROGRAM PLANNING

The WS&S Program

WS&S systems need to be planned—those that develop in an ad hoc manner are less efficient, more costly and often unsustainable. Planning of WS&S systems and services is commonly a function of the local authority and the responsible municipal enterprises. In the past, many municipalities focused on preparing “master plans,” setting out an ideal for longer-term development of services. However, experience has shown that these master plans were almost always over-ambitious, poorly matched to local needs and resources, and, because of the effort required, rarely updated to reflect changing needs. Current consensus holds that it is more useful and appropriate to develop strategic plans setting out approaches and policies for the development of services. These plans will be translated into a series of programs, developed in sequence to respond to current needs and conditions.

This Section introduces a simplified process to prepare an Urban Water Supply and Sanitation Program.

WS&S Program Characteristics

The WS&S program is a strategic plan for WS&S development at the city level, typically covering a 3- to 5-year period. The program is not a master plan or engineering design. Rather, it is a forward-looking strategy and course of action to meet stated goals for WS&S service provision. WS&S programs should be

- practical and action oriented;
- affordable, corresponding to available resources and customers’ willingness to pay;
- acceptable to decision makers, customers and other stakeholders;
- flexible and adaptable;
- linked to other plans and programs, such as urban physical or structure plans and capital investment plans;
- locally developed using available resources, supplemented by external national or foreign resources if available;
- documented on paper and formally approved by the local authority; and
- reviewed and updated regularly.

Given the magnitude of the WS&S shortfall, it is important for developing countries to adopt approaches that can readily be replicated using domestic resources, rather than relying on foreign donors. They should also be careful not to adopt standards that reflect donor requirements but that cannot be sustained using local resources and regulations.

WS&S Planning

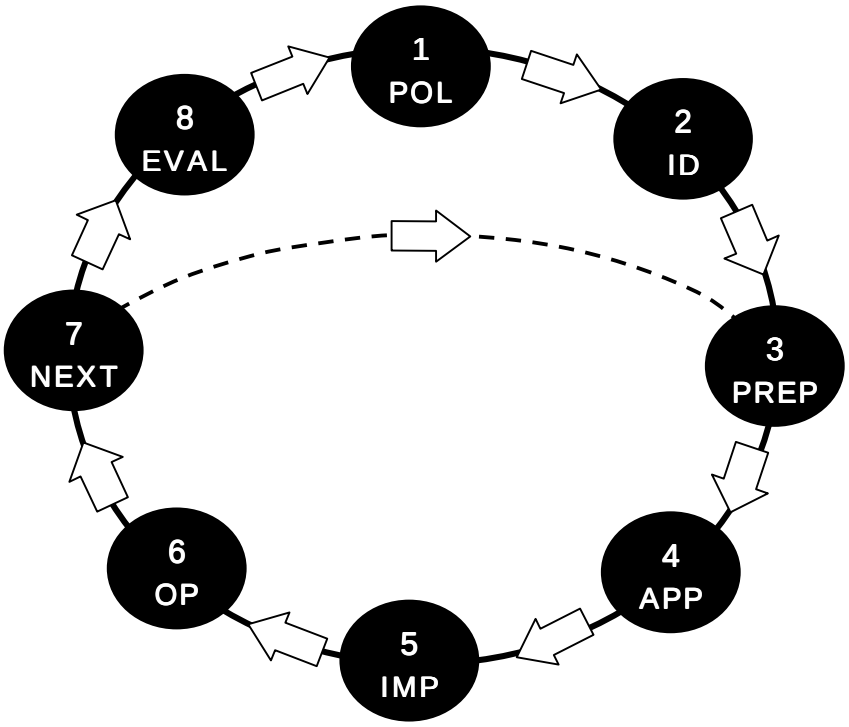
In the context of this Guide, *planning* is the process of preparing an urban WS&S program. The planning process should be continuous and iterative, and the program updated periodically as new needs and priorities evolve, as new and better information becomes available and as experience is gained in the implementation of specific WS&S projects. [UNICEF, 1997]

The process of preparing the WS&S program will itself serve as a valuable capacity-building activity for all participants. The planning activities and process should be "institutionalized"—made the responsibility of specific departments or individuals and linked with other planning processes and the city's budgeting cycle. Results and activities should be reported regularly to senior officials and to stakeholder groups.

Typical Planning Process

It is beyond the scope of this Guide to present a detailed tutorial on procedures for preparing infrastructure programs and plans. However, the following diagram showing the "DFID Project Cycle" illustrates a typical sequence of activities that are universally applicable.

Project Cycle



POL
Policy development, sector planning and programme formulation

IMP
Implementation and monitoring

ID
Programme and project identification

OP
Operation and Monitoring

PREP
Programme and project preparation

NEXT
Extensions or next phase programme and project identification

APP
Programme and project appraisal and approval

EVAL
Evaluation

[WELL, 1998]

WS&S Projects

A WS&S program will usually include one or many separate *projects* for specific locations, communities or items of infrastructure. These projects should include the city's highest priority activities for the water and sanitation sector. They may address different types of services and "belong" to different levels of government. For example, the program might include projects to build or upgrade primary and secondary networks, which would be implemented by the city, together with smaller projects targeting tertiary networks, which would be implemented at the community or neighborhood level.

The WS&S program's financing plan should provide estimates of the overall funding requirements of the proposed activities and identify a variety of financing mechanisms corresponding to the types of projects that are included. For example, it may identify municipal and state funding for the construction of secondary networks, community funded local networks and private financing of major capital works through private sector participation (PSP).

Feasibility Studies

Pre-feasibility studies and *feasibility studies* are conducted to determine the financial, technical, social and institutional viability of each project *Pre-feasibility studies* are preliminary assessments used to qualify potential projects for inclusion in the program. Problems identified at this stage may indicate the need to refine or modify the project concept and implementation mechanisms or may disqualify a project from further consideration.

Projects that are included in the program are normally the subject of full *feasibility studies* as the first step in the implementation process. Feasibility studies may be prepared by staff of the local authority or municipal enterprise, by private consultants or firms, or jointly. Stakeholders should be involved throughout the development of the studies. City officials rely heavily on feasibility studies as part of the process of approving projects and specific capital investments.

Crosscutting Components

In addition to the projects, the WS&S program will include crosscutting activities that are of wider importance and impact. These activities could include a medium-term capacity-building or institutional development program that encompasses numerous departments and organizations, or a plan to increase the availability of municipal infrastructure finance by improving the legal and regulatory environment and establishing links to domestic capital markets.

Implementation Plans

Once proven feasible and approved, each project or crosscutting component of the program will require its own detailed *implementation plan.* These implementation plans or "action plans" describe a course of action that sets out the results to be accomplished; the preliminary physical plan and engineering specifications, or capacity-building measures; a schedule for the work; the amount of money and other resources required; the type of contracting and procurement to be used; and other principles or standards to be applied.

Conceptual Framework for WS&S Program

The following diagram presents a conceptual overview of the components of an illustrative WS&S program, including typical steps in project assessment, design and implementation.

CONCEPTUAL FRAMEWORK FOR WS&S PROGRAM IMPLEMENTATION

WS&S PROGRAM

Addresses the city as a whole.

Medium term, 3–5 years.

Sets priorities in light of needs and resources.

Identifies projects and activities and their timing.

Approved by council.

Regularly reviewed and updated.

Assessment of:
- enabling environment
- available resources
- service problems, needs and priorities
- existing systems, service levels and standards

Presentation of:
- goals, objectives and strategies
- alternative projects, selection criteria and priorities
- overall financing and scheduling plans
- projects selected for implementation
- justification of program and selected projects

PROJECTS

PROJECT IDENTIFICATION

Project 1
Description

Project 2

Project 3

Approval?

FEASIBILITY ASSESSMENTS

Project 1
Feasibility Assessment

Project 2

Project 3

Approval?

DETAILED PLANNING

Project 1
Physical Plans
Engineering Designs
Financing Plan
O&M Plan
Capacity Building Plan

Project 2

Project 3

IMPLEMENTATION

Project 1
Procurement
Construction
Training
Commissioning
Operation

Project 2

Project 3

CROSSCUTTING ACTIVITIES

Institutional Reforms, Capacity Building, Legal and Regulatory Reforms

Communication Plan, Publicity and Outreach

Financial Management Reforms, Capital Investment Process, Privatization, Capital Markets Development

Monitoring, Evaluation and Feedback

Community and Private Sector Involvement

Community groups are increasingly involved in WS&S planning to make programs more realistic and responsive to local needs and to build support for implementation. Private sector participation can bring in much-needed expertise, introduce market efficiencies and provide access to private capital. The Guide provides additional notes on community-based planning and planning for large private sector participation projects at the end of the Planning Section.

The generic planning process is oriented to preparing the WS&S Program with participation by communities and potential private sector partners. The role of community and private sector participation needs to be reviewed and determined as early as possible in the planning process, because these decisions will substantially influence program design, particularly the institutional, financial and technology options that are adopted. For example, the selection of technology options will emerge from consultations with the community (customers), which is normally one of the first activities in the community-based planning process. Since community-based planning will not be feasible or optimal in all communities, early involvement of the community is essential to define where it should be used and what the implications are for the overall program. Similarly, the planning team should consult early with potential private sector partners to gauge their interest and preparedness to provide services under the WS&S Program.

The outcome of these consultations will determine the extent and timing of participation by community and private sector partners in the planning and implementation process.

Demand-Driven Planning

The planning approach advocated in this Section departs substantially from supply-driven procedures, which often start with an assessment of needs for conventional WS&S systems, then proceed to the preparation of designs and cost estimates, financial feasibility and affordability. Experience shows that resources spent in preparing assessments and designs may be wasted if the proposed projects are later found to be financially infeasible.

Instead, one of the first tasks should be to make preliminary estimates of the feasible level of investment, including the community's effective demand, expressed as its willingness to pay, for water supply and sanitation services. The total amount that can be charged to customers, less the amount already committed for existing services and projects, is the maximum that can be afforded for a new program. This amount must adequately cover annual operating and maintenance charges and repayment of loans and interest costs on borrowed money. This approach provides the benchmark on which the maximum affordable investment in water supply and sanitation should be based, thus providing useful parameters for the selection of technologies, pricing and institutional options. [UNDP/The World Bank, 1999b]

THE ILLUSTRATIVE WORK PLAN

Planners are encouraged to document the planning process by defining the tasks in a work plan as an aid to budgeting time and other resources, and to improve coordination and understanding of diverse participants.

This Section documents a generic planning process in the form of an *illustrative work plan* using the critical path method (CPM). The work plan is a minimal framework for preparation of a WS&S program. It includes a typical set of WS&S planning tasks, but it is unlikely to be a perfect fit in any specific situation. Rather, it must be adapted and modified to suit local conditions, not least the availability of time and expertise. Cities that enjoy access to ample resources may be able to prepare more ambitious programs, possibly with support from specialized consultants. Less affluent or smaller cities may have to rely on their own staff resources.

Electronic copies of the illustrative work plan, community and PSP planning processes are available as Microsoft Project templates, and can be obtained from the CD-ROM or web site versions of the WS&S Guide.

The time needed to prepare a WS&S program greatly depends on the quality and number of staff who will take part, the size of the population to be served and many other local conditions. A reasonable goal would be to prepare the program within a period of one year. This assumes that preparation of the program will proceed independently of legal, policy and institutional reforms that may require more time to implement.

Subsequent updating of a program may require less time and fewer resources, especially if it is done on a regular basis.

The following narrative section contains a brief orientation to the main planning tasks. The level of emphasis placed on different planning activities greatly depends on such local conditions as the size of the urban area and the magnitude of the proposed program, as well as the nature of stakeholder involvement. The Illustrative Work Plan Diagram, which follows the narrative, renders the work plan in graphic form to illustrate the approximate sequencing and dependence of tasks. Although many tasks are presented in sequence, often they can overlap or be undertaken in parallel.

Planning Resource Requirements

It is difficult to generalize about the resources and time needed to prepare a program. Much depends on the complexities of the particular urban area, its stage of development, technologies that might be applied and, of course, the absolute size of the program. A rough estimate of the “soft costs”—consulting and staff technical inputs required for planning and implementation of the program—would range from 7% to 10% of total investment. Kevin Tayler suggests an allowance of 7.5% of capital costs for planning and design of upgrading programs and an additional 5% for construction supervision; however, these amounts may not include

extensive community involvement. In general, the percentage of soft costs will probably increase as technical complexity goes down, because of both the lower cost of physical works and the additional software (consultation, training, hygiene education) needed at the community level.[9]

Actual cost will depend on the type of project, the level of skills available locally, the balance between staff and outside consultants and the amount of training required.

Although it seems costly, planning is cost-effective in that it allows the adoption of lower-cost solutions and ensures long-term sustainability of projects and other elements of the WS&S program.

[9] Tayler, Kevin, and Andrew Cotton. January 1993. *Urban Upgrading—Options and Procedures for Pakistan.* GHK/MRM International, London, and WEDC, Loughborough University, UK. (especially pp. 147-161, Chapter 12: Costs, Cost Recovery and Affordability).

PREPARATIONS

Establish a Steering Committee

WS&S planning activities should be supervised by a *steering committee* with representatives from the local government council and relevant line agencies and utility companies. The committee should also be able to invite other stakeholders to participate in discussions and deliberations to represent groups such as the private sector, unions and professional associations, technical experts and customers. The committee will oversee the planning process on a periodic basis and facilitate the coordination among stakeholders. Inclusion of stakeholder representatives on the steering committee incorporates their concerns and builds the basis for popular acceptance of the program. Ideally, the steering committee is formed under the leadership of a lead agency (WS&S ministry or department or local development or planning agency, as appropriate).

Steering committees that include high-level officials or business leaders may only be able to meet infrequently. In such cases, a *working group* or *subcommittee* may be designated by the steering committee to be responsible for the practical implementation of its decisions and for routine supervision of the planning team.

Establish the Planning Team

The WS&S program is prepared by a multidisciplinary team of experts—the *planning team*—often composed of staff and external consultants covering various professional disciplines. The planning team requires extensive input from experts in engineering, finance, organizational development and community relations. The team is likely also to require occasional inputs from the disciplines of economics, accounting, public health, demography, and legal and regulatory frameworks. Formal assignment of team members may be required, possibly including secondment of staff or temporary reassignment of duties.

Prepare a Work Plan

Typically, the planning team (and working committee) prepares a *work plan* for approval by the steering committee. This illustrative work plan can be used as a general guide but must always be adapted to local circumstances, especially the availability of time, expertise and other resources. It is important to physically record the work plan as a tool for communication, coordination and learning. The work plan should be reviewed and updated regularly to reflect progress.

Recruit and Mobilize Consultants

If outside consultants are to be used, they must be identified and engaged under contract. Multiple contractors, including individuals or firms, may be required. This step normally requires: writing terms of reference, scopes of work or job descriptions, as appropriate; advertising the positions or contracts; selecting consultants through interviews and evaluation of proposals and writing and negotiating contract agreements. Government procurement rules may apply to the hiring of firms and individual consultants. External support agencies and international

financial institutions may bring their own procurement rules and procedures, which may restrict the ability of the local executing agency to influence the terms and selection.

Poor integration of local and foreign consultants with government counterparts is a common deficiency of planning activities, often because government counterpart staff and facilities are inadequate or consultants do not deliver the required personnel. As a result, consulting teams often tend to work in relative isolation. If the WS&S planning process is to be institutionalized, the planning team needs to function effectively within framework of municipal government institutions. This requires adequate preparation and continual engagement of the counterpart team.

Stakeholder Roles and Responsibilities

The following matrix illustrates key stakeholders and their typical roles and responsibilities in WS&S program planning and implementation.

	Policy Formation & Implementation	Sector Strategic Planning	Budget Allocations	Regulatory Control	WS&S Program Planning	Financial, Institutional [illegible]tt	Project Identification	Detailed Project Planning & Design	Project Implementation	Monitoring, Evaluation, Feedback	Operations & Maintenance (O&M)
National Government	R	R	R							r	
Provincial Government	r	R	r							r	
Special Committees	I	I			I					i	
Utility Regulatory Body	I			R						i	
Local Authority (Council)			R		R	R			R	R	
Steering Committee, Planning Team					R	r	R		I		
Water/Sanitation Enterprise					I	I	I	R	R	R	R
Consultants		I			I	i	I	I	I		
Contractors								I	R		R
Private Water/Sanitation Operators							i	i	i		i
NGOs and CBOs					I	i	i	i	i	I	i
Community Groups, Customers							i	i	i	i	i

R = **responsible**	r = **may be responsible**	I = **involved**	i = **may be involved**

DEVELOPING THE WS&S PROGRAM

Review the WS&S Strategic Issues

The team should begin by reviewing the s*trategic issues* that comprise the political, social, economic, institutional, legal and regulatory and financial environment for the WS&S sector. These issues are discussed in Section I of the Guide. Analysis of these issues will reveal opportunities and constraints. It may be necessary to address certain strategic issues before implementing parts of the WS&S program. However, resolving significant legal and institutional issues may take years and should not stand in the way of preparing the program. Rather, the program may include tasks that will improve the enabling environment and must be designed so that it can be implemented effectively even while the enabling environment is imperfect. The strategic review serves to

- identify impediments to water supply and sanitation development;
- determine which agencies are responsible and which stakeholders are interested; and
- identify remedial actions to establish a supportive enabling environment, including time and resource requirements.

The strategic review is a process of problem identification. As such, it should involve extensive stakeholder participation and may attract political interest.

In cases where the impediments are many and serious, it may be necessary to undertake an independent "Water Supply and Sanitation Sector Reform Study" to obtain a detailed assessment of constraints and remedial actions that might be necessary.

Assess Urbanization Trends and Patterns

Realistic planning for WS&S services cannot be done without knowledge about residents and customers. At a minimum, it is essential to know basic demographic characteristics of the population today—projected for at least 5 to 10 years—to provide a long-term planning context for the WS&S program. Critical data items include the population size, age/sex profiles, growth rate, household size, housing typology, household income and expenditure patterns and geographic distribution of the household and housing types. Projections of population growth by district, community or neighborhood are needed to identify future needs and help set priorities among locations.

If resources permit, it is advisable to conduct an "Urban Development Assessment" that typically includes population projections, estimates of industrial and commercial development and economic growth. [PADCO, 1999]

Similarly, it is advisable to assess local environmental conditions using, for example, the "Rapid Urban Environmental Assessment." (See the

approach prepared by Joseph Leitman for the Urban Management Programme). [Leitman, 1994]

Water Sector Assessment

Planning for the future must reflect the present types and conditions of WS&S systems, including formal and informal service mechanisms. An assessment of the current systems should therefore be conducted to equip the planning team with knowledge about present coverage of both water supply and sanitation services. Guidelines[10] prepared by international development banks suggest the following general dimensions of a WS&S assessment: [Grover, 1983]

Water Resources—briefly describe quantity and quality of surface and groundwater resources; existing plans for the development of new sources including reuse of wastewater; patterns of use by all sectors, including patterns of surplus or deficiency; actual or potential pollution problems role of various agencies in managing water resources, including allocation and water quality control. What impacts do non-potable water supply systems (e.g. irrigation, industrial users) have on the water resources used for potable water supplies?

Water Supply Systems—briefly describe and assess all existing water supply systems, public and private. Ascertain the condition and operating capacity of each system and component identify constraints to increasing or improving service. [WHO, 2000b]

Water Infrastructure—describe the specific facilities, including water sources and the characteristics of water they produce; raw water headworks and related conveyance systems; water treatment facilities; reservoirs and pumping stations; transmission and distribution systems; flow metering by different types of customers role of private sector in delivering services.

Service Coverage and Standards—describe numbers of people served by type of system and standards of service for each, including those groups not served by any improved system. What are users' attitudes toward quality, convenience and cost of service? Describe service standards: quantities used by categories of customers; water quality; reliability of supply; frequency of breakdowns. Describe water tariffs. Explain non-revenue or unaccounted-for water.

Sanitation Sector Assessment

A similar assessment of sanitation services should be conducted to profile existing sanitation systems, their coverage and adequacy in respect to established standards or targets. [WHO, 2000b]

Systems in Use—identify systems or methods currently use to dispose of human wastes and wastewater, including formal and informal practices. Identify opportunities and constraints for expansion of services,

[10] The profile of a water and sanitation sector assessment presented in this subsection is partly based on Grover, Brian. November 12, 1983. *Water Supply and Sanitation Project Preparation Handbook,* Volume 1. World Bank Technical Paper Number 12.

including the use of alternative technologies.

Sanitation Facilities—for each type of system, identify location or general extent of use (including estimates of the number in use); laws and regulations affecting design, construction and operation; industrial and privately operated wastewater treatment systems; patterns of reuse of excreta, if any; role of private sector in providing services; wastewater treatment standards and processes; stormwater impacts, in particular the presence of combined sewers; sewer overflows and treatment plant bypasses; methods of disposing effluents and sludge; comparison of quantity of water used by residents and industries and the amount of wastewater discharged through sewers; assessment of water quality in receiving bodies upstream and downstream from sewer outfalls.

Service Coverage—assess the extent of coverage (by area, population) of each method or sanitation system; assess the excreta disposal practices of children]; estimate number of households that could be connected to present sewer system, but are not, and explain reasons; assess the effectiveness of systems in use in terms of cost, hygiene and public health, and protection of water quality and the environment.

Assess Financial Resources

The financial assessment is needed to estimate an upper financial limit for the proposed WS&S program. In other words, “How much can the city afford to spend to improve WS&S services?” The answer will influence the selection of technologies, implementation schedules and the extent of community participation. [Foley, undated]

The initial financial assessment comprises a number of broad estimates of the community’s ability and willingness to pay, and of the availability of funding such as loans and grants from other sources. The most important issues to examine are the following:

User Charges and Willingness to Pay (WTP)—What financial resources are available to residents and customers, and how much are they willing to pay for better service? It is rather difficult to answer these questions, particularly when residents are uninformed about the options potentially available and their respective costs and benefits. One of the goals of community participation is to gain a better understanding of demand for different service options. As communities become better informed about their options and the associated costs, it is likely that the types of systems and technologies they prefer may change. [Reiff, 1999]

The community consists of different groups, including industry and commerce, retailing and services and households. The latter are further divided into the various socioeconomic groups ranging from affluent to poor. A number of rough benchmarks are often applied when estimating acceptable levels of user charges. For poor households, it is expressed as a percentage of total household income. Variously, figures in the range of 2% to 5% have been used, with 3.5% as the most often quoted maximum percentage that households are willing to pay for water. Local validation is necessary because conditions vary greatly, even within a

single urban area. For example, willingness to pay might be lower where households have other unusual expenses, such as repayment of home improvement loans in an urban upgrading program.

Although homeowners pay for sanitation facilities that are part of their home, such as toilets and septic tanks, studies have shown that they are not willing to pay much for offsite sanitation infrastructure and services. The business sector is likely to be more willing to pay for water services, because the cost of water is normally a very small part of the cost of doing business.

An attempt should also be made to identify the direct and indirect costs paid by customers—costs such as the price of water bought from vendors, the cost of water tanks and pumps, in-house filtration, boiling water, installing toilets, building and emptying septic tanks. These costs are not captured by tariffs, but are nonetheless funding the provision of WS&S services. Social survey techniques such as questionnaires, interviews or focus groups are typically used to gather such information. These surveys are complex and time-consuming to conduct. Often, local institutes, universities or market research firms are engaged to conduct field surveys and interpret the results.

Despite the inherent difficulties of determining what is affordable and what a community is prepared to pay, it is a necessary and essential first step to bring realism into the planning process. It would be a waste of time to design a program that has no hope of implementation.

Cost Recovery—It is also important to assess the pattern of cost recovery by service providers:

- What part of recurrent and capital costs is covered by user tariffs, subsidies, connection fees and other sources of revenue or funding?
- What cost recovery policies are in effect? Are there cross-subsidies within the tariff structure?
- How good is payment discipline? What share of user charges are actually paid by customers?

It is important to find out what customers are paying and what additional amounts are received in the form of subsidies.

Government Funding—What other revenues and sources of government funding are available in addition to user charges, whether or not they are currently in local use? Primarily, these will include local revenues of all sorts (net, after accounting for operating costs and debt servicing), and intergovernmental transfers such as capital grants and sharing of locally levied national taxes. Betterment levies, also known as “valorization charges,” have been widely used, primarily in Latin America, for recovering costs of urban improvements by a direct charge on households that may or may not benefit directly. What is the capacity to

further exploit these local revenue sources?

Capital Finance—What external sources of capital are available to local government and municipal enterprises, including grants, loans, bonds, (by source) and PSP?

Estimate Funding Available for WS&S Program

Estimate the amount of funds that might be assembled for capital construction and related activities under different scenarios, and considering the city's capital investment program as a whole. This step requires analyzing and synthesizing information from local and central government finance and budgeting departments, and from banks and capital market specialists. Estimates of household resources such as regular income, savings and in-kind contributions should also be included. Residents frequently commit their own resources to improvements in or adjacent to the home and may be able to leverage their resources, for example, if they have access to home improvement loans. [Saywell, 2000]

If municipal borrowing is anticipated, the existing financial obligations and creditworthiness of the city must be examined, and relevant legislation reviewed, to define a practical, prudent and legal credit ceiling.

Estimate the ability to generate a regular stream of revenues for recurrent (O&M) costs and debt repayment under realistic economic projections and tariff and funding scenarios.

Using these estimates, combined with knowledge of current costs, determine a range of feasible estimates of future revenues from customers, from which current costs and repayment of loans (including finance costs) may be recovered on a sustainable basis. The most important estimate to determine at this stage of program planning is the amount of funding that may be available in excess of the amount required to meet current commitments. This amount indicates the size of new investment that the city can afford. In practice, such an affordability analysis is rather more complex than this simplified presentation, but it should be within the capability of finance and budget analysts on the municipal staff.

Institutional Assessment

An *Institutional Assessment* is a "systematic procedure for assessing the performance of an institution based upon the use of standards or performance indicators. It is essential to assess the institutional capacity of key participating organizations, and prepare an Institutional Development Plan as a primary component of the WS&S program. The final output of an institutional assessment is a profile of institutional strengths and weaknesses which have been analyzed by major category of institutional function."[11] [Cullivan, 1988]
The specific approach and outputs of an institutional assessment will depend on the objectives of the exercise, but the usual purpose is to

[11] This overview of institutional assessment is based on the approach developed under USAID's Environmental Health Project (see Cullivan, 1988).

make recommendations for institutional development to achieve specific goals. For example, to streamline planning and implementation of water and sanitation projects or to implement new decentralization policies of the government.

A typical institutional assessment may address these characteristics or qualities of the institution(s):

- Organizational autonomy
- Leadership
- Management and administration
- Commercial orientation
- Customer orientation
- Technical capability
- Developing and maintaining staff
- Organizational culture
- Interactions with key external institutions

The strategic issues identified in Section I of this Guide can also be used as context for the institutional assessment. For example, the leadership characteristics of the organization should be reviewed against the need to build political support for program approval or the ability to guide the institution(s) through reforms that might result from decentralization policies. Similarly, the assessment of technical capability should be set in the context of the types of water and sanitation systems that are likely to be used. Analysis of management and administrative capacity should look at the management of personnel, programs and projects and information, and should carefully evaluate the financial management capabilities of the organization. [USAID, 2000b]

In conducting the assessment it is important also to focus on relevant crosscutting issues such as the role and opportunities for women; the use of outsourcing for goods or services, including the use of community groups as development partners and the impact of HIV/AIDS on staffing and training.

The recommendations that result from the assessment should be presented as part of an Institutional Development Plan—a set and sequence of actions designed to achieve the recommended reforms and capacity building measures. The plan should be much more than a training plan. It can include a diverse range of activities designed to effect organizational change, improve morale and organizational effectiveness, establish links to partner organizations and monitor and improve organizational effectiveness on a continuing basis. [UNDP, 1997a]

The United Nations Development Programme (UNDP) suggests the following simple framework for an institutional development plan:

1. Mapping the Starting Point (the assessment)

2. Determining Objectives (desired future state)
3. Determining a Change Strategy (how to get there)
4. Determining What Capacities are Needed (what is needed)

Large management consulting firms working in the private sector may also have consultants or units that are specialized in conducting institutional or management assessments in public sector organizations. National institutes of public administration may be another useful source of external expertise for conducting an institutional assessment.

Set Goals and Priorities

Goals for the WS&S program should be formulated taking into account existing conditions, availability of water and financial resources and projection of trends and consumption patterns into the future. Goals should be realistic and acceptable to decision makers. Goals are usually stated in broad terms, as a desirable future status to be achieved within the framework of the program. It may be helpful to identify special goals to address critical issues or objectives, such as poverty eradication, gender equity, slum upgrading, health and the environment.

If possible, identify and include specific indicators and performance benchmarks (or "performance objectives") to facilitate measuring progress in achieving the goals. [World Bank, 1999]

Priorities should be set referring to specific locations and services (water, sanitation), and types of customers and residents to be provided with new or improved services. Priorities should be stated as concretely as possible. Setting priorities may be an iterative process—as more information is gathered concerning the estimated costs and benefits, the priorities assigned to different locations, projects or program elements may change. Participatory events such as community workshops, visioning exercises and public hearings should be used to elicit priorities from users and stakeholder groups.

Ultimately, the steering committee should formally endorse or adopt a statement of goals and priorities that will drive the design of program elements and identification of specific projects. This statement should be widely disseminated to ensure public awareness and support.

WS&S Strategies

The planning team should identify, discuss and agree upon strategies to achieve the goals of the WS&S program. These strategies should be based on information collected during the assessments and on expert knowledge of other factors and approaches. The strategies should provide guidance on major principles for the identification and preliminary design of specific projects, including aspects such as the selection of financing mechanisms, choice of technology options, institutional arrangements and timing and phasing of activities. For example, how should resources be divided between upgrading and rehabilitation of existing systems in comparison to construction of new infrastructure? Should conventional waterborne sewage systems be considered? What roles are suitable for PSP? What share of capital requirements should be financed through loans?

Identify and Formulate Specific Projects

Specific water supply and sanitation projects need to be identified, evaluated, prioritized and selected for inclusion in the program. The planning team must lead this task, responding to the issues, opportunities and constraints and the goals, priorities and strategies that have emerged from the assessments, goal setting and preliminary planning activities.

This is usually an iterative process, beginning with the identification of a number of potential projects deemed likely to achieve the program goals, and proceeding to an evaluation and refinement of those goals, developing a sufficient level of detail and accuracy. The team should strive to balance the needs and solutions proposed by municipal engineers and planners with effective demand that emerges from well-informed user communities.

Before identifying technologies for system expansion, it bears repeating that upgrading and rehabilitation of existing systems are usually the most cost-effective options, returning the greatest benefits for minimal capital investment. Note, however, that upgrades and rehabilitation may be less politically popular than the construction of new facilities, which may involve large construction contracts and photo opportunities for politicians.

Typical Water Supply Options

A simplified presentation of typical water supply options, shown below, illustrates some of the options available, but it should not be used as a decision-making tool. For additional information on the range of choices and technologies available, and their respective merits and disadvantages, refer to the Resources at the end of this Section. [WELL, 1998a/b/c]

Low Use—5 to 20 liters per capita per day

- Private or community well with handpump
- Public standpipe (supplied from piped system or well with power pump and storage)
- Water vendor (tanker or kiosk)

Medium Use—20 to 40 liters per capita per day

- Patio connection supplied through a municipal or community-managed distribution network.
- Private well with electric pump

High Use—100 or more liters per capita per day

- Conventional house connection to piped municipal system
- Private well with electric pump delivering to storage tank

Households frequently use more than one source of water, but generally prefer piped systems because of their convenience and greater quantity of water delivered, if working properly. However, the presence of a piped system is no guarantee of better water quality, since many piped systems draw from sources polluted with industrial effluents, are not treated properly and are delivered intermittently through old, leaky networks that are vulnerable to infiltration and contamination. Nevertheless, as stated

earlier, health benefits are more dependent on quantity of water used than its quality.

Densely populated, built-up areas are generally restricted to piped water systems. Non-piped systems are more common in peri-urban areas.

Typical Sanitation Options

There are many more sanitation options than water supply systems, and choosing among them is complex, owing to technical, institutional, social and financial factors. [GHK, 2000]

The following diagram presents a sanitation technology selection algorithm to guide the selection of sanitation options. Any of the types of sanitation systems, if properly designed, built, operated and maintained, are capable of achieving secondary and tertiary levels of treatment. For additional information on the range of choices and technologies available, and their respective merits and disadvantages, refer to the Resources at the end of this Section. [Mara, 1996]

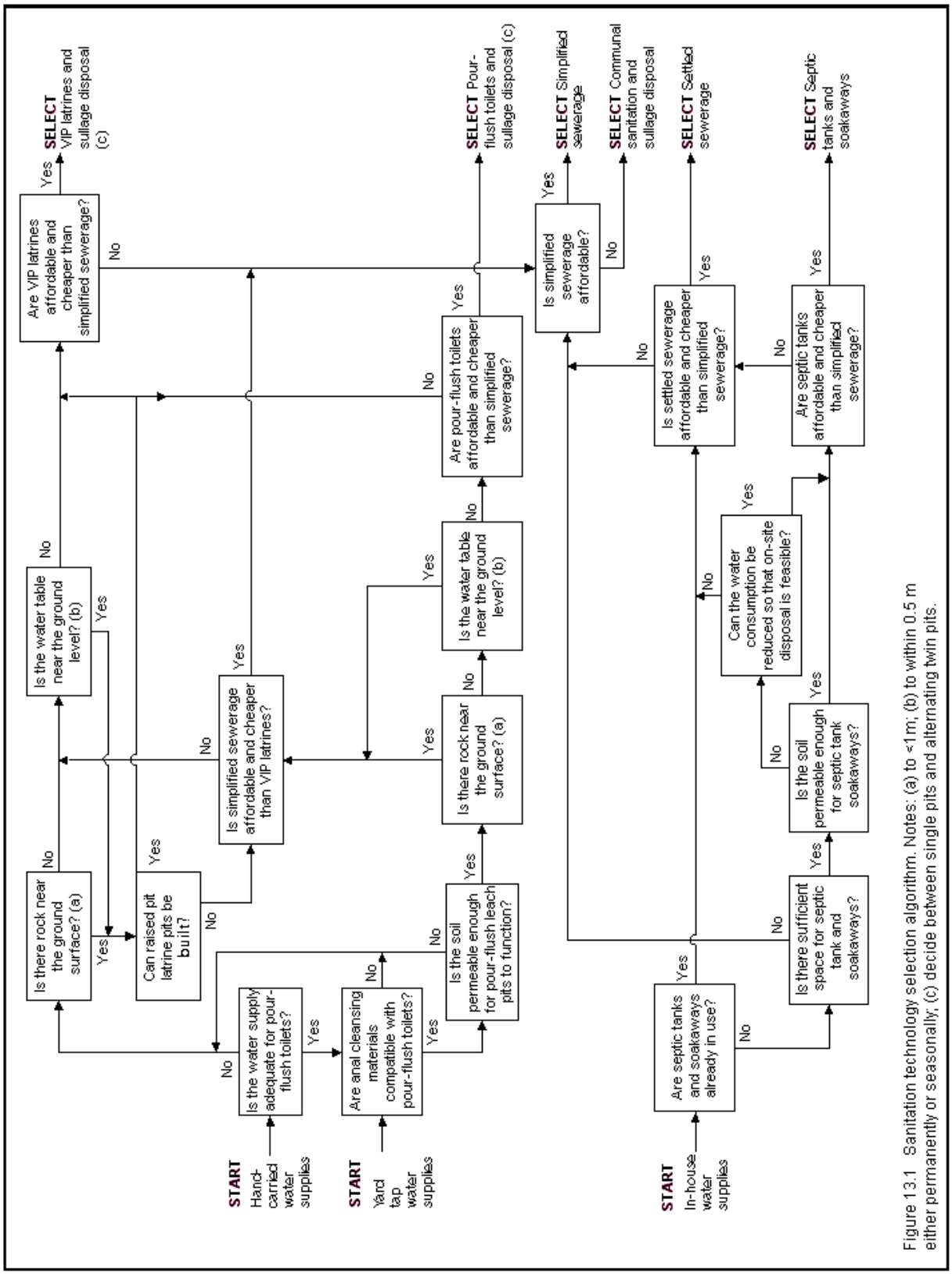


Figure 13.1 Sanitation technology selection algorithm. Notes: (a) to <1 m; (b) to within 0.5 m either permanently or seasonally; (c) decide between single pits and alternating twin pits.

Water and Sanitation Linkages

Planning for water supply and sanitation should be holistic and realistic. If water is scarce (city-wide or locally), then extending conventional waterborne waste disposal may be inappropriate. Inadequate sanitation, leaky sewers and leachate from septic tanks can potentially contaminate overdrawn urban aquifers, possibly irreversibly, thus forcing them to be abandoned. Waste discharges into storm drains will constitute health hazards, especially if the drainage system or solid waste management is inadequate.

When identifying alternatives, it is important to consider how water and sanitation systems are directly or indirectly linked. Decisions made in each sector can have profound implications for the other. For example, one or more viable sanitation alternatives can be identified for every water supply option that is considered. Similarly, the O&M requirements and implications for health and hygiene training must also be considered. [Flavin, 1999]

It is also possible to reuse treated wastewater for a variety of non-potable purposes, such as irrigation of landscaping and pastures and selected industrial processes. However, managing the use of non-potable water is challenging and potentially risky. There are also concerns, not yet fully researched, about the health hazards of low-level exposure to a variety of pharmaceutical components, especially endocrine disruptors, that may be present in recycled wastewater. [Bendahmane, 1992]

Planning for Upgrading

It is important to plan for sequential service upgrades as incomes improve and people upgrade their houses. For example:

- The distribution network in the community may initially deliver water through standpipes. Later, the network may be extended to patio connections and, ultimately, to full house connections.
- Sanitation systems will usually start with ventilated improved pit (VIP) latrines or pour-flush toilets. As resources permit and the area develops, these can be upgraded, for example, by installing water-efficient flush toilets, converting the installations below ground into interceptor tanks and carrying away the effluent in solids-free sewers (SFS) or simplified sewer systems.

Evaluation of Alternative Projects and Options

Each project or option must be evaluated to determine whether it adequately provides the desired service, is acceptable to users and is affordable. Each of these questions introduces a host of factors, some of which are identified in the following table.

Typical Evaluation Criteria for Selection WS&S Options

Typical Evaluation Criteria	Water	Sanitation
Water Resource: Suitable? Sustainable?	●	●
Cost to Build	●	●
Service Life	●	●
Operation & Maintenance Requirements	●	●
Water Quantity Requirements	●	●
Water Quality & Service Standards	●	
Acceptability to Users	●	●
Geology/Soil Suitability		●
Land Availability		●
Risk of Groundwater Contamination		●

Most public health professionals, especially those trained as civil engineers, have almost no familiarity with recent developments in alternative sanitation approaches. In drawing up terms of reference and selecting consultants, city staff need to be very careful to insist on working with professionals who are fully conversant with all the options and selection factors.

Program Design and Project Packaging

The projects and other components of the program need to be reviewed separately and jointly to ensure that they are capable of achieving the goals of the program within the framework of resources, opportunities and constraints identified during the assessment stage. Selection of projects for inclusion in the program will be heavily influenced by comparisons of estimated capital and operating costs for alternative options, and by screening out projects that cannot be financed or appear too costly to operate.

Selected projects then need to be “packaged” for financing. Packaging includes description of the projects, preparation of pre-feasibility and feasibility studies, preparation of a financing and procurement strategy and preparation of other documents typically required by lenders or investors. The projects may be packaged separately or in combination, depending on the size of the program, the characteristics of the specific projects and the expectations of potential lenders and investors.

External technical assistance may be available to help in project packaging, for example, from national development agencies, municipal development funds, development banks or international lenders and donors.

It is probably sufficient for approval of the program to limit project packaging to the level of pre-feasibility assessment. Full feasibility assessment will be carried out for projects in the program as the first step

in the implementation phase.

Feasibility Studies

WS&S projects are normally subject to *pre-feasibility studies* that screen out poorly designed projects and validate the inclusion of viable projects in the WS&S program. The pre-feasibility study normally considers technical, economic, institutional, financial, social, cultural and environmental characteristics of the project on the basis of limited information and estimates. Findings presented in *pre-feasibility reports* should complement the WS&S program.

Projects that are included in the WS&S program are also usually subject to full *feasibility studies* as the first step in the design process (covered in Section III, Implementation).

Program Approval

The planning process is not complete until the responsible authorities—typically the city council–have approved the program. The WS&S program document must be prepared and placed before the government officials responsible for its review and adoption. This final step may be led by the steering committee, which is best equipped to explain and defend the selections made and trade-offs considered.

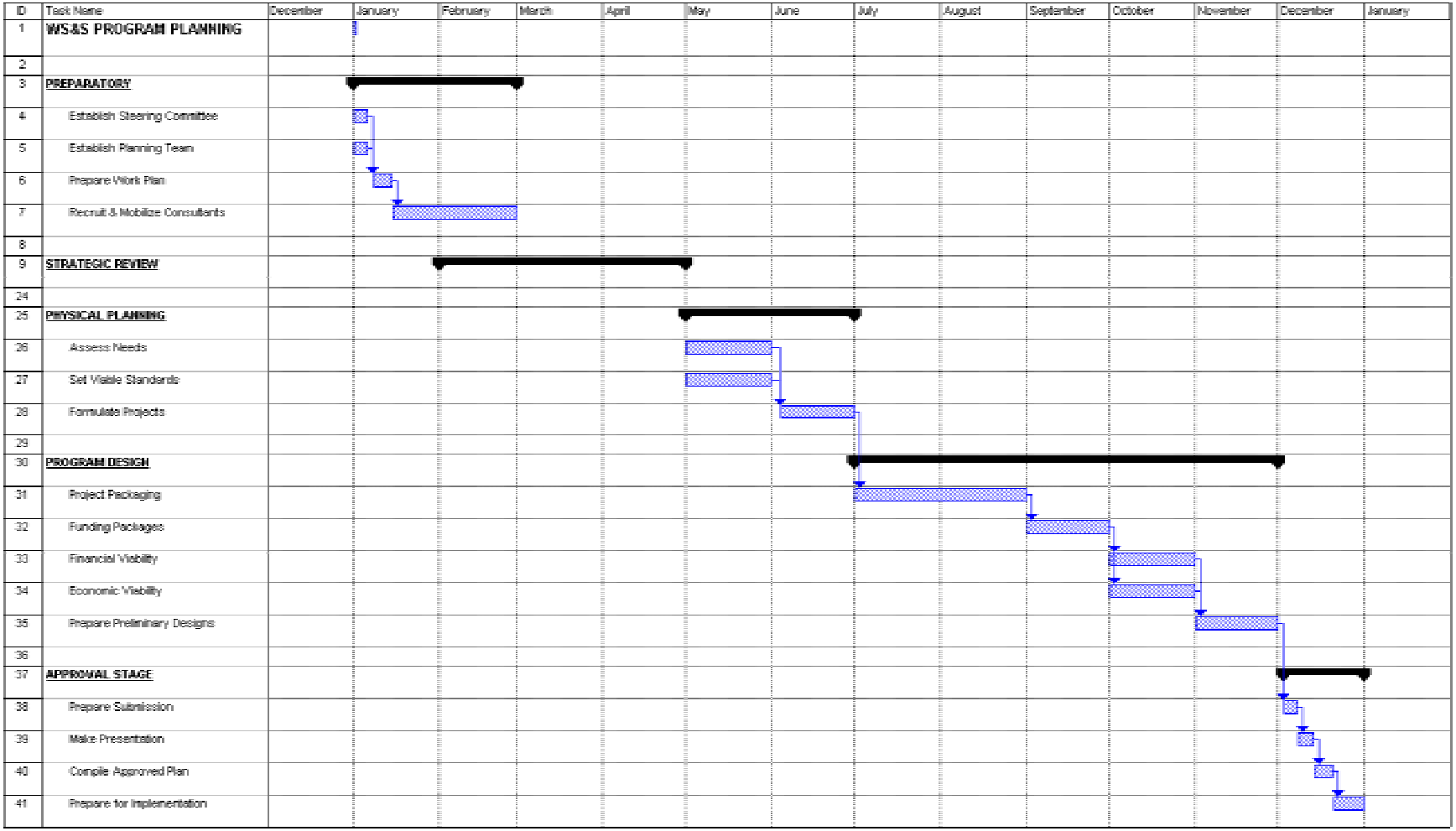
Obtaining approval of the program generally will also require liaison with various government departments and offices. Support should also be sought from the users, including business groups and local communities. Political leaders are likely to approve a program only when they can be assured that the proposed program has the support of the voters. Such support is best obtained by including, to the extent possible, the various stakeholders in the planning process. In that way, much time can be saved and last-minute hurdles avoided.

It is also likely (and advisable) for the program to be approved without obtaining the council's commitment to fund specific projects that are contained in the program. It is important that the program be adopted as a statement of intent and policy. If possible, funding for feasibility studies and crosscutting activities should be sought and committed together with the approval of the program. However, linking the approval of the program to the commitment of funds for specific projects is likely to introduce unacceptable delays. In practice, the timing of project implementation is likely to be subject to the availability of funding. Yet, arranging funding may not even be possible until after the completion of feasibility studies and a considerable amount of detailed design work.

Implementation and Replication

Section III of the Guide presents an orientation to implementation of WS&S programs.

Illustrative Generic Work Plan for Planning the Urban WS&S Program, in CPM Format



COMMUNITY-BASED PLANNING

Community-based planning (CBP) involves residents and users directly in the planning, construction and management of local water and sanitation infrastructure. *Communities* are households and local organizations sharing common interests because of shared geographic location.

Community-Based Planning

Community participation is valuable at all stages of WS&S program planning and implementation. As mentioned elsewhere in the Guide, CBP helps to define and understand levels of demand for services and to set priorities within the program. [WHO, 1999]

The involvement of local users is also particularly appropriate to the development of tertiary infrastructure networks and facilities and related institutions. For example, community groups are capable of planning, building and managing pit latrines and small-bore sewers, usually with support from local small builders and service firms.

CBP is an important means to plan and design specific projects within the WS&S program, bringing together support agencies and end users for mutual cooperation, with the following benefits:

- Plans and programs are more realistic because they are demand driven users have confirmed their desire for the facilities offered and their willingness to meet the costs.
- Projects are more sustainable because user involvement leads to stronger commitment or “ownership” by users and the community, and projects with strong community support are thus more likely to survive changes in political leadership and resulting changes in local government’s priorities or policies.
- The management of projects and the operation and management of facilities is more responsive because it is closer to people.
- Collaboration with users and communities increases the pool of resources available for planning, building and managing WS&S systems.

Key Steps in Community-Based Planning

There are many approaches to community-based planning. The USAID WASH project developed a model for promoting community participation that involves two parallel processes: the technical evaluation of environmental health problems and a systematic effort to provide community members with the skills they need to participate fully. Any established CBP process must be tailored to local circumstances. The structured approach presented here may not be feasible or necessary in all cases. [MIT, 2000e]

Most community-based planning processes generally involve the following sequence and types of activities.

Community Mobilization: If possible, mobilization of residents for WS&S planning should build upon existing formal or informal organizations.

Living together in a neighborhood does not necessarily mean that residents think and act together. In urban communities, people are often mobile and settlements may be diverse. Social mobilization may be needed to unite these households in a community-based organization or a users' group. The mobilization process usually involves sensitization, capacity building and maturation time. Ideally, the participating organizations or users groups should represent at least 80% of households in the community. [Bartle, 1998a]

The organizations or users' groups should have a shared purpose, an effective organizational structure (governance rules, regular meetings), a participatory mode of decision making, transparency and basic skills in record keeping and accounting. These characteristics are important for community groups to participate effectively. Capacity-building measures such as training of facilitators and community organizations may be helpful in preparing community members and groups for productive CBP.

Strong leadership, rules and regulations and decision-making processes are what sustain the organization. Clarity of vision, transparency of transactions and energetic participation are keys to robust organizations. Such leadership generally comes from a few prominent activists in the local communities. Their commitment and continued participation is crucial to effective community participation.

Sensitivity to Social Context: Success in mobilizing the community may depend upon its social character and hierarchies, historic conflicts or commonalities within the community and migration patterns. Inclusion of women is important because they are most closely involved in procuring and managing water and solving household sanitation and hygiene-related problems.

Planning Workshops: Community-based planning activities are often initiated by holding one or more workshops at which participants identify and explore issues and potential solutions and arrive at priorities and consensus for action. Often the first workshop is followed by one or more issue-specific workshops. Participation of stakeholders, facilitators, support agencies, local authorities, local businesses and political leaders is very important for achieving practical solutions and consensus on priority actions.

Action Plan: Once the participants have articulated issues and priorities, they should quickly move to identify specific actions and activities to address the priority problems. This stage often requires access to external knowledge, for example, about the types of water and sanitation technologies that are feasible in each community, their costs and comparative features and the associated institutional and financing options. It is also at this stage that significant negotiation between subgroups may be needed to accommodate their differing objectives and desires. Trained facilitators and planners should support this process without dominating the decision making. A community action plan should be produced.

Action plans should be as specific as possible about the nature of the activities to be undertaken and about the assignment of individual and

shared responsibilities. They may also indicate roles for external stakeholders. Sound estimates and clear allocation of costs to those responsible for action are also very important.

PSP PLANNING PROCESS

Private sector participation (PSP) encompasses a broad range of relationships between public and private sector organizations. For the purpose of this Guide, the term PSP refers to large-scale endeavors characterized by substantial management, construction or investment activity by the private sector, sustained over a moderate to long period (at least several years). Under the right conditions, large-scale private sector involvement in water and sanitation can yield substantial benefits and cost savings. However, global experience has shown that it often requires massive effort and years of preparation just to establish a suitable enabling environment and negotiate the terms of a partnership. Several major PSP efforts have been initiated over rather short periods of about two years (e.g., Buenos Aires and Manila); however, the failure to address the regulatory issues has later led to complications during implementation. As highlighted in a World Bank case study [World Bank case study]:

> *The key to an effective gradual move to private sector participation is a realistic and enforceable allocation of functions and risks between the parties at each stage of the process. This allocation should accord with the parties' comparative advantages in performing the functions and managing the risks.* [12]

When considering PSP in water and sanitation services, the city must be clear about its technical and financial objectives and must objectively assess, at the outset, whether private participation is a feasible means to achieve the objectives at least cost and reasonable risk. [Komives, 1999]

Following are brief descriptions of key steps in the process of planning and implementing PSP. The specific application of these general steps will vary greatly according to the nature of the project and local conditions. Many of the tasks can occur in parallel or form part of an iterative process.

Enabling Environment for PSP

Potential private partners are primarily concerned with financial risk and return. The greater the risk, the higher the return they will expect. Government must reduce risks and establish a favorable policy, legal and regulatory enabling environment that may include

- Fiscal and regulatory conditions that encourage and support private business; impartial, non-judicial dispute resolution systems; access to the judicial system, if necessary; and a fair tax system.
- Transparent and fair procurement and privatization processes.
- Domestic long-term debt instruments and credit enhancement

[12] Brook Cowen, Penelope J. April 1999. *Lessons from the Guinea Water Lease, Note No. 78*. The World Bank. <http://www.worldbank.org/html/fpd/wstoolkits/resources/frame.html>

	alternatives, such as letters of credit and stand-by credit facilities. ▪ An established financial services industry and infrastructure such as rating agencies, bond insurance, underwriters, domestic credit markets and reasonable, transparent government market oversight. ▪ As needed, access to foreign capital markets, combined with unrestricted movement of funds, stable exchange rates and an absence of foreign exchange controls. ▪ Sovereign guarantees in situations where financial infrastructure and domestic long-term debt instruments are absent or inadequate. Guarantees may include price or tariff guarantees.
Define Service Needs	Drawing upon the water and sanitation needs assessments and the assessment of financial resources, the planning team must define the service needs corresponding to the roles and capacities of potential private sector partners. In other words, it is necessary to find a match between the assessed needs and the ability of the private sector to supply those needs through some form of partnership activity.
Define Performance Standards	The planning team must define target service levels and the standards by which the performance of the private partner will be measured. These standards may relate, for example, to the quality of service, the extent of coverage and the timeliness of specific works such as rehabilitation or expansion of networks. It is essential to carefully measure and document baseline conditions as a benchmark for future progress against the established service targets.
Estimate Investment Needs	An estimate of the investment needs of the proposed project is also needed, including the amount of capital available from the public sector and estimates of future revenue yields from user tariffs. These financial factors will greatly influence the type of PSP option that is selected.
Assess Financial and Commercial Viability	Using demand and expenditure forecasts and estimates of available financial resources, the city must estimate whether the proposed project is financially viable for the city and commercially attractive to the private sector. Particular attention should be paid to estimating the public costs, including capital investment, in-kind contributions such as land and budget subsidies, the political impact of tariff increases and their effect on household budgets. Through discussions with other cities having PSP experience, and by preliminary discussions with potential partners (possibly including international donor or aid agencies), the city can gauge the financial factors that will attract the interest of the private sector.
Select PSP Option	Selection of the specific form of partnership should be driven by an objective assessment of the comparative strengths and weaknesses of the public and private sectors. The most fruitful partnerships will be those in which the partners' respective strengths are complementary. The selection of a form of PSP usually hinges on factors such as the amount of capital investment required and the potential sources of capital; whether or not new "greenfield" facilities are to be built; public policy

concerning the ownership of assets; and the extent to which the city can or will delegate its responsibilities. [Franceys, 1997]

Recent global experience has typically involved the following forms of partnerships. Frequently, multiple forms of partnership are used in combination.

Service contracts—provide services such as design, water loss reduction, repairs and equipment rental.

Management contracts—can cover operations and maintenance and billing and collection.

Lease contracts—private entities lease public assets and assume responsibility for all management functions and working capital.

Build-operate-transfer (BOT) contracts—the private partner designs, builds, finances and operates a water or wastewater treatment plant for a fixed period (typically 15 to 20 years), after which the assets are transferred to government.

Concessions—the government conveys to a private entity the full responsibility for service delivery and financing for a fixed period (typically 20 to 30 years).

Joint ventures—between government and private entities are established to provide WS&S services.

Outright sale or divestiture—WS&S assets are sold to a private sector entity that becomes responsible for service delivery.

The more comprehensive and longer the PSP arrangement, the more important it is to have the regulatory framework in place. Often, this requires the enactment of special laws, which has proven to be a time-consuming process.

Draft Bid and Contract Documents

Private contracts and concessions are preferably awarded by a process of competitive bidding. Large contracts may attract consortia of local and international bidders. The quality of the tender documents, clarity of evaluation criteria and integrity of the selection process will all strongly influence the quality of the outcome. Model tender documents are available, but there are few model contracts—parties to these contracts prefer not to disclose specific details to protect their proprietary interests. [World Bank, 1997]

The tender documents and draft contracts must be carefully crafted to reflect the complex relationship between public and private partners. To do draft them, the city must employ highly experienced and specialized legal, financial and technical advisors, capable of dealing on an equal footing with the advisors who represent potential private partners.

A bid selection committee should be formed, including some of the technical specialists, to oversee the bid process. Ultimately the

	committee will evaluate the bid proposals and recommend the firm(s) to which the contract(s) will be awarded. Responsibility for making the actual decision to award the contract(s) is normally defined in local procurement regulations.
Regulatory Measures	The nature of public regulatory control over the private partner derives from the legal and regulatory framework and from specific provisions in the contract or concession. The city must have sufficient certainty that the service delivery targets will be met and that potential risks to the city and customers are reasonable. At the same time, the city must be sensitive to the needs of the private partner, achieving a delicate balance between risk and reward.
	The lack of effective regulatory systems in many developing countries raises concerns that an uncontrolled monopolist provider might charge excessive prices, deny services or fail to improve services. Sufficient attention must be given to adopting appropriate regulations and means to monitor and control private providers of essential services. [Smith, 1997]
Public Relations	In parallel with planning and implementation of PSP, the local authority needs to conduct outreach or publicity activities to raise public awareness of the planned changes. For example, the city may need to introduce the new service provider to customers and perhaps inform them about new tariffs.
Human Resources and Institutions	Another important “outreach” activity is to inform the existing service provider’s management and workers of the upcoming changes and how they will be affected. Of necessity, senior management is likely to be involved in the needs assessment and other planning activities that lead to the decision to pursue PSP options. However, both management and staff may be expected to resist change, especially when they are uninformed. Particular attention must be given to explaining how the transition will be handled and what its impact will be on jobs, wages and other benefits.
	In addition to establishing an appropriate regulatory framework, other institutional changes may be called for, depending on the nature of services to be provided by the private sector. For example, existing municipal enterprises may need to be restructured or their mandates changed to reflect new roles and responsibilities.
Prequalification of Bidders	Prequalification improves the quality of bids and reduces the work of the selection committee. Normally, during prequalification, the potential bidders present or submit sufficient information about their experience and capabilities to allow the city to eliminate all but the most appropriate bidders. Reducing the number of competing firms increases each firm’s chance of winning, thus encouraging them to invest more effort in preparing the bid.
Call for and Review Bids, Award Contracts	Once the bid documents are prepared and approved by the selection committee, and after the prequalified firms have been selected, the bid committee calls for bids and distributes the bid documents to the prequalified bidders. Pre-bid conferences are usually held prior to prequalification and when the bid documents are released, giving

potential bidders a chance to ask questions about the project and the bidding process. Normally, the public sector establishes a “Data Room” in which all available information about the sector, the city and the concerned utility is made available. Usually, potential bidders pay a high fee for access to the Data Room and to obtain the bid documents.

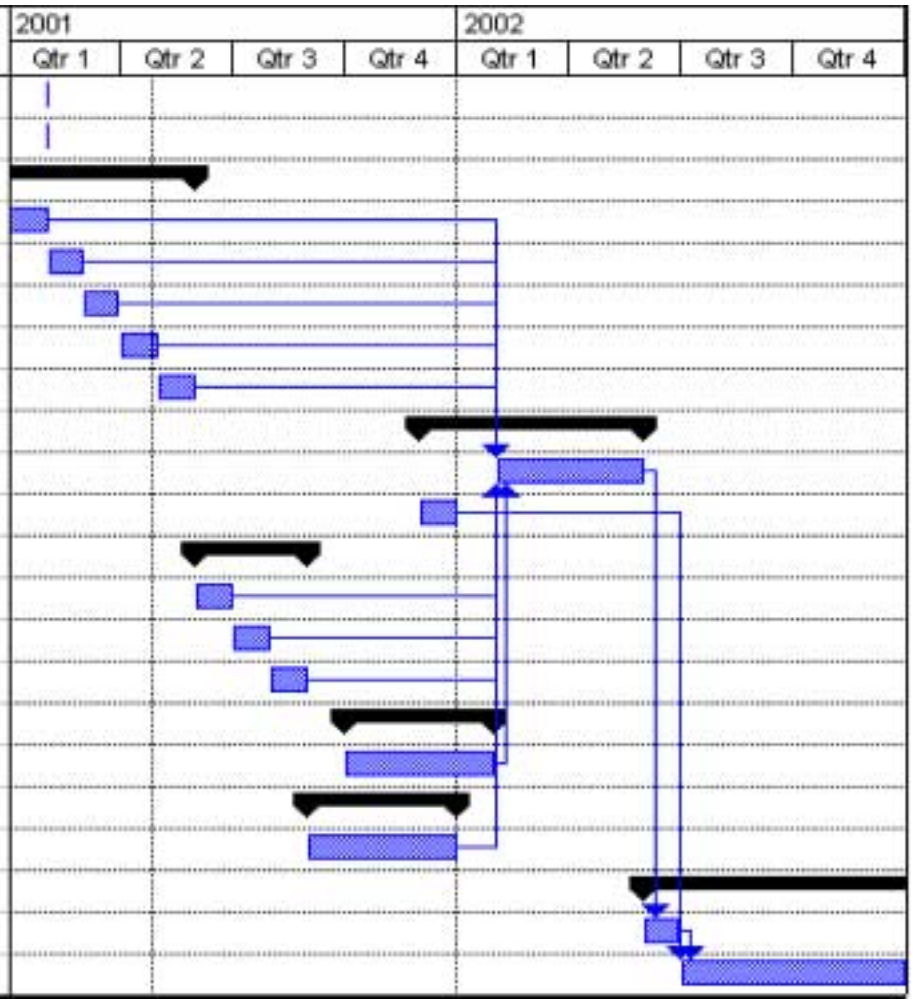
When the bids are received, they are evaluated according to selection criteria adopted in advance by the bid selection committee.

It is common for bidders to request, in writing, clarifications during the preparation of bids. Similarly, the city may need to request clarifications from bidders during bid evaluation. These communications must be treated carefully to avoid giving unfair advantage to any bidder (and to avoid even the appearance of unequal treatment). For this reason, questions and answers are made available to all prequalified bidders.

When the evaluation is complete, the preferred firm is invited to negotiate a contract. Negotiations can be simple or complex, depending on the size of the contract, the nature of the work and the degree of risk to be assumed by the partners. Implementation of works may also be broken into separate stages, with subsequent stages depending on the outcome of prior stages.

Illustrative PSP Work Plan, in CPM Format

ID	Task Name
1	**PRIVATE SECTOR PARTICIPATION**
2	(Abbreviated Schedule of Tasks)
3	**TECHNICAL EVALUATION**
4	Technical Review of System
5	Define Service Needs
6	Estimate Investment Needs
7	Define Performance Standards
8	Decide PSP Option
9	**LEGAL & REGULATORY**
10	Draft Bid & Transaction Documents
11	Select & Appoint Regulator
12	**ECONOMIC & FINANCIAL**
13	Demand Forecasts
14	Financial Assessment
15	Define Financial Covenants
16	**PUBLIC RELATIONS**
17	Raise Public Awareness
18	**HUMAN RESOURCES**
19	Discuss with Workers & Unions
20	**TRANSACTION**
21	Prequalification of Bidders
22	Call, Review & Award Bids



Section III: WS&S PROGRAM IMPLEMENTATION

This Section gives general guidance for implementing water supply and sanitation programs.

Implementation is the process of carrying out the WS&S program. The program includes specific projects such as upgrading, rehabilitation and construction of new WS&S systems, as well as crosscutting activities such as institutional development. The tasks and time involved to implement the program can vary immensely depending on its size and complexity, the number and types of projects, the stakeholders involved and resources available.

PREPARATION

Responsibility for Implementation

The city council or an equivalent executive body[13] must take ultimate responsibility for implementing the WS&S program. Generally, four types of supervisory functions are required: political, executive or management, technical supervision and construction supervision.

Depending on the specific structure of local government, some supervisory tasks may be performed by the council itself, by other executive or supervisory bodies or by staff of government operating departments and enterprises. The "steering committee" established during the planning phase might also be authorized to fill this executive role. Normally, by approving the program and the projects that are included, the council effectively assigns or delegates implementation of specific projects and some (usually technical) supervisory activities to the appropriate executing partners such as municipal water and sanitation enterprises.

However, the council must remain actively engaged in supervising and monitoring the implementation of the program. Executing partners such as water and sanitation enterprises or utilities are likely to focus mainly on technology and civil works, but in many cases they pay less attention to institutional development, public outreach and interagency coordination. Special effort may be required to ensure that adequate attention is paid to the proper implementation of these essential nontechnical components of the program.

Managing People, Organizations and Funding

For senior staff of the city and its partners, implementation of the WS&S program is mainly an exercise in managing people, organizations, funding and other resources. Therefore, as part of the WS&S program planning activities, the planning team should assess the management capabilities of key organizations that will be entrusted with managing program implementation. This is particularly important when implementing new technologies and processes or projects that are expected to challenge the capacity of city departments and executing partners. The recommendations that result from the assessment should be presented in the institutional development plan that is a crosscutting component of the WS&S program.

The council must clearly define and communicate the roles of all participants, using job descriptions, terms of reference, contracts and other suitable mechanisms. It must also manage and coordinate the interaction of the executing partners, paying particular attention to promoting and facilitating interagency and interdepartmental communication.

[13] The "council" is used in this section to refer to the municipal body with ultimate responsibility for implementation of the program.

Financial management is equally important and may require setting up and training special financial management and control bodies if the funding mechanisms or volume of funds are unusually large or complex.

Management Reporting

The council must establish and enforce reporting systems to ensure that it receives a regular flow of reliable information about the preparation and implementation of the program. The WS&S program document should include management "tools" such as a critical path schedule for implementation (a detailed work plan showing the expected timing and sequencing of major activities), a financing plan and cash flow projections. It is equally important to use these project management tools to track the implementation of projects and crosscutting activities. These tools should be actively used and regularly updated. Progress reporting should be linked to objectively verifiable indicators that have been carefully designed to help prevent and solve problems by tracking specific events and milestones. Periodic reporting and formal reviews of implementation schedules and indicators are required, their frequency depending on the size and duration of the program and projects. [WHO, 1994]

Administrative Procedures

The council must also set up and follow administrative procedures, as required by law or local regulation, and streamline routine tasks. For example:

Procurement procedures and rules ensure that procurements are managed efficiently, fairly and transparently.

Contract administration manages contracts, monitors contract compliance and protects the city's interest in dealing with contractors and consultants.

Monitoring and auditing the regular collection, interpretation and reporting of information about the physical and financial progress of project activities, resources and results ensure effective project implementation .

Projects that involve loans from international lending institutions such as the World Bank have additional procedural requirements. For example, while the borrower is responsible for managing procurements financed by the World Bank, the Bank nonetheless monitors procurement to ensure that spending is efficient and transparent, that funds are spent only on the approved project works and that qualified bidders have adequate, fair opportunities to compete for bids.

CROSSCUTTING ACTIVITIES

Crosscutting activities are typically those designed to improve the technical, managerial and financial capacity of WS&S institutions and sector-wide activities such as overall performance monitoring. They generally affect every project included in the program. The WS&S program is likely to include a number of such crosscutting activities that contribute to multiple projects or support the program as a whole (refer to the "Conceptual Framework for WS&S Program Planning" for an illustration of different program components).

The crosscutting activities are likely to be run concurrently with each other and with the implementation of the individual WS&S projects. Their specific timing will depend on the availability of resources. However, these activities often include necessary prerequisites to the funding or implementation of construction projects. For example, external lenders, whether domestic or international, often will make a loan conditional on specific institutional, regulatory or management reforms. Thus, the timely implementation of crosscutting activities should be of vital importance to the council and executing agencies.

In practice, some crosscutting activities may be funded only in conjunction with specific projects or by central government programs. Others are funded from operating revenues, general revenues or other sources. This makes implementation rather challenging—the necessary time and management resources should not be underestimated.

Institutional Development

Successful implementation of the program and projects is likely to depend upon institutional reforms, such as restructuring enterprises or establishing new coordinating or regulatory bodies. Thus, the success and timing of these changes may be very important, and it is in the council's interest to make sure that the institutional development plan (introduced in Section II) is implemented by the affected organizations.

Normally, however, it is unrealistic to expect existing organizations—especially government bodies—to undertake significant institutional reforms without guidance and supervision from an experienced, objective source. For example, this guidance might be provided by an expert commission or management consulting unit. Facilitation and arbitration are also essential when the program calls for interagency coordination or integration. Sufficient time must be allowed to overcome institutional barriers and establish coordination mechanisms.

Support to Communities

Effective, sustained community-based management of water supply and sanitation systems requires active and ongoing support by local and national governments. USAID experience[14] shows that NGOs and

[14] Summarized in Bendahmane, Diane B., ed. 1993. *Lessons Learned in Water, Sanitation and Health*. The WASH Project, Arlington, VA.

	external support agencies are frequently unable to provide continuing sustained support to communities, especially when small pilot programs are rapidly expanded on local or national scales. National and local governments must therefore take operational steps to ensure effective community management, including developing widespread, shared understanding of the goals and means of community management; clarifying the roles of support groups and fostering collaboration; developing a legal and policy framework and a financial management system that promote community management and control; and providing supplemental training and information resources. Although it is now considered essential to involve communities in the development process, the effort and lead times needed are generally underestimated, in part because the poor often have distinct beliefs and communication channels that require special approaches.
Policy and Regulatory Reforms	The legal and regulatory framework is seldom ideal. Specific constraints to program implementation should have been identified during the preparation of the WS&S program and strategies developed to resolve them. The most significant, potentially crippling constraints must be resolved prior to the commitment of funds that would otherwise be at risk. During project implementation, senior officials and professionals must therefore devote sufficient time and resources to completing key legal, policy and regulatory reforms and to adopting reasonable standards. The council must take the lead in pursuing policy and regulatory reforms, whether at the local or national level.
Public Outreach	Similarly, there should be early, frequent dissemination of information to the public and other stakeholders to raise awareness of and support for changes introduced by the WS&S program. Many projects will have their own separate strategies for outreach to customers, for example, to announce new tariffs or a change in service providers. The council may also implement a general publicity campaign designed, for example, to improve payment discipline, to explain rate increases or to reduce residents' annoyance over disruption caused by trenching and interruption of services during project implementation. Such campaigns can also be used to win support for broad-scale initiatives such as water conservation or improved household hygiene. [UNICEF, 1999]

PROJECT IMPLEMENTATION

Illustrative Work Plan for a Typical Construction Cycle

The following steps explain major elements of a typical project cycle, including full feasibility, design, construction and post-construction activities. An Illustrative Work Plan for Project Implementation is shown at the end of this section, using the critical path method (CPM). The work plan presents a simplified view of the construction cycle and is intended only as a generic guide. It must be adapted and modified to suit the type of project and local conditions, including resource availability.

Electronic copies of the Illustrative Work Plan and community and private sector participation (PSP) planning processes are available as Microsoft Project templates and can be obtained from the CD-ROM or web site versions of the WS&S Guide.

Project Packaging

Specific projects are implemented as financial resources become available. It is also the case that funding partners and lenders commit funds only after receiving sufficiently detailed and reliable information about project costs, risks and benefits.

Project packaging or *financial packaging* is the process of establishing the viability of a number of projects and obtaining financial commitments. The “packaging” refers to the usual need to assemble a package of financing from multiple sources, including public and private financing of different types and origins. The *feasibility study* is an essential first step in the process of project packaging and a basic input to detailed project design.

Feasibility Studies

The feasibility study presents the project and its anticipated costs and benefits, risks and impacts, and operation and maintenance requirements in greater detail, usually based on preliminary designs. It requires considerable local investigation, user input and gathering of more accurate data on costs and benefits, affordability and acceptability, and institutional and financial capacity.

Feasibility studies for projects that involve large capital investments are normally more rigorous and demanding, driven by the need to maximize the use of scarce public funding and to assure lenders of the ability to repay loans. Financial analysis examines the monetary costs and benefits that arise directly from the project. The concepts of discounted cash flow, internal rate of return and benefit/cost ratio are fundamental to WS&S project financial analysis and planning and should be understood by decision makers.

Large projects, particularly those undertaken with international donor financing, are also subject to economic appraisal to determine how the project contributes to the economy as a whole, including direct and indirect impacts on national economic resources that cannot easily be measured in monetary terms. Techniques of economic analysis are

rather specialized, requiring expert economic and financial advisors, and thus are typically justified only for large projects.

Illustrative Outline of Feasibility Report

An illustrative outline of a detailed feasibility is given below. This outline should be adapted to local conditions, the size and complexity of the proposed project and the requirements of potential financing partners.

[Grover, Vol. 1, 1983]

Feasibility Report—Illustrative Outline

Executive Summary

I. Background (including the Sector)

II. The Project Area and Project Justification

III. Strategic Plan for Water Supply and Sanitation

IV. The Proposed Project

Objectives; Users and Beneficiaries; Rehabilitation Measures; Project Description; Integration with Existing and Future Systems; Responsibilities for Project Implementation; Cost Estimates; Implementation Schedule; O&M Requirements; Environmental Impacts

V. Institutional and Financial Aspects

Management Approach; Staffing and Training Implications; Financial Status of Operating Organization; Charges for Services; Willingness to Pay; Publicity/Outreach Plan; Financial Situation and Plan; Monitoring, Evaluation and Feedback

VI. Conclusions and Recommendations

Justification; Conclusions; Issues and Risks; Uncertainties and Sensitivities; Recommended Actions

Financial Packaging

Financial packaging of WS&S projects is closely linked to many steps in the planning and implementation process. It often becomes quite complex because multiple sources of funds are used, each likely to have unique application procedures and information requirements. Because starting dates are not precisely known, the financing requirements may be further complicated by changing economic forces that affect prices, household incomes, interest rates and exchange rates. [Ocasio, 1997]

The process of arranging financing begins in the planning stage, with the assessment of financial resources and the packaging of projects for financing from these sources. However, it is entirely likely that the WS&S program may be formally approved without any specific commitment of public funds. Specific financing commitments must be obtained prior to beginning detailed design and construction. The council must therefore establish the financing mechanisms that were identified during the

	planning stage or make new financing arrangements, if necessary. Because the city budget is normally an important source of project funding, the WS&S planning team needs to take care that projects are prepared and submitted for consideration in the city's capital improvements program and may have to adjust the timing of project implementation to match the annual budget cycle. Competing for budget funds with other urban capital works such as roads and schools is a process that requires skillful negotiation and lobbying to gain the support of decision makers and the public. Arranging financing from any source is also an iterative process, requiring frequent dialogue and exchange of information, resulting finally in negotiation of terms and conditions (including compromise) and formal approval by external lenders and the council.
Tariffs and Collections	Modifying tariffs and collection procedures is likely to be an essential element of the cost recovery strategy for any WS&S project. Tariff reforms and procedural changes, including activities such as publicity campaigns, accounting and billing and collection reforms, and training and incentive programs, need to be implemented on time. These activities should be addressed in the financing and O&M plans. Ample time must be allowed because these essential reforms are usually politically sensitive, requiring lengthy negotiation and formal approvals.
Environmental Clearance	Local requirements for environmental assessments and permits vary considerably. Most countries require an environmental impact assessment to be prepared and filed. This should be done immediately following the feasibility study. Sufficient time should be allowed to obtain the approval of external agencies, which in turn may require public review and comment and the negotiation of mitigation measures. Projects funded by international finance institutions such as the World Bank, Asian Development Bank or USAID are likely to have additional environmental clearance procedures imposed as conditions of the loan or grant. For example, U.S. federal regulations (22 CFR 216) and USAID policy both require USAID to conduct an environmental review and disclose all environmental impacts of proposed activities; to determine the significance of the impacts and to minimize the adverse impacts of U.S. government-funded activities. This review typically involves an initial environmental examination (IEE) and may require an environmental assessment (EA) and environmental impact statement (EIS).
Other Preparations	There are numerous other preparatory steps to be taken. For the most part, these activities are typical of any civil works project. The council needs to be aware of these steps and ensure that they are completed in sufficient time that they do not delay the start of construction. For example: ▪ Acquisition of sites and rights-of-way for the construction of the

project, possibly to include temporary easements needed only during the construction process. If compulsory purchase of land is anticipated, then sufficient time must be allowed to complete the process, which may include negotiation, legal action and resettlement.

- Updating of maps, soil surveys and "as built" plans for existing infrastructure. Prior to the completion of the feasibility studies, the results of mapping and soil surveys (and other geotechnical and similar investigations) and checking of "as built" plans may all be required to avoid last-minute modifications to the proposed works. Often these activities are contracted out to specialized private firms.

- Approvals and construction permits.

Detailed Planning and Design

The starting points for detailed planning and design should be detailed specifications based on the project description(s) contained in the WS&S program and on information contained in the pre-feasibility and feasibility studies.

Water supply and sanitation projects are normally designed by civil engineers, with inputs from other specialists, including architects, quantity surveyors, planners, environmental specialists and financial analysts. Depending on local conditions, these specialists may be found on the staff of the city and its utility enterprises, or the design work may be contracted out to external design institutes or private firms.

The consultants hired to prepare the designs should be knowledgeable about a wide range of conventional and innovative technology; otherwise, there is a risk that only traditional approaches will be offered, neglecting less costly but equally effective alternatives. This is important, as experience has shown that councils, utilities and designers often have a natural tendency to prefer foreign, high-tech, capital-intensive investments rather than local, low-cost technologies.

Global experience has shown that poor operation and maintenance of facilities is the most important factor contributing to the poor quality of WS&S services. This fact reflects the bias toward construction rather than O&M that is typical of many utilities. Therefore, the O&M requirements of each project should be carefully considered in the project's planning and design stages and as important criteria in the selection of technologies. Each project should have its own O&M plan to identify the organizations and individuals who will be responsible for O&M tasks, the resources they require and strategies for building capabilities and reallocating resources in a timely manner to ensure a smooth transition from construction to operations. When community groups are involved in managing WS&S systems, the O&M plan must include the inputs and activities of the community. Additional preparatory time may be required to establish or strengthen community-based institutions and to train individuals who will be responsible for operation and maintenance tasks.

Planning and design of specific projects must also reflect local conditions, including soils and topography, the capacity of local builders, local construction practices and materials and sites and designs that are compatible with existing local development. Moreover, WS&S planning activities and plans need to be carefully coordinated with existing urban development plans, capital investment programs and the city's budgeting cycle.

Consultation with stakeholders, including future facility operators and community groups (if appropriate), is essential to verify the selection of technology and compatibility with existing systems, operating conditions and user expectations.

Construction Contracting

The details of construction contracting are beyond the scope of this Guide. Contracting procedures also vary from place to place, according to national or local legal requirements. [Hendrickson, undated]

When international finance institutions such as the World Bank are involved, the procurement procedures can become quite demanding and the time required will increase accordingly. Community-based contracting may offer benefits such as improved community participation, decentralization and local job creation, but it may also require intensive monitoring and technical supervision. [de Silva, 2000]

Most procurement procedures embody the following steps:

Plan for procurement—Develop a strategy for the procurement that is appropriate to the nature of the services required and consistent with procurement rules and regulations. Decide who will be responsible for different stages of the procurement process, what rules will be followed and how specific decisions will be made. If international procurement is anticipated (it may be required when international finance institutions are involved), then sufficient lead time is needed for international advertising and receipt of responses. [Victorian Government Purchasing Board, undated]

Prepare bid documents—Include a letter of invitation to bid, conditions of tendering, specifications describing the infrastructure and facilities to be built, proposed terms and conditions of the contract, bid evaluation factors and process and forms or requirements for the form of the bidder's proposal. For the crosscutting activities, terms of reference may need to be prepared if external consulting services are to be procured.

Shortlist or prequalify bidders—This is usually done for larger contracts to improve the quality of bids. Interested firms are invited to submit "expressions of interest" for the tender. A small number of well-qualified firms are then prequalified. By reducing the number of competing prequalified firms, shortlisting increases each bidder's odds of winning and thus motivates them to prepare the best possible proposals.

Call for bids or tenders—Advertise the procurement or invite selected

firms to submit proposals. Bidders' conferences are often held at the time of prequalification and when the call for tenders is released as an opportunity for potential bidders to obtain information directly from the organizers. The project manager must be prepared to answer questions and provide clarifications to bidders during the period allowed for bid preparation.

Receive bids—Methods for receiving bids vary from place to place, but formal procedures are required for recording the receipt of bids up to the closing date and time. Often, to improve transparency and fairness, the bids are publicly opened at the appointed bid closing time, and the name and amount of each bid is announced.

Evaluate bids—Bids received in accordance with the procedures are analyzed and evaluated by the appointed team, following the procedures and using criteria adopted in advance and made known in the bidding documents. A ranking of preferred proposals or contractors is developed, including specific points for negotiation with the top one or two firms.

Negotiate terms and conditions—A contract to supply goods or construct facilities according to bills of quantities or specifications contained in the bid documents is normally awarded to the bidder that submitted the lowest priced responsive bid. In contrast, contracts for consulting services are normally evaluated first on the basis of technical quality. Price is factored in at a later stage. This is because the quality of the services offered could outweigh the price, which normally is a relatively small proportion of the total cost. The highest ranked bidder is then invited to negotiate the terms and conditions of the contract. If that bidder is unsuccessful, the next firm is normally approached in turn and invited to negotiate. In either case, the city's legal advisors will often be involved in the negotiation and must review the contract as it is finally negotiated, prior to its approval.

Award contract—The contract is awarded and signed by the parties. The outcome of the procurement is announced to the other bidders. Major contract awards are often required to be published in the local newspapers or, for multilateral financed projects, in *Development Forum.*

Execute contract—Terms of execution are contained in the contract, for example, mobilization procedures to be followed, deposits and payments to be made, reports and notices to be given by either party and conditions for occupation of construction sites.

Construction Supervision

The city must supervise the construction process, which is normally assigned to a resident engineer working on staff or hired as an independent consultant. Supervision is important to ensure quality, cost control and public safety. Moreover, lenders (especially the multilateral banks) increasingly use external quality control and quality assurance procedures that require works to be inspected before loan tranches are released for payment to contractors and suppliers.

During construction, the project manager will obtain input from the contractor(s) and manage resulting procedures such as approving *variation orders* (formal adoption of design changes that exceed a pre-determined cost threshold), conducting routine inspections and preparing progress reports. Usually the council's approval will be required when change orders reach or exceed a fixed percentage of project contingency costs (50%, for example).

Worker safety and environmental impacts also need to be monitored during construction to prevent or control potentially damaging events such as illegal tree clearance, intentional or unintentional releases of diesel fuel and other polluting substances or poor sediment control.

The project manager is ultimately responsible for monthly budget/financial status reporting, updating the project work plan (CPM schedule), maintaining files of contract related documentation, completing status reports and reporting progress to council. Accountants, auditors, quantity surveyors and other specialists normally assist and provide inputs to these tasks.

Additional tasks and responsibilities that arise periodically during construction include comparison of actual and estimated quantities, final budget reconciliation, financial reporting and auditing, obtaining certificates for testing of materials and the preparation and review of "as built" plans.

Project Acceptance—The city formally accepts the completed project once the terms and conditions of the contract have been fulfilled to its satisfaction. At this stage or later, as agreed in the contract, it will release any security deposits held by the council.

Post-Construction

Transition to operations and maintenance—Each completed project makes a transition from development to operation, at which point the focus of effort shifts from design and construction to operation and maintenance. For some projects, this shift may entail considerable technical challenges, especially when the new infrastructure becomes physically connected and integrated with existing systems. Environmental monitoring may be heightened at this stage as worksites and trenches are to be restored and revegetated and as new pipelines are flushed with large volumes of water before being put into service. Probably the most dangerous potential environmental impact is the sudden discharge of large amounts of sewage effluents from treatment plants that have not yet reached stable operating status.

Commissioning, and the transition to routine O&M activities, may also require new or expanded workshops and equipment, as well as training of the relevant staff. By this time, the operator may also need to have modified existing procedures and staffing assignments and reallocated equipment and other resources. Many of these technical, institutional, management and financial changes need to be completed prior to

commissioning.

Implementation of the O&M plan is naturally a responsibility of the enterprise or operating company, but it should be monitored externally, for example, by the project manager.

Implementing Private Sector Participation

Different skills and activities are called for when a specific program component involves large-scale PSP. The detailed CPM shown at the end of this Section illustrates the required steps. This is a specialized expertise that normally falls outside the competence of local urban government and the staff of its utilities. The gains that may be obtained from participation by the private sector can be significant, but the process must be handled well to maximize benefits and avoid pitfalls. This invariably requires the recruitment of the most competent independent local or foreign consultants available. These consultants must have considerable experience in all forms of privatization and be thoroughly familiar with the sector and the country.

Typically, the steps to be taken are the same steps followed when contracting for construction by the private sector. The essential difference, however, is that the council does not specify the type or scale of construction to take place but rather the type and standards of the service that is to be provided by the private sector. In other words, it is left to the private sector to propose to the council or utility what actions it plans to take to meet the specified service delivery level. Like the calling of tenders for construction, the calling of proposals for PSP must go through a competitive and transparent bidding procedure. The public sector agencies must provide potential private bidders with information upon which they can base their bids.

Typical Steps in PSP Implementation

The steps to be taken in soliciting private sector participation are typically as follows:

Technical evaluation—An evaluation of the condition of the existing WS&S infrastructure is prepared that defines the service needs, makes broad estimates of the investment that might be needed, defines the performance standards that might be expected from a private partner and determines what form of should be sought.

Legal and regulatory work—Typically this includes drafting the bid documents as well as the contract that would be offered to the private sector and improving the regulatory framework including appointment of a regulator. The latter is a complex task, often requiring legislative action. An assessment and decision on the extent to which regulations might be covered under existing or new laws or whether, as time often is inadequate, any necessary regulations should be covered by contract between the public and private sectors.

Demand forecasts and price estimates—Concurrently, it is necessary to prepare demand forecasts and decide on price cap or rate of return financial criteria that would regulate the upper level of prices return that

might be charged by the private sector operator. This would entail an assessment of risks and their allocation and mitigation.

Stakeholder participation—As for any other program component, it is critically important that stakeholders, particularly the management and staff of concerned utilities, be involved and informed.

Procurement—Finally, bidders are prequalified and bids called, evaluated, negotiated and awarded. It is important to note here that a bid is normally expressed in terms of the cost that the private sector would charge customers (price per cubic meter of water) that would be charged by the successful bidder to meet the minimum performance criteria specified in the bid documents.

While the potential rewards from PSP might be significant, its realization requires concerted effort by all concerned. It cannot be accomplished without plenty of patience on the part of politicians and decision makers and the support of experienced specialized privatization consultants.

MONITORING, EVALUATION, FEEDBACK

Global experience has shown that improvement in physical works alone may not lead to improved public health or social development; therefore, three components—monitoring, evaluation and feedback (MEF)—are all critical to successful project implementation and sustainability. Certain MEF activities apply during the construction and development of a project, while others are appropriate post-construction. Donor agencies require specific MEF activities. [Globalization Challenge Initiative, 2000]

Monitoring alone is not sufficient unless the results are analyzed and the lessons learned are acted upon. The *Global Water Supply and Sanitation Assessment 2000 Report* suggests these dimensions for monitoring of programs:

- **Water supply—**equity, quality of service, sustainability and efficiency.
- **Sanitation—**Are the facilities used? By whom? What is the ultimate disposal result? Is it sustainable?
- **Hygiene—**Are hands washed? Is soap or other cleanser used?

MEF requires resources, which often are inadequate or entirely lacking. These costs should be included in the financing plan for the WS&S program. If the council and executing agencies are not already engaged in MEF activities, then additional training resources are required, and sources of training may need to be identified. These aspects must be covered in the institutional development component of the program.

Several important categories of MEF activities are briefly introduced below: *management information, impact monitoring* and *benchmarking.* The council must ensure that all three types of MEF activities are carried out, but the mechanisms for doing so are different. Management information is largely internal, from collected records, while impact monitoring requires consultation with users. Benchmarking uses both kinds of information to monitor performance indicators over time and against local or international industry norms.

Management Information

Management information is required by any project to ensure efficient, timely implementation, to keep the project within budget and to ensure the quality of work. The project work plan and financial plan are the most critical frameworks for management reporting. Thus, the project manager must make arrangements to track the implementation of tasks and sub-tasks, monitor costs against the budget and ensure compliance with design specifications, contract requirements and regulations.

Management reporting and feedback must be regular and continuous throughout the project cycle. This is essential to keep works on

schedule, thereby reducing costs and risks to investors. The council should assign one senior official to be ultimately responsible for management information systems related to the project. This person must be adequately equipped with staff and other resources matched to the scale of the project.

Impact Monitoring

Impact monitoring is designed to assess the results, benefits or impacts of the program or project on users. This assessment enables those responsible for the program to know whether it is actually achieving the objectives that were used to justify the investment. Impact monitoring is focused on whether the users are receiving the expected benefits and whether overall development objectives are being achieved. Three basic questions are usually addressed:

- Were the facilities or services provided?
- Are they working?
- Are they being used as intended?

A monitoring guide for WS&S, developed with USAID sponsorship, suggests the following impact and monitoring indicators:

Impact indicators:

- Percentage of children younger than 36 months with diarrhea in the last two weeks
- Quantity of water used per capita per day
- Percentage of child caregivers and food preparers with appropriate handwashing behavior
- Percentage of population using hygienic sanitation facilities

Monitoring indicators:

- Percentage of households with year-round access to improved water source
- Percentage of households with access to a sanitation facility
- Percentage of recurrent costs for water supply services provided by the community served
- Percentage of constructed water supply facilities maintained by the communities served

Benchmarking

Many countries have established, or are establishing, performance indicators or benchmarks to be used as management tools to monitor performance and identify opportunities for improvement. Regular monitoring and reporting of benchmarks should become an integral part of project and process management. Benchmarks need to be designed to suit specific circumstances. Poorly designed benchmarks can send the wrong signals to managers. [World Bank, 1999]

The council and the relevant WS&S enterprises should consider establishing and monitoring a set of benchmarks or indicators to aid in monitoring performance in the sector. For example, for conventional water supply systems, the World Bank suggests developing benchmarks and indicators in at least the following categories:

- Service coverage
- Water consumption and production
- Unaccounted-for water
- Metering practices
- Pipe network performance
- Cost and staffing
- Quality of service
- Billings and collections
- Financial performance
- Capital investment

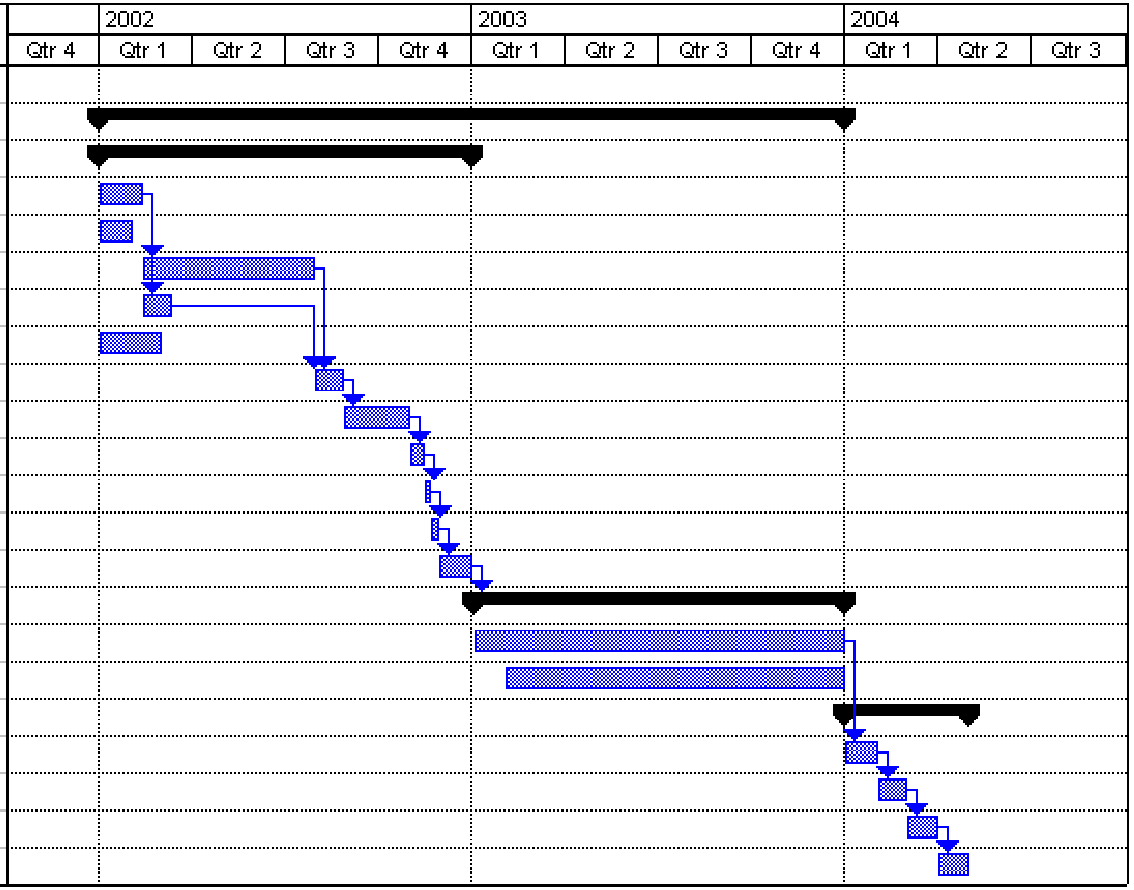
Evaluation

Evaluation refers to the assessment of the results or outcomes of the project or program and the methods used to improve the planning, design and implementation of existing and future projects.

Evaluations are typically conducted by an independent individual or small team of specialists in the appropriate technical fields. They conduct interviews and inspections and review documents to ascertain how well the objectives of the project were realized. Their results and recommendations for future improvement are reported to council.

Evaluation and monitoring activities often require intimate knowledge of the community, in which case it may be most efficient and effective to seek inputs from community members or groups to carry out these activities. [Bartle, 1998b]

ID	Task Name
1	**IMPLEMENTATION**
2	**CROSS CUTTING ACTIVITIES**
3	**DESIGN PHASE**
4	Recruit & Mobilize Consultants
5	Initiate Training, as needed
6	Complete Designs
7	Arrange Financing
8	Initiate any PSP Proposal
9	Prepare Bid Documents
10	Call for Bids
11	Evaluate Bids
12	Award Bids
13	Contract Execution
14	Mobilize Contractors
15	**CONSTRUCTION PHASE**
16	Construction
17	Make Progress Payments
18	**POST-CONSTRUCTION PHASE**
19	Project Commissioning
20	Formal Handover
21	Monitor Performance
22	Release Security Deposits



Section IV: INFORMATION RESOURCES

Most of the following citations contain links to Internet web sites. If you select the link with your mouse, your computer will attempt to find the web site using your computer's browser. A browser such as Microsoft Internet Explorer or Netscape Navigator is required to access the web sites, and the Adobe Acrobat Reader is also required to access many of the documents. All three can be downloaded free from the Internet (click on the names above to visit their web sites).

The links are indicated as follows:

- [resource citation]—The browser will jump to the text of the full citation contained in the Information Resources section of the Guide.
- <Internet Location>—The browser will try to open a web site on the Internet that contains the full text of the document. In some cases, this will open a document in Adobe Acrobat Reader. If the computer is not connected to the Internet, or if the linked web site no longer functions, a window containing an error message will appear.
- [CD ROM]—The browser will attempt to open a key resources document stored on the CD-ROM using Adobe Acrobat Reader.

In some cases the hyperlink takes the browser to a web site containing a further link to the document in Adobe Portable Document format. This is usually done so that the document can be viewed in proper context, for example, if it is one of a series of documents, or if a single document has been split into several parts.

A broken link occurs when the address of a web site or document has changed so that the hyperlink is no longer correct. Usually this results in an error message. Sometimes this means that the site or document is no longer available online, but often it has simply been moved to another location on the Internet. It is worth trying the same hyperlink once or twice because sometimes the problem is temporary. However, a missing site or document can often be located using one of these methods:

- "Peel back" the Internet address and look for the site or document on the parent web page. For example, if the (illustrative) address (www.site.org/water_docs/tools/index.pdf) does not work, try visiting (www.site.org/water_docs/) or (www.site.org), and if successful, look on that web site for the name of the document or the "publications" section. To peel back the address, edit the address in the box marked "address" or "location" in your browser. Alternately, type in the address omitting the last element(s).
- Use an Internet search engine to search for the publication by title, author, or publisher.

To save an Adobe Portable Document File on your local computer, rather than opening it immediately on your screen, you may right-click the hyperlink to the document (on the web site) and choose the option "Save target as …" that appears on the pop-up menu.

ANNOTATED BIBLIOGRAPHY

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

A

Alcázar, Lorena, Lixin Colin Xu, and Ana Maria Zuluaga. 2000. *Institutions, Politics, and Contracts: The Attempt to Privatize the Water and Sanitation Utility of Lima, Peru.* World Bank Working Paper No. 2478. The World Bank. [cited in March 2001]. Available on Internet: <http://wbln0018.worldbank.org/Research/workpapers.nsf/fc90c6f8c9a42fe6852567e50050df1e/c75b0b2a6601d2a685256989006d7430?OpenDocument>

Case study of political and other factors that led to the failure of a private water concession in Lima, Peru.

Almendom, Astier M., Ursula Blumenthal and Lenore Manderson, eds. 1997. *Hygiene Evaluation Procedures: Approaches and Methods for Assessing Water- and Sanitation-Related Hygiene Practices*. London: Intermediate Technology Development Group Publishing.

"Describes methods of gathering, reviewing and interpreting qualitative information, by using a variety of sources and methods to produce effective, reliable and trustworthy data. Using case studies from Africa and Asia involving field personnel working in water supply, sanitation, and health/hygiene education projects, the handbook was developed as a practical answer to the limitations of using a single method or instrument for information gathering."

Andrews, Richard N., et al. 1993. *Guidelines for Improving Wastewater and Solid Waste Management*. EHP Technical Report No. 88. [cited in April 2001] Available on Internet: <http://www.dec.org/pdf_docs/pnabp925.pdf>

B

Bartle, Phil. 1998a. *Handbook for Mobilizers*. In Community Development Society (web site). Seattle Community Network (SCN). [cited in April 2001]. Available on Internet: <http://www.scn.org/ip/cds/cmp/hbmob.htm>

Orientation, guidance, and practical tips for mobilizing communities to participate in development activities.

Bartle, Phil. 1998b. *Handbook of Monitoring.* In Community Development Society (web site). Seattle Community Network (SCN). [cited in April 2001]. Available on Internet: <http://www.scn.org/ip/cds/cmp/hemon.htm#SPreface>

Orientation, guidance, and practical tips for monitoring community-based development projects.

Bendahmane, Diane, ed. 1992. *Water Reuse in Developing Countries Including Guidelines for Water Reuse*. Camp Dresser and McKee, Inc. (CDM) for USAID Bureau for Research and Development, Office of Health. [cited in April 2001]. Available on Internet: <http://www.dec.org/pdf_docs/pnack837.pdf>

Black, Maggie. 1998. *Learning What Works: 20 Years Cooperation in Water and Sanitation*. UNDP/The World Bank - Water and Sanitation Program. [cited in March 2001]. Available on Internet: <http://www.wsp.org/pdfs/global_lww.pdf>
Traces the developments that have guided thinking and action in the water and sanitation sector since the Water and Sanitation Program's inception in 1978, and analyzes how the program has affected—and been affected by—these developments.

Blokland, Maarten, Okke Bradbaart, and Klas Schwartz. 1999. *Private Business, Public Owners—Government Shareholdings in Water Companies*. WSSCC/Netherlands Ministry of Housing, Spatial Planning, and the Environment, Geneva, Switzerland and The Hague, The Netherlands.

Briscoe, John, Pablo Anguita Salas, and Humberto Pefia T. 1998. *Managing Water as an Economic Resource: Reflections on the Chilean Experience*. Environmental Economic Series, Paper No. 62. The World Bank, Environment Department. The World Bank. [cited in March 2001]. Available on Internet: <http://www-wds.worldbank.org/pdf_content/000009265398101313461 7/multi_page.pdf>

Presents issues of water markets, in general, and in Chile in particular. Among its conclusions are the following: (a) Countries following the open market model must ensure that water is allocated to highest value users and used efficiently; this requires resources management and movement toward the use of market-friendly instruments. (b) Water markets lead to the better use of water in irrigated agriculture and its release to higher-value urban and industrial users. (c) Water markets function best when rivers are well regulated. (d) Low transaction costs and the consistent and predictable interpretation of water law is essential. (e) The water markets in Chile, though developed during non-democratic political circumstances, are now broadly popular. (f) To deal with market imperfections, water markets need to be supplemented by effective dispute resolution.

Brook Cowen, Penelope J. 1997a. "The Private Sector and Water Sanitation—How to Get Started." In *Public Policy for the Private Sector: Note No. 126*. The World Bank. [cited in March 2001]. Available on Internet: <http://www.worldbank.org/html/fpd/notes/126/126brook.pdf>

Presents the challenges in getting private sector involved in WS&S and discusses areas where private sector can be effectively involved. Includes a matrix of PSP options.

Brook Cowen, Penelope J. 1997b. "Getting the Private Sector Involved in Water—What to Do in the Poorest of Countries." In *Public Policy for the Private Sector: Note No. 102*. The World Bank. [cited in March 2001]. Available on Internet: <http://www.worldbank.org/html/fpd/notes/102/102brook.pdf>

Presents options or mechanism that are suitable for the promotion of private sector involvement in WS&S in developing countries, including stepwise decision process.

Brook Cowen, Penelope J. 1999. *Lessons from the Guinea Water Lease, Note No. 78*. The World Bank. Available on Internet: <http://www.worldbank.org/html/fpd/wstoolkits/resources/frame.html>

"In 1989, the government of Guinea entered into a lease arrangement for private sector operation of water services in the capital city, Conakry, and sixteen other towns. The lease has been broadly successful—in the first five years, it led to a big increase in the population with access to safe water. But because the risk sharing between the parties to the lease has proved difficult to implement and enforce, improvements have been smaller than hoped for. Penelope J. Brook Cowen reviews the lease's performance, drawing lessons for water projects in other countries."

C

Castillo, Oscar. 1998. *Demand and Inclusion: The Andean Study.* UNDP/World Bank Community Water Supply and Sanitation Conference, 1998. [cited in March 2001]. Available on Internet: <http://www.wsp.org/english/focus/conference/decentral.html>

This brief case study is a snapshot of relationships between communities and municipalities, based on experiences of selected municipalities in four Andean countries: Bolivia, Colombia, Ecuador, and Peru. It examines the role that municipalities play in national administrative decentralization and the activities that rural communities can undertake to make their sanitation services sustainable. A link to the full case study is at the bottom of the web page given above.

Cave, Ben, and Valerie Curtis. 1999. *Promoting Change in Environmental Health Behavior*. WELL. [cited in March 2001]. Available on Internet: <http://www.lboro.ac.uk/well/studies/t165.pdf>

Literature review on the potential effectiveness of approaches to environmental health promotion in developing countries and appropriate expectations and targets for change in health behavior.

Cave, Ben, and Peter Kolsky. 1999. "Groundwater, Latrines and Health." In *Well Studies*, edited by Darren Saywell. WELL [cited in March 2001]. Available on Internet: <http://www.lboro.ac.uk/well/Brief/brief163.htm>

"Reviews the risks to health posed by groundwater contamination from on-site sanitation (particularly latrines) and attempts to consider it in the light of realistic alternatives. The study focuses on microbiological contamination because this is the most widespread and direct threat to health from on-site sanitation."

Choe, KyeongAe, Robert C. G. Varley, and H. U. Bijlani. 1996. *Coping with Intermittent Water Supply: Problems and Prospects. Dehra Dun, Uttar Pradesh, India.* EHP Activity Report No. 26. [cited in April 2001]. Available on Internet: <http://www.dec.org/pdf_docs/pnabz958.pdf>

Collignon, Bernard, Régis Taisne, and Jean-Marie Sié Kouadio. 2000. *Water and Sanitation for the Urban Poor in Côte d'Ivoire*. UNDP/The World Bank, Water and Sanitation Program. [cited in March 2001]. Available on Internet: <http://www.wsp.org/pdfs/af_ci_urbanpoor.pdf>

Case study of successful WS&S services provided by private sector in a rapidly urbanizing city. Presents legal framework and subsidies and their impacts on the poor.

Crites, Ronald W., and George Tchbanoglous. 1988. *Small and Decentralized Wastewater Management Systems*. McGraw-Hill, Inc., New York, NY.

Cullivan, Donald, et al. 1988. *Guidelines for Institutional Assessment: Water and Wastewater Institutions*. WASH Technical Report No. 37. [cited in March 2001]. Available on Internet: <http://www.dec.org/pdf_docs/pnaaz336.pdf>

Guideline on assessment of institutions in water supply and sanitation. Print copies are also available in French, Spanish, and Arabic.

D

Daane, Janelle, and Frederick McNeill. 1997. *Rehabilitation of Priority Springs and Wells in Jordan: Part 1. Assessment Report on Wadi Sir, Qairawan, Qantara, and Deek/Teis Springs and Kafrein Wells*. EHP Activity Report 43. [cited in April 2001]. Available on Internet: <http://www.dec.org/pdf_docs/PNACC356.pdf>

Dauskardt, Rolf P.A. 2000. *Applied Financial Improvement Planning in Local Governments*. Institute for Housing and Urban Development Studies. Netherlands. [cited in April 2001]. Available on Internet: <http://www.ihs.nl/publications/publications%20in%20pdf/Applied_financial_improvement.htm>

The report covers the development of an appropriate framework for applied financial improvement planning in local government, the results of the framework and financial analysis as applied in the city of Kitwe in Zambia, and the structuring of a recommendation package of financial improvement measures.

Dayal, Rekha, Christine Van Wijk, and Nilanjana Mukherjee. Undated. *Methodology for Participatory Assessments with Communities, Institutions, and Policy Makers*. The World Bank /UNDP Water and Sanitation program. [cited in March 2001]. Available on Internet: <http://www.wsp.org/pdfs/global_metguide.pdf>

Presents methodology for participatory assessment, with focus on community-level institutions and policies, and emphasizing sustainability of community-based projects. A

detailed process of participatory assessment is presented in Appendix A.

de Sherbinin, Alex, and Victoria Dompka with Lars Bromley. 1998. *Water and Population Dynamics: Case Studies and Policy Implications*. USAID, Population Reference Bureau, and IUCN. AAAS. [cited in March 2001]. Available on Internet: <http://www.aaas.org/international/psd/waterpop/contents.htm>

Discussion of the impacts of population on water resources, with reference to case studies and lessons learned.

de Silva, Samantha. 2000. *Community-based Contracting: A Review of Stakeholder Experience.* The World Bank. [cited in April 2001]. Available on Internet: <http://www.worldbank.org/html/fpd/water/pdf/ccpaper.pdf>

An analysis of lessons learned in the implementation of small localized subprojects in which communities became involved in procuring goods and services. Identifies several different community contracting models, their goals and characteristics. Presents a "subproject cycle for community subcontracting." Most of the discussion concerns lessons learned and good practices in project planning, preparation, implementation, capacity building, and monitoring and evaluation. Draws on case studies in Brazil and Malawi.

Deverill, Paul. 2000. *Learning Lessons from Sector Studies—Uganda, Tanzania, Nigeria and Kenya.* WELL. [cited in March 2001]. Available on Internet: <http://www.lboro.ac.uk/well/studies/t325.htm>

Synthesizes lessons learned from donors and nongovernmental organizations (NGOs) during recent country sector studies in water supply, sanitation, and environmental health in Uganda, Nigeria, Tanzania, and Kenya. Following a brief overview of the sector in each of the countries, the lessons learned are presented in an attempt to reflect current priorities.

DFID (Department for International Development). 2000. *Better Health for Poor People*. Available on Internet: <http://www.dfid.gov.uk/public/what/pdf/tsp_health.pdf>

"Spells out actions which could transform the lives of hundreds of millions of poor people and make the planet a better and safer place for our children and grandchildren…Looks at the four key international targets—for reducing infant and child mortality; reducing maternal mortality; providing universal access to reproductive health services; and reducing HIV infection rates."

Dillinger, William. 1995. *Decentralization and its Implications for Urban Service Delivery*. Urban Management Programme Discussion Paper No. 16, The World Bank, Washington, DC.

E

Edwards, Daniel B., et al. 1997. *Issues and Options for Transfer of Water Distribution Responsibility to Local Government Structures in the Bushbuckridge, Hazyview, and Nsikazi North Areas of South Africa*. EHP Activity Report No. 30. [cited in April 2001]. Available on Internet: <http://www.dec.org/pdf_docs/PNACB565.pdf>

EHP (Environmental Health Project). 1999a. *Community Involvement: Lessons Learned*. [cited in March 2001]. Available on Internet: <http://www.ehproject.org/PDF/Lessons_Learned/community_involvment.pdf>

Presents lessons from the field study of projects in four countries: Ecuador, Tunisia, Bolivia, and Benin.

EHP (Environmental Health Project). 1999b. *Environmental Sanitation Policies: Lessons Learned*. EHP Project leaflet. [cited in March 2001]. Available on Internet: <http://www.ehproject.org/PDF/Lessons_Learned/sanitation_policies.pdf>

A concise document describing the policy relationship between sanitation and health, making the case for raising the priority of sanitation.

Esrey Steven, and Ingvar Andersson. "Environmental Sanitation from an Eco-Systems Approach." In *Vision 21: Water for People*. (web site). WSCC. [cited in April 2001]. Available on Internet: <http://www.wsscc.org/vision21/docs/doc39.html>

"Promotes waste as a resource and envisages local solutions involving pathogen destruction, reuse, cultural attitudes, and promotion."

Estache, Antonio, ed. 1995. *Decentralizing Infrastructure - Advantages and Limitations*. World Bank Discussion Paper No. 290, The World Bank, Washington, DC.

European Union. Undated. *Water Pricing, Economics, Environment and Society*. The European Union (Europa web page). [cited in April 2001]. Available on Internet: <http://europa.eu.int/comm/environment/wconf/summaries.htm>

This site has summaries (one page or less) of numerous papers and presentations on pricing, economics, politics, cost recovery, and tariffs related to water.

F

Falkenmark, Malin, and Carl Widstrand. 1992. "Population and Water Resources: A Delicate Balance." *Population Bulletin,* Vol. 47, No. 3. Population Reference Bureau.

Feacham, R. G., et al. 1983. *Sanitation and Disease: Health Aspects of Excreta and Wastewater Management*. Published for the World Bank by John Wiley & Sons, New York, NY.

Flavin, Michael, May Yacoob, and Diane Bendahmane. 1999. *Behavior First: A Minimum Package of Environmental Health Behaviors to Improve Child Health*. EHP Applied Study No. 10 [cited in March 2001]. Available on Internet: <http://www.dec.org/pdf_docs/PNACF961.pdf>

Provides guidance on how to design, implement, and monitor a minimum package of interventions designed to improve environmental health behaviors, to accompany water and sanitation improvements.

Foley, Sean, Anton Soedjarwo, and Richard Pollard. *Of The People, By The People, For The People: Community-Based Sewer Systems In Malang, Indonesia*. UNDP/The World Bank Water and Sanitation Program – South East Asia. [cited in March 2001]. Available on Internet: <http://www.wsp.org/pdfs/eap_malang.pdf>

A detailed case study of community based sewer system in Indonesia, including detailed analysis of finances and affordability to the community.

Fragano, Frank, et al. 2001. "Case Studies on Decentralization of Water Supply and Sanitation." In *Latin America.* EHP Strategic Paper No. 1, edited by Fred Rosensweig. [cited in March, 2001]. Available on Internet: <http://www.dec.org/pdf_docs/pnack672.pdf>

Presents case studies on decentralization of water supply and sanitation, including six cases of five different countries: Columbia, Paraguay, El Salvador, Nicaragua, and Honduras.

Franceys, Richard. 1997. "Private Sector Participation in the Water and Sanitation Sector." In *Water Resources Occasional Papers No 3*. Prepared by WEDC, Loughborough University and IHE, Delft. [cited in March 2001]. Available on Internet: <http://www.lboro.ac.uk/well/occpaps/no3.htm#anchor97573>

Presents an overview of the principles that should underlie private sector participation in the water and sanitation subsector to inform stakeholders on the role and potential of private

sector participation (PSP). Suggests approaches that might be appropriate in low and lower-middle income countries and presents a brief analysis of various PSP options.

G

Gardner-Outlaw, Tom, and Robert Engelman. 1997. "Sustaining Water, Easing Scarcity: A Second Update." In *Why Population Matters.* Population Action International. [cited in March 2001]. Available on Internet : <http://www.populationaction.org/why_pop/water/>

A discussion of global water stress projections and implications for development. Includes estimates and projections of water scarcity for all countries.

GHK Research and Training Institute. 2000. *Strategic Planning for Municipal Sanitation: A Guide*. [cited March 06, 2001]. Available on Internet: <http://www.ghkint.com/RandT/projects/strategicplanning/guide.htm>

Comprehensive guide to strategic planning of municipal sanitation. Section 1: Urban Sanitation Problems and the Need for Strategic Planning makes the case for strategic planning in the sector. Section 2: Characteristics of a Strategic Approach to Sanitation Planning elaborates on key strategic issues.

Gidman, Philip, et al. 1995. *Public-Private Partnerships in Urban Infrastructure Services*. Urban Management Programme Working Paper No.4. UNDP/UNCHS/World Bank, Nairobi, Kenya.

Globalization Challenge Initiative. 2000. "Social and Environmental Assessments of the World Bank." In *News & Notices for IMF and World Bank Watchers*, Vol. 2, No. 2. [cited in April 2001]. Available on Internet. <http://www.challengeglobalization.org/html/news_notices/spring2000/spring2000_03.shtm>

Gómez-Lobo, Andrés, Vivien Foster, and Jonathan Halpern. 2000. "Designing Direct Subsidies for Poor—A Water and Sanitation Case Study." In *Public Policy for the Private Sector: Note No. 211*. The World Bank. [cited in March 2001]. Available on Internet: <http://www.worldbank.org/html/fpd/notes/211/211foste.pdf>

Presents suggestions on how subsidies can be better targeted to the poor in WS&S. Refers to the Chilean case.

Gordon, Christopher. 1998. "Freshwater Ecosystems in West Africa: Problems and Overlooked Potentials." In *Science in Africa: Emerging Water Management Issues*. Association for the Advancement of Science, Africa Programs. [cited in March 2001]. Available on Internet: <http://www.aaas.org/international/ssa/ewmi/gordon.htm>

Presents a brief discussion of freshwater management issues in Africa.

Grover, Brian. 1983. *Water Supply and Sanitation Project Preparation Handbook, Volume 1: Guidelines*. World Bank Technical Paper No. 12. The World Bank, Washington, DC.

H

Haarmeyer, David, and Ashoka Mody. 1998. "Financing Water and Sanitation Projects—The Unique Risks." In *Public Policy for the Private Sector: Note No. 151*. The World Bank. [cited in March 2001]. Available on Internet: <http://www.worldbank.org/html/fpd/notes/151/151haarm.pdf>

Presents commercial and noncommercial risks involved in WS&S project financing with private sector's perspectives and suggests possible solutions.

Hendrickson, Chris. *Project Management for Construction: Fundamental Concepts for Owners, Engineers, Architects and Builders*. Made available on Internet by Department of Civil and Environmental Engineering, Carnegie Mellon University, Pittsburgh. [cited in April 2001]. Available on Internet: <http://www.ce.cmu.edu/~cth/pmbook/index.htm>

A textbook on construction management.

Hyden, Goran. 1998. "Governance for Sustainable Livelihoods: Operational Issues." In *Sustainable Livelihoods* (web site). UNDP. [cited in March 2001]. Available on Internet: <http://www.undp.org/sl/Documents/Strategy_papers/Governance_and_SL.htm/Govern_and_SL.htm>

Describes the importance of governance in development. Elaborates on economic, political, and administrative governance in the overall context of development, with implications for WS&S programs.

I

IADB –(Inter American Development Bank). 1999. *Workshop on Decentralization and Local Development: Summary of Themes*. [cited in March 2001]. Available on Internet: <http://www.iadb.org/regions/re2/consultative_group/groups/decentralization_workshop.htm>

As part of the Consultative Group Meeting on Reconstruction and Transformation of Central America, a workshop was held to take stock of the status of decentralization and local development in the region. This site contains a concise summary of the key themes addressed at the workshop.

IRC (International Water and Sanitation Centre). 1999. *Community Water Management*. PLA Notes 35. [cited in March 2001]. Available on Internet: <http://www.irc.nl/products/planotes35/index.html>

Experiences from four years of a community management research project funded by the government of the Netherlands. The June 1999 issue of PLA Notes (Participatory Learning and Action) contains 12 articles about experiences from this Participatory Action Development project in 22 communities in six countries.

K

Katakura, Yoko, and Alexander Bakalian. 1998. *PROSANEAR—People, Poverty and Pipes, A Program of Community Participation and Low-Cost Technology Bringing Water and Sanitation to Brazil's Urban Poor*. UNDP/The World Bank, Water and Sanitation Program. [cited in March 20001]. Available on Internet: <http://www.wsp.org/pdfs/working_prosanear.pdf>

Describes the PROSANEAR I experience in detail as an innovative project that offers new hope for bringing water and sewerage services to Brazil's *favelas* and perhaps to poor urban neighborhoods around the world. This case describes the process of community participation, technology adopted, management, and informal settlements.

Kerf, Michel, et al. 1998. *Concessions for Infrastructure—A Guide to Their Design and Award*. World Bank Technical Paper No. 399, The World Bank, Washington, DC.

Kessides, Christine. 1997. *World Bank Experience with the Provision of Infrastructure Services for the Urban Poor: Preliminary Identification and Review of Best Practices.* Transportation, Water, and Urban Development Department, The World Bank. [cited in April 2001]. Available on Internet: <http://www.worldbank.org/html/fpd/urban//publicat/service_provision.pdf>

An informal paper based on a desk review of some 70 Bank-supported urban projects and a dozen water and sanitation projects with components aimed at the provision of basic infrastructure services to low-income urban communities. It seeks to inform and stimulate the debate about future efforts to address the growing needs. The following questions are discussed: (i) What kinds of projects are most effective in providing infrastructure services to the urban poor? (ii) Under what conditions have these services been sustained beyond the

project duration? (iii) How can Bank operations best influence non-Bank-financed activities in the sector to achieve broader impacts on larger numbers of beneficiaries—that is, increase the potential for "scaling up"?

Kessler, Earl. 2000. "What Is a Good Project? And How Does the Project/Program Fit into the Broader Development Context?" In *What Is Upgrading? Issues and Tools* (web site). Department of Urban Studies and Planning, MIT. [cited in March 2001]. Available on Internet: <http://www.mit.edu/afs/athena/org/u/urbanupgrading/upgrading/issues-tools/issues/broader-devel.html>

Brief presentation of good urban program design.

Klein, Michael, and Timothy Irwin. 1996. "Regulating Water Companies." In *Public Policy for the Private Sector: Note No. 77*. The World Bank. [cited in March 2001]. Available on Internet: <http://www.worldbank.org/html/fpd/notes/77/77irwin.pdf>

Presents arguments for why and how water companies should be regulated.

Klugman, Jeni. 1994. *Decentralization: A Survey of Literature from a Human Development Perspective*. UNDP Occasional Paper No. 13. [cited in March 2001]. Available on Internet: <http://www.undp.org/hdro/oc13.htm>

Presents decentralization from the perspective of human development. Chapter III elaborates on sector-specific considerations, including water and sanitation.

Komives, Kristin. 1999. *Designing Pro-Poor Water and Sewer Concessions: Early Lessons from Bolivia*. World Bank Policy Research Working Paper No. 2243, The World Bank, Washington, DC. [cited in April 2001]. Available on Internet: <http://www-wds.worldbank.org/pdf_content/000094946991214053053 13/multi_page.pdf>

Discusses the process adopted in Bolivia in designing concessions for WS&S services and the issues and lessons learned that were encountered in the process.

L

LaFond, Anne K. 1995. *A Review of Sanitation Program Evaluations in Developing Countries. Activity Report 5*. UNICEF and EHP. [cited in March 2001]. Available on Internet: <http://www.dec.org/pdf_docs/PNACB331.pdf>

Presents findings and lessons learned from the evaluations of various sanitation projects and describes the importance of issues such as technology, participation, institutions, capacity building, sectoral linkages, and subsidies.

Laredo, David, Tarek Selim, and James Carney. 1996. *Development of Indicators for the Water and Wastewater Sector in Egypt*. EHP Activity Report No. 27. [cited in April 2001]. Available on Internet: <http://www.dec.org/pdf_docs/pnaca065.pdf>

Lee, M. D., and T.F. Bastemeijer. 1991. *Drinking Water Source Protection: A Review of Environmental Factors Affecting Community Water Supplies*. IRC—International Water and Sanitation Centre. [cited in March 2001]. Available on Internet: <http://www.irc.nl/products/publications/online/op15e/index.html>

A review of environmental factors affecting community water supplies.

Leitman, Joseph. 1994. *Rapid Urban Environmental Assessment: Lessons from Cities in the Developing World,* Vols. 1 and 2. Urban Management Program Series Paper No. 15. The World Bank, Washington, DC.

"Presents tools for rapid urban environmental assessment, providing a starting point for environmental planning and management in those cities where few environmental data exist."

Linares, Carlos Armando, and Fred Rosensweig. 1999. *Decentralization of Water Supply and Sanitation Services in El Salvador*. EHP Activity Report 64. [cited in April 2001]. Available on Internet: <http://www.dec.org/pdf_docs/PNACF338.pdf>

M

Mara, Duncan. 1996. *Low-Cost Urban Sanitation*. John Wiley & Sons Ltd., Chichester, West Sussex.

"This book covers the public health, technical, socioeconomic, sociocultural, and institutional aspects of sanitation in towns in developing countries. The sanitation technologies covered are VIP latrines, pour-flush toilets, septic tanks, settled sewerage."

Mara, Duncan, Andrew Sleigh, and Kevin Tayler. 2001. *PC-based Simplified Sewer Design*. University of Leeds, Leeds, UK. [cited in April 2001]. Available on Internet: <http://www.efm.leeds.ac.uk/CIVE/Sewerage/sewerage_index.html>

"Simplified sewerage is an off-site sanitation technology that removes all wastewater from the household environment. Conceptually it is the same as conventional sewerage, but with conscious efforts made to eliminate unnecessarily conservative design features and to match design standards to the local situation.…It is the purpose of this Manual to disseminate this technology more widely in the developing world, so that it can be used in peri-urban sanitation programmes and projects to improve the health of poor communities."

The computer program for design of simplified sewer systems can be downloaded from this web site: *Simplified Sewerage*. School of Civil Engineering, University of Leeds. [cited in April 2001]. Available on Internet: <http://www.efm.leeds.ac.uk/CIVE/Sewerage/>

MIIU (Municipal Infrastructure Investment Unit). *Partnerships Newsletter*. [cited in April 2001]. Available on Internet: < http://www.miiu.org.za/MIIUIndex.htm >

Partnerships is the newsletter of the Municipal Infrastructure Investment Unit. The MIIU was established by the government of South Africa to help municipalities find innovative solutions to critical problems with the financing and management of essential municipal services such as water supply, sanitation, waste, energy, and transport. These solutions include the involvement of new parties in service delivery, in various forms of public/private partnership arrangements. Each issue of *Partnerships* contains articles about successful partnerships and the methods used to create and support them. Issues 4, 5, and 7 in particular contain information about water and sanitation projects.

MIT (Massachusetts Institute of Technology), Department of Urban Studies and Planning. 2000a. "Carrying It Out: Hiring Consultants." In *What Is Urban Upgrading? Issues and Tools* (web site) [cited in March 2001]. Available on Internet: <http://www.mit.edu/afs/athena/org/u/urbanupgrading/upgrading/issues-tools/tools/hiring-consultants.html>

Presents a simple checklist for hiring consultants.

MIT, Department of Urban Studies and Planning. 2000b. "Community Contracting." In *What Is Urban Upgrading? Issues and Tools* (web site). [cited in March 2001]. Available on Internet: <http://www.mit.edu/afs/athena/org/u/urbanupgrading/upgrading/issues-tools/tools/Comm-contracting.html>

Notes on hiring communities and undertaking community contracting. Discusses benefits and drawbacks of community partnerships.

MIT, Department of Urban Studies and Planning. 2000c. "Identifying Stakeholders." In *What Is Urban Upgrading? Issues and Tools* (web site). [cited in March 2001]. Available on Internet.

Brief notes on what to look for when selecting the stakeholders and their basic characteristics (perspectives) in urban planning. Organized by topic, as follows:

Participation Analysis:

<http://www.mit.edu/afs/athena/org/u/urbanupgrading/upgrading/issues-tools/tools/Ident-stakeholders.html>

Stakeholder Perspectives:
<http://www.mit.edu/afs/athena/org/u/urbanupgrading/upgrading/issues-tools/issues/stakeholder.html>

Worksheet for Stakeholder Identification:
<http://www.mit.edu/afs/athena/org/u/urbanupgrading/upgrading/issues-tools/tools/worksheet-stakeholders-1.html>

Worksheet for Stakeholder Categorization:
<http://www.mit.edu/afs/athena/org/u/urbanupgrading/upgrading/issues-tools/tools/worksheet-stakeholders-2.html>

MIT, Department of Urban Studies and Planning. 2000d. "Interactive Community Planning." In *What Is Urban Upgrading? Issues and Tools* (web site) [cited in March 2001]. Available on Internet: <http://www.mit.edu/afs/athena/org/u/urbanupgrading/upgrading/issues-tools/tools/Interac-Comm-Plan.html>

Presents comprehensive links to tools for participatory community planning. Includes case studies and a detailed planning chart.

MIT, Department of Urban Studies and Planning. 2000e. "Summary of Four Approaches to Interactive Community Planning." In *What Is Urban Upgrading? Issues and Tools* (website). [cited in March 2001]. Available on Internet: <http://www.mit.edu/afs/athena/org/u/urbanupgrading/upgrading/issues-tools/tools/Sum4-Interac-Comm-Plan.html>

Comparison among four participatory community planning approaches (Community Action Planning, Planning for Real, ZOPP, and Urban Community Assistance Team).

MIT, Department of Urban Studies and Planning. 2000f. "Are Gender Issues Appropriately Considered?" In *What Is Urban Upgrading? Issues and Tools* (web site). [cited in March 2001]. Available on Internet: <http://www.mit.edu/afs/athena/org/u/urbanupgrading/upgrading/issues-tools/issues/gender-issues.html>

Discusses why gender is important in project planning and how gender can be integrated in projects.

MIT, Department of Urban Studies and Planning. 2000g. "Positioning Issues: The Problem Tree." In *What Is Urban Upgrading? Issues and Tools* (web site). [cited in March 2001]. Available on Internet: <http://www.mit.edu/afs/athena/org/u/urbanupgrading/upgrading/issues-tools/tools/problem-tree.html>

Discusses using a graphical tool—the "problem tree"—to identify problems and their causal relationships.

MIT, Department of Urban Studies and Planning. 2000h. "What Are Alternatives in Service Options?" In *What Is Urban Upgrading? Issues and Tools* (web site). [cited in March 2001]. Available on Internet: <http://www.mit.edu/afs/athena/org/u/urbanupgrading/upgrading/issues-tools/issues/Alternative-in-Service.html>

Presents concept of alternatives in services and provides example from real life projects.

MIT, Department of Urban Studies and Planning. 2000i. Basic Services/Spatial: What Standards Will Be Used? In *What Is Urban Upgrading? Issues and Tools* (web site). [cited in March 2001]. Available on Internet: <http://www.mit.edu/afs/athena/org/u/urbanupgrading/upgrading/issues-tools/issues/Standards.html>

Discussion of what ought to be and what can be achieved in setting standards in development programs. Includes links to case studies in Zambia and Indonesia.

N

Nankani, Helen. 1997. *Testing the Waters—A Phased Approach to a Water Concession in Trinidad and Tobago*. The World Bank, January 1997. [cited in March, 2001]. Available on Internet: <http://www.worldbank.org/html/fpd/wstoolkits/resources/frame.html>

"The government of Trinidad and Tobago has adopted a two-phase approach to privatizing its water services, first awarding a management contract through competitive bidding and then, after three to five years, converting it through negotiation to a long-term concession. With the management contract in place less than a year, it is too early to draw firm lessons about the strategy. A two-phase strategy is proposed as an attractive one for a small country with limited regulatory capacity and poor information on the state of the business."

Niederer, Stephen. 1998. "Technology and Balanced Development." In *Report on the 14th AGUASAN Workshop*. Swiss Centre for Development Cooperation in Technology and Management SKAT. [cited in March 2001]. Available on Internet: <http://www.skat.ch/ws/publ/download/Aguasan_14.pdf>

This report of the workshop presents various issues in WS&S for its balanced development, including a market oriented approach for the water supply and sanitation services. Discusses various issues (e.g., sustainability) and focuses on development of indicators.

O

O'Toole, Lawrence J., and David J. Sencer. 1999. *Institutional Lessons Learned in Environmental Health Programs*. EHP Applied Study No. 8. [cited in March 2001]. Available on Internet: <http://www.dec.org/pdf_docs/PNACE688.pdf>

A collection of case studies on the role of institutions in promoting environmental health. Provides important lessons learned, with reference to cases (with overview) from Africa, Latin America, and the Caribbean.

Ocasio, Raymond. 1997. *Identification of Financial Resources and Credit Mechanisms for the Urban Sanitation Program in Jamaica.* EHP Activity Report 39. [cited in April 2001]. Available on Internet: <http://www.dec.org/pdf_docs/PNACB547.pdf>

Ortiz, Fabián Gonón, et al. 2001. "Aguacatá in Guatemala: How Seven Communities Joined Hands." In *PLA Notes 35: Community Water Management*. IRC—International Water and Sanitation Centre. [cited in March 2001]. Available on Internet: <http://www.irc.nl/products/planotes35/pnts8.htm>

Presents case study of community participation to improve water management in seven communities within the municipality of Aguacatán, Guatemala.

P

PADCO, Inc. 1999. *The Urban Development Assessment Methodology Review and Update.* Unpublished.

The UDA was designed as a framework for the assessment of urban problems and opportunities, leading to the formulation of an urban development strategy by USAID Missions.

Parry-Jones, Sarah. *Low-cost Sanitation in Areas with a High Groundwater Table*. WELL Technical Brief. [cited in March 2001]. Available on Internet: <http://www.lboro.ac.uk/well/services/tecbriefs/highgwsan.htm>

Discusses the alternative of low-cost, on-site sanitation facilities in areas with a seasonally high groundwater table or in areas that are prone to flooding.

Peasey, Anne. 2000. *Health Aspects of Dry Sanitation with Waste Reuse*. WELL. [cited in April 2001]. Available on Internet: <http://www.lboro.ac.uk/well/studies/t324.pdf>

"This report examines the practice of dry sanitation with reuse in Mexico, with a particular focus on health issues and the lessons to be learned from case studies and experience."

Phouangphet, Khonethip, et al. 2000. *Sanitation and Hygiene Promotion in Lao PDR: Learning from the National Water Supply and Environmental Health Programme*. UNDP/The World Bank—Water and Sanitation Program - East Asia and the Pacific. [cited in March 2001]. Available on Internet: <http://www.wsp.org/pdfs/eap_sanitation_lao.pdf>

Presents stepwise dialog process for community sanitation focused on hygiene.

Pickford, John, ed. 1995. *Affordable Water and Sanitation. Proceedings of the 20th WEDC* Conference. WEDC. [cited in April 2001]. Available on Internet: <http://www.lboro.ac.uk/departments/cv/wedc/conferences/20conts.htm>

These proceedings consider issues surrounding affordable water supply and sanitation, including "software" aspects—people, communities, health, management, and institutions—as well as technological considerations such as waste management. It comprises over 40 papers presented at the 20th WEDC Conference held in Colombo, Sri Lanka, in 1994. The material is drawn from countries in all parts of the world.

Pickford, John, ed. 1998. *Sanitation and Water for All. Proceedings of the 24th WEDC Conference*. WEDC. [cited in April 2001]. Available on Internet: <http://www.lboro.ac.uk/departments/cv/wedc/papers/24/24thconts.htm>

These proceedings consider issues surrounding affordable water supply and sanitation, including "software" aspects—people, communities, health, management, and institutions—as well as technological considerations such as waste management.

Plummer, Jannelle. 2000. *Municipalities and Community Participation: A Sourcebook for Capacity Building*. Earthscan, London.

"This Sourcebook presents a comprehensive idea of the capacities needed for community participation to work. It sets out the options, stages, and kinds of participation involved in delivering services to urban residents. It also lays out the management structures, systems, skills, and attitudes needed."

PRB (Population Reference Bureau). 2001. "Urban Population Trends 2001." In *An Urbanizing World*. [cited in March 2001]. Available on Internet: <http://www.prb.org/pubs/population_bulletin/bu55-3/55_3_urban_population_trends.html>

Concise discussion on trends in urbanization problem and challenges.

R

Reiff, Suzanne, and Guy Clégbaza. 1999. "The Experience of Non-Subsidized Household Latrines Through Social Marketing and the Promotion of the Small-Scale Private Sector—The Case of the Padear Program in Benin." In *Field Notes: Rural Sanitation*. UNDP/The World Bank, Water and Sanitation Program. [cited in March 2001]. Available on Internet: <http://www.wsp.org/pdfs/afr_padear.pdf>

Presents a case of increase in demand for latrines through social marketing as an innovative approach. Includes a discussion of lessons learned.

Rogers, Peter, Ramesh Bhatia, and Annette Huber. 1997. “Water as a Social and Economic Good: How to Put Principle into Practice.” Paper prepared for the meeting of the Technical Advisory Committee of the Global Water Partnership in Namibia. The World Bank. [cited in March 2001]. Available on Internet: <http://www-esd.worldbank.org/rdv/training/watroger.htm>

Presents general principles and methodologies for estimating costs and benefits in the water sector (Section 2). Presents illustrative estimates of costs and values in urban, industrial, and agricultural sectors, based on available data (Section 3). Provides a summary of results and conclusions (Section 4).

Rosensweig, Fred, and Eduardo A. Perez. 1999. *Decentralization of Water Supply and Sanitation Systems in Central America and the Dominican Republic*. EHP Activity Report 76. [cited in April 2001]. Available on Internet: <http://www.dec.org/pdf_docs/PNACF504.pdf>

Rosensweig, Fred, and Edward Salt. 1993. *Designing and Implementing Decentralization Programs in the Water and Sanitation Sector*. EHP Technical Report No. 89. [cited in April 2001]. Available on Internet: <http://www.dec.org/pdf_docs/pnabp595.pdf>

S

Saywell, Darren. 2000. “Micro-credit for Sanitation.” In *WELL Technical Briefs* (web site). [cited in March 2001]. Available on Internet: <http://www.lboro.ac.uk/well/services/tecbriefs/microcre.htm>

Discusses micro-credit as an alternative mechanism for financing sanitation, with case studies and recommendations.

Schuebeler, Peter. 1996. *Participation and Partnership in Urban Infrastructure Management.* Urban Management Programme Policy Paper No. 19, The World Bank, Washington, DC.

Seldon, James. 1998. *Creative Inter-Sectoral Partnering for Urban Water Supply Systems in Developing Countries*. Research Paper. UNDP/Yale Collaborative Programme. Research Clinic, New Haven, CT. [cited in March 2001]. Available on Internet: <http://www.undp.org/ppp/library/files/james01.pdf>

Explores the relationships between water supply and sanitation projects. Focuses on private sector participation and community involvement based on field experiences.

Selim, Tarek. 1999. *Morocco: Ouled Teima Integrated Wastewater Management and Reuse Project*. EHP Activity Report 77. [cited in April 2001] Available on Internet: <http://www.dec.org/pdf_docs/PNACG409.pdf>

Shi, Anqing. 2000. *How Access to Urban Potable Water and Sewerage Connections Affects Child Mortality: Working Paper No. 2274*. The World Bank. [cited in March 2001]. Available on Internet: <http://wbln0018.worldbank.org/Research/workpapers.nsf/f3f369922a1fe12c852567e50052bf69/deb83a3c607e359c8525686600521ddd?OpenDocument>

Lower child mortality is associated with improved access to urban potable water and sewerage connections, government involvement in the provision of local water services, and private or parastatal participation in the provision of sewerage connections.

Singh, Joth, and Francine Clouden. 1999. *A Review of Water Conservation Practices and Potential for Tourist Facilities in Barbados and St. Lucia*. EHP Activity Report 67. [cited in April 2001] Available on Internet: <http://www.dec.org/pdf_docs/PNACG407.pdf>

Smith, Warrick. 1997. “Utility Regulators—Decisionmaking Structures, Resources, and Start-up Strategy.” In *Resources: Water and Sanitation Toolkit*. (web site). The World Bank. [cited in April 2001]. Available on Internet: <http://www.worldbank.org/html/fpd/wstoolkits/resources/frame.html>

"The design of a regulatory agency's decisionmaking structure encompasses issues relating to the number of decisionmakers, the basis for selecting them, the role played by stakeholders, and the regulatory and appeals processes. …When agencies are to be independent, the goal should be to select regulators with the personal qualities needed to exercise independent judgment and resist improper pressures. An appeals process is also important to ensure that the regulator does not stray from its mandate and that it remains accountable. Warrick Smith outlines good practice."

Smith, Warrick. 1997. "Utility Regulators—The Independence Debate." In *Resources: Water and Sanitation Toolkit*. (web site) [cited in April 2001]. Available on Internet: <http://www.worldbank.org/html/fpd/wstoolkits/resources/frame.html>

"Some governments are reluctant to surrender political control over regulatory decisions, and some who agree on the general desirability of independent agencies may question whether they are feasible in all country settings. Warrick Smith argues that regulatory independence is worth the effort even in countries with little tradition of such government entities."

Solo, Toya Maria, Eduardo Perez, and Steve Joyce. 1993. *Constraints in Providing Water and Sanitation Services to the Urban Poor*. WASH Technical Report No. 85. Available on Internet: <http://www.dec.org/pdf_docs/pnabn953.pdf>

Swiss Centre for Development Cooperation in Technology and Management SKAT. 1999. *20 Basic Books on Drinking Water Supply, Sanitation and Wastewater*. [cited in March 2001]. Available on Internet: <http://www.skat.ch/ws/publ/download/Books_on_DWS.pdf>

This is a selected list of books on WS&S, categorized as general literature, hygiene behavior, water supply and sanitation technologies and operation and management. The list is presented on the web site, but the books are not available for download from this site.

Swiss Centre for Development Cooperation in Technology and Management SKAT. *Overview of Computer Programs on Drinking Water Distribution*. [cited in March 2001]. Available on Internet: <http://www.skat.ch/ws/publ/download/Programs_on_DWD.pdf>

Review of computer programs available for distribution of water supply both for simple and complicated networks. Programs allow users to vary the parameters and compare the end results.

Swiss Centre for Development Cooperation in Technology and Management SKAT. "Private Sector—Just a (new) Hope?" 1999. In *Report on the 15th AGUASAN Workshop, (June 28 - July 2, 1999)*. [cited in March 2001]. Available on Internet: <http://www.skat.ch/ws/publ/download/Aguasan_15.pdf>

Presents results of private sector in WS&S with analytical illustration of six cases from Bangladesh, India, Lesotho, Nicaragua, Romania, and South Africa.

U

U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. *Safe Water Systems for the Developing World: A Handbook for Implementing Household-Based Water Treatment and Safe Storage Projects*. Available on Internet: <http://www.cdc.gov/safewater/manual/1_toc.htm>

UNDP, "Formulating Program and Projects 2000." In *UNDP Programming Manual*. (Chapter 4). [cited in March 2001]. Available on Internet: <http://www.undp.org/osg/pm/>

Presents a sequence of steps to prepare a program, with important discussions and suggestions. The manual is written for formulating UNDP-funded programs but is relevant to program and project design in general.

UNDP, Management Development and Governance Division, Bureau of Development Policy. 1997a. "Capacity Assessment and Development." In *A System and Strategic Management Context, Technical Advisory Paper 3*. [cited in April 2001]. Available on Internet: <http://magnet.undp.org/Docs/cap/Main.htm>

This is a guideline developed for managers, by UNDP, to help in capacity assessment and development.

UNDP, Management Development and Governance Division, Bureau of Development Policy. 1997b. *Capacity Development, Technical Advisory Paper 2*. [cited in April 2001]. Available on Internet: <http://magnet.undp.org/Docs/cap/Capdeven.pdf>

"Presents the lessons from four decades of technical cooperation—and the fundamental changes that UNDP has instituted to capitalize on the potential contributions of capacity development." Two versions of the report are given, the HTML version is far more detailed. The "Tools and Frameworks" section presents "12 Key Questions for Developing a Change Strategy."

UNDP/The World Bank Water and Sanitation Program—South Asia. 1999a. *Community Partnership in Operation and Maintenance: Public Sector Water Corporation Leases Out O&M to Users (Meerut, India)*. [cited in March 2001]. Available on Internet: <http://www.wsp.org/pdfs/sa_meerut.pdf>

A case study of community managed O&M in water supply. Chronological description of the case with lesson learned.

UNDP/The World Bank, Water and Sanitation Program. 1999b. *Willing to Pay But Unwilling to Charge: Do "Willingness-To-Pay" Studies Make a Difference*? [cited in March 2001]. Available on Internet: <http://www.wsp.org/pdfs/sa_willing.pdf>

This brief field note analyses various cases of Indian cities to better understand the willingness to pay and why local governments have not increased water charges despite people's willingness to pay. Suggests methods to calculate the willingness to pay.

UNDP/The World Bank, Water and Sanitation Program. Undated. "The Challenge of the Urban Poor." In *Services to the Urban Poor*. (web site) [cited in March 2001]. Available on Internet: <http://www.wsp.org/english/focus/urban-depth.html>

Briefly presents the challenges in providing WS&S services to the urban poor, including suggestions on institutions, technology, incentives for change and information issues for catering to the special needs of the urban poor.

UNDP/The World Bank, Water and Sanitation Program—South Asia. *Ahmedabad Parivartan*. [cited in March 2001]. Available on Internet: <http://www.wsp.org/pdfs/urban-ap.pdf>

Case of community participation for development (sanitation) in slums of the Indian city Ahmedabad in Gujrat.

UNICEF, Programme Division, Water, Environment and Sanitation Section, in collaboration with EHP. 1997. *Towards Better Programming: Sanitation Handbook*. [cited in April 2001] Available on Internet: <http://www.unicef.org/programme/wes/pubs/glines/sanit.htm>

A comprehensive document dealing with planning and implementation of sanitation projects. It has sequential presentation of various issues in planning of sanitation programs: (a) establishing a broad vision; (b) identifying communities; (c) community participation; (d) technology options; (e) financing; (f) institutional arrangements; (g) building political will. Includes case studies, checklists, and samples of programming. Available at this Internet site in English, French, and Spanish.

UNICEF, Programme Division, Water, Environment and Sanitation Section. 1999. *Towards Better Programming: A Manual on Hygiene Promotion*. 1999. [cited in March 2001]. Available on Internet: <http://www.unicef.org/programme/wes/pubs/glines/hman.pdf>
A comprehensive manual on hygiene promotion.

United Nations, ECOSOC. 1997. *Comprehensive Assessment of the Freshwater Resources of the World*. Document No. E/CN.17/1997/9. [cited in March 2001]. Available on Internet: <http://www.un.org/documents/ecosoc/cn17/1997/ecn171997-9.htm>

Presents a comprehensive discussion on the present situation of water resources and scarcity, and presents possible policy measures with reference to future trends.

United Nations, ECOSOC. 2000. *Progress Made in Providing Safe Water Supply and Sanitation for All During the 1990s: Report of the Secretary-General*. [cited on March 7, 2001]. Available on Internet: <http://www.un.org/documents/ecosoc/cn17/2000/ecn172000-13.htm>

A comprehensive analytical report on global water supply and sanitation situation. Reviews lessons learned and provides future outlook.

University of Leeds, School of Civil Engineering. "Case Study—Conception and Installation of the Condominial Sewerage System in the Town of Santa Maria." In *Low Cost Sewerage Link* (web site) [cited in April 2001]. Available on Internet: <http://www.efm.leeds.ac.uk/CIVE/Sewerage/articles/condominial4.pdf>

The sewerage project installed in the town brings some innovations to condominium sewer systems, including: (a) a new project methodology that rationalizes and simplifies the usual studies and procedures for this stage of the enterprise, taking advantage of favorable topography and plan flexibility offered by the condominial system; (b) use of economical components in the construction of the collection system; (c) adaptation of the structures of transport and treatment of sewage for future recycling of the effluents treated in the irrigation.

USAID Center For Development Information And Evaluation (CDIE). 2000a. "Building a Results Framework." In *Performance Monitoring and Evaluation Tips, No. 13*. [cited In April 2001]. Available on Internet: <http://www.dec.org/pdf_docs/pnaca947.pdf>

Presents definition and methods of building a results based framework for project planning.

USAID Center For Development Information And Evaluation (CDIE). 2000b. *Measuring Institutional Capacity*. Recent Practices In Monitoring And Evaluation Tips, No. 15. [cited In April 2001]. Available on Internet: <http://www.dec.org/pdf_docs/pnacg612.pdf>

Presents importance of institutions in projects and methods and tips in assessing the institutional capacity for the purpose of evaluation but is useful in planning. The Annex contains tools to assess institutions <http://www.dec.org/pdf_docs/pnacg624.pdf>

USAID Center for Development Information and Evaluation (CDIE). 2000c. "Monitoring the Policy Reform Process. In *Recent Practices in Monitoring and Evaluation*. [cited In April 2001]. Available on Internet: <http://www.dec.org/pdf_docs/pnaca949.pdf>

Practical evaluation tips on monitoring policy reforms.

USAID, Regional Urban Development Office, New Delhi. Various dates. *FIRE Project Notes*. [cited in April 2001] Available on Internet: < http://www.dec.org/partners/dexs_public/ > (enter the word FIRE in the search box and select the "search" button).

The Project Notes consist of more than 20 brief reports of activities and results of USAID's "Financial Institutions Reform and Expansion (FIRE) Project, presented in newsletter format. The Project Notes typically include case studies and instructive articles based on urban infrastructure projects, many including water or sanitation components. The FIRE Project supports the Government of India in its efforts to strengthen domestic capital markets to enable them to serve as an efficient source of development finance. The Debt Market/Infrastructure Component (FIRE-D) seeks to expand the debt market through the financing of commercially viable urban environmental infrastructure projects.

USAID. Undated. "Promoting Community Participation in Municipal Services: Potable Water Project in Matagalpa, Nicaragua." In *Participatory Practices #5: Learning From Experience.* [cited in March 2001]. Available on Internet:

<http://www.usaid.gov/about/part_devel/docs/prtpract5.html>

"In collaboration with the Mayor of Matagalpa and his staff, the Regional Information Clearinghouse (RIC) in USAID/Guatemala assisted Municipal officials in the design of a series of activities that, as a whole, would constitute an intensive, six-month effort to launch a campaign to encourage greater community support and participation. The campaign's objectives were to raise awareness among the municipal population of the problems being faced in the delivery of the water service, and, by strengthening demand for municipal bonds, to improve the level of cost recovery for the water service and new projects."

V

Varley, Robert C.G. 1995. *Financial Services and Environmental Health: Household Credit for Water and Sanitation*. EHP Applied Study No. 3. [cited in March 2001]. Available on Internet: <http://www.dec.org/pdf_docs/pnabu314.pdf>

This paper, directed toward technical professional staff in USAID who are responsible for designing programs and projects, advocates the use of micro finance institutions as an integral part of financing strategies for increasing water supply and sanitation coverage in urban and peri-urban areas. Policymakers and program designers in NGOs and international financing institutions also may find much that is relevant to their attempts to incorporate micro finance within the design of a wide range of activities. The document lists examples of household credit in various Asian and African towns.

Varley, Robert C.G., May Yacoob, and Scott Smith. 1996. *Beyond Participation: Locally Based Demand for Environmental Health in Peri-Urban Areas*. EHP Applied Study No. 6. [cited in March 2001]. Available on Internet: <http://www.dec.org/pdf_docs/PNABZ936.pdf>

Describes strategies that use "locally based demand" concepts to improve environmental health interventions in peri-urban areas in developing countries that can lower costs, increase effectiveness, and contribute to improved governance.

Victorian Government Purchasing Board, Branch Department of Treasury and Finance. "5 Step Procurement Cycle." In *Policies and Guidelines*. (web site). Available on Internet: <http://www.vgpb.vic.gov.au/polguid/polmenu.htm#invitation>

Presents process of procurement in systematic order. The site has lots of other information on procurement.

Visscher, Jan Teun. 1997. *Technology Transfer in the Water Supply and Sanitation Sector: A Learning Experience from Colombia.* IRC—International Water and Sanitation Centre. [cited in March 2001]. Available on Internet: <http://www.irc.nl/products/publications/online/tp32e/index.html>

Presents experience generated in the TRANSCOL Program. It is oriented towards professionals and managers involved in the WS&S sector and specifically directed toward the technology transfer and its implication on other water related issues. The three main themes that emerged from it, are (a) an approach to search for sustainable solutions; (b) a model for technology sharing; and (c) learning projects for capacity building at institutional and community level.

Visscher, Jan Teun, et al. 1999. *Integrated Water Resource Management in Water and Sanitation Projects: Lessons from Projects in Africa, Asia and South America*. IRC—International Water and Sanitation Centre. [cited in March 2001]. Available on Internet: <http://www.irc.nl/pdf/publ/op31e.pdf>

Reviews experience with water resource management principles (strategic issues) from eleven projects in seven countries. Covers issues including water resources, stakeholders, economic value, capacity building and gender balance.

W

Walker, Ian, and Max Velásquez. 1999. *Regional Analysis of Decentralization of Water Supply and Sanitation Services in Central America and the Dominican Republic.* EHP Activity Report 65. [cited in April 2001] Available on Internet: <http://www.dec.org/pdf_docs/PNACF340.pdf>

Walker, Ian, et al. 2000. "Pricing, Subsidies, and the Poor: Demand for Improved Water Services in Central America." In *Policy Research Working Paper No. 2468.* The World Bank. [cited in March 2001]. Available on Internet: <http://wbln0018.worldbank.org/Research/workpapers.nsf/fc90c6f8c9a42fe6852567e50050df1e/82e99f61556cb4a785256989005dc1c6?OpenDocument>

"Evidence from Central America's publicly owned and managed water supply companies indicates that the urban poor are ill served by current subsidy policies. The best way to improve water services for the urban poor, this study concludes, is for tariffs to reflect system costs and for consumption to be metered. This permits each household to determine how much it wants to spend on water while ensuring sustainability of services across the network. The attitudes of poor communities toward metering are generally positive."

WASH. 1993. *Lessons Learned in Water, Sanitation and Health: 13 years of experience in developing countries*. Water and Sanitation for Health (WASH) Project, Bureau for Research and Development, USAID.

Webster, Mike, and Kevin Sansom. 1999a. *Public-Private Partnership and the Poor*. WELL Technical Brief. [cited in March 2001]. Available on Internet: <http://www.lboro.ac.uk/well/Brief/brief164.htm>

Review of Public Private Partnership (PPP) literature and analyses the risks and benefits associated with PPP for the poor (on page 14).

Webster, Mike, and Kevin Sansom. 1999b. *Public-Private Partnership and the Poor: An Initial Review*. WELL. [cited in April 2001] Available on Internet: <http://www.lboro.ac.uk/well/studies/t164.pdf>

Reviews the impact of PPP in the water and sanitation sector on service delivery to the poor and identifies important gaps in current knowledge, including potential risks and benefits of various institutional arrangements for the provision of infrastructure to poor communities.

Wegelin-Schuringa, Madeleen. 2001a. *Strategic Elements in Water Supply and Sanitation Services in Urban Low-Income Areas*. IRC—International Water and Sanitation Centre. [cited in March 2001] available on Internet: <http://www.irc.nl/themes/urban/elements.html>

This paper describes strategic issues and options for action in WS&S sanitation projects.

Wegelin-Schuringa, Madeleen. 2001b. *Water Demand Management and Urban Poor*. IRC—International Water and Sanitation Centre. [cited in April 2001] Available on Internet: <http://www.irc.nl/themes/urban/demand.html>

This short web article describes challenges in providing WS&S to the urban poor.

WELL. 1998. *DFID Guidance Manual on Water Supply and Sanitation Programmes.* Well, Loughborough University, UK. Available on Internet [cited on 07 March 2001]: <http://www.lboro.ac.uk/well/gm/contents.htm#anchor27834>

Comprehensive guide to the preparation of urban and rural water supply and sanitation projects. Prepared for the UK Department for International Development (DFID).

WELL. 1998a. "Introduction to Water Sources." In *Technical Brief No. 55.* [cited in March 2001] Available on Internet: <http://www.lboro.ac.uk/well/services/waterlin/tb55-1.pdf>

One page of practical information.

WELL. 1998b. “Issues to be Considered in Sources Selection.” In *Technical Brief No. 55*. [cited in March 2001]. Available on Internet: <http://www.lboro.ac.uk/well/services/waterlin/tb55-2.pdf>

One page of practical information.

WELL. 1998c. “Steps for Selecting Alternative Water Sources.” In *Technical Brief No. 55*. [cited in March 2001] Available on Internet: <http://www.lboro.ac.uk/well/services/waterlin/tb55-3.pdf>

One page of practical information.

Whittington, Dale, et al. 1997. *Urban Sewer Planning in Developing Countries and “The Neighborhood Deal”: A Case Study of Semarang, Indonesia*. UNDP/The World Bank Water and Sanitation Programme. [cited in April 2001]. Available on Internet: <http://www.wsp.org/pdfs/working_semarang.pdf>

“The feasibility study described in this report was conducted to test a contingent valuation methodology for assessing consumer demand for sewer services. While not a comprehensive assessment of willingness to pay for sanitation systems and services in Semarang, the data do provide some interesting and useful insights into consumer priorities for public and private investment in sanitation infrastructure.”

WHO Regional Office for Europe. 1999. “Community Participation In Local Health And Sustainable Development: A Working Document On Approaches And Techniques.” In *European Sustainable Development and Health, Series 4*. [cited in April 2001]. Available on Internet: <http://www.who.dk/healthy-cities/pdf/book4.pdf>

“This document briefly describes what community participation is and why it is important. Explores in detail the techniques and methods frequently used and categorizes them in relation to five aspects of an action planning model: assessing needs and assets, agreeing on a vision, generating ideas and plans for action, enabling action and monitoring and evaluation. The document provides specific guidance to people wishing to engage in their own community participation activities. Case studies, contacts and reference material are included.”

WHO. 1994. *Financial Management of Water Supply and Sanitation: A Handbook*. Available on Internet: <http://www.who.int/dsa/cat98/water8.htm#>

Describes a range of financial principles and methods for improving the management of water supply and sanitation services—whether large or small, urban or rural. Addressed to decision-makers, the book shows how financial mechanisms, such as cost recovery, cash raising, and cost containment, can be used to ensure that services are financially sustainable and able to meet users’ needs. Brief description and ordering instructions available at this Internet address.

WHO. 1998. “Sanitation Promotion.” In *WSSCC Working Group on Promotion of Sanitation.* Document (WHO/EOS/98.5). Edited by Mayling Simpson Hébert and Sara Wood. [cited in March 2001] available on Internet: <http://www.who.int/water_sanitation_health/Environmental_sanit/Sanprom/saniprom.htm>

A comprehensive document on the promotion of sanitation. Discusses issues such as political will, empowerment, partnership, advocacy, innovative technologies, and participatory approaches. Includes checklists with some reference to specific cases.

WHO. 2000a. *Guidelines for Drinking Water Quality Training Pack*. Protection of the Human Environment. (web site) [cited in April 2001]. Available on Internet: <http://www.who.int/water_sanitation_health/Training_mat/GDWQtraining.htm>

“Provides information for use in the planning and delivery of seminars, workshops and training courses in water quality surveillance, control and improvement, especially where these concern the WHO Guidelines for Drinking-Water Quality. The pack contains 23 different sessions, including both presentation and practical exercises.” Includes full information on the WHO Guidelines for Water Quality.

WHO. 2000b. *Tools For Assessing the O&M Status of Water Supply and Sanitation in Developing Countries* (WHO/SDE/WSH/00.3). [cited in March 2001] Available on Internet: <http://www.who.int/water_sanitation_health/wss/O_M/ToolsAssess.pdf>

Guidelines and methods for assessing and evaluating the operation and maintenance of WS&S. Also presents how to assess the institutional capabilities for O&M.

WHO. 2001a. "Constraints Affecting the Development of the Water Supply and Sanitation Sector" In *Sustainable Development and Healthy Environments: Protection of Human Environment*. (web site) [cited in March 2001]. Available on Internet: <http://www.who.int/water_sanitation_health/wss/constraints.html>

Presents a brief discussion on various issues and challenges in WS&S sectors. Topics include (a) inadequate data on operation and maintenance; (b) insufficient and inefficient use of funds; (c) poor management of water supply facilities; (d) inappropriate system design; (e) low profile of operation and maintenance; (f) inadequate policies, legal frameworks and overlapping responsibilities; and (g) political interference.

WHO. 2001b. "Global Water Supply and Sanitation Assessment 2000 Report." In *Sustainable Development and Healthy Environments: Protection of Human Environment*. (web site) [cited in March 2001]. Available on Internet: <http://www.who.int/water_sanitation_health/Globassessment/GlobalTOC.htm>

Provides a snapshot of water supply and sanitation worldwide (water and sanitation coverage estimates, supporting decisions relating to investment, planning, management and quality of service) at the turn of the millennium using information available from different sources.

World Bank, Water and Sanitation Program. Undated. *Methodology of Participatory Assessments: Helping Communities Achieve More Sustainable and Equitable Services*. International Water and Sanitation Centre (IRC), undated. Available on Internet: <http://www.wsp.org/pdfs/eap_mpa_helping.pdf>

"To shed more light on the linkages between sustained services and project approaches that are more demand-responsive and gender-and poverty-sensitive, the Water and Sanitation Program (WSP), in collaboration with IRC (International Water and Sanitation Centre), conducted participatory assessments with 88 communities that had managed and sustained their water supply systems for three or more years… The assessments involved community members with project staff and policy makers in participatory meetings, to examine the organizational and policy factors that support or constrain sustainability on the ground. The Methodology for Participatory Assessments (MPA) that was developed to conduct the assessments is proving to be a valuable tool by which policy makers, program managers and the local people themselves can monitor the sustainability of their services and take actions to enhance it."

World Bank. 1996a "Participation in Water and Sanitation Sector." In *Appendix II: Working Paper Summaries, The World Bank Participation Sourcebook*. The World Bank Group. [cited in March 2001]. Available on Internet: <http://www.worldbank.org/wbi/sourcebook/sba206.htm>

Presents the importance of participation in the WS&S and related issues such as: (a) Challenges for the Sector; (b) The Role of Participation; (c) Conditions for Success; (d) specific WS&S case studies.

World Bank. 1996b "Practice Pointers in Participatory Planning and Decision Making." In *The World Bank Participation Sourcebook*. (Chapter III). [cited in March 2001]. Available on Internet: <http://www.worldbank.org/wbi/sourcebook/sb03.htm>

The chapter addresses issues in participation, their implications and possible solutions under various headings, including: Subtopics include (a) Getting Started; (b) Identifying Stakeholders; (c) Involving Stakeholders; (d) Participatory Planning and Decisionmaking; (e) Task Manager Roles. Contains links to case studies (not all cases are WS&S related but good inferences can be drawn).

World Bank. Undated. "Toolkit on Gender in Water and Sanitation." In *Gendernet.* (web site) [cited in April 2001]. Available on Internet: <http://www.worldbank.org/gender/know/water.htm>

The toolkit is designed to provide practical guidance on incorporating gender issues into water and sanitation programs and projects. "The toolkit distills lessons from project and sector work experience and draws on examples of successful strategies, interventions, and promising approaches."

Copyright (c) 1996 by The International Bank for Reconstruction and Development/The World Bank, 1818 H Street, N.W., Washington, D.C. 20433, U.S.A.

World Bank. 1997. *Toolkits for Private Participation in Water and Sanitation 1997*. [cited in March 2001]. Available on Internet: <http://www.worldbank.org/html/fpd/wstoolkits/>

This toolkit explains the importance of private sector participation (PSP) in WS&S and the options (alternatives) available for PSP, including project selection, design, implementation and necessary arrangements for PSP. Three separate documents are available on “Selecting an Option for Private Sector Participation,” “Designing and Implementing an Option for Private Sector Participation” and “What a Private Sector Arrangement Should Cover.”

World Bank. 1999. *Water & Wastewater Utilities Indicators* 2nd Edition. [Cited in April, 2001] Available on Internet: <http://www.worldbank.org/html/fpd/water/pdf/indicators.pdf>

Indicators have been collected from a selected group pf utilities from industrialized and developing countries. They are grouped into three sets: (1) Operational Indicators; (2) Financial Indicators; and (3) Overview of Tariff Rates and Structures. The 1999 pdf file is based on the report 2nd edition report produced in 1996.

Copyright (c) 1996 by The International Bank for Reconstruction and Development/The World Bank, 1818 H Street, N.W., Washington, D.C. 20433, U.S.A.

World Resource Institute. 1996. “Urban Priorities for Action: Water and Sanitation.” In *World Resources 1996-97*. (section 5). [cited in March 2001]. Available on Internet: <http://www.wri.org/wr-96-97/up_txt2.html>

Discusses briefly the outlook for global urban water supply and sanitation, and argues for some prioritized actions.

KEY RESOURCES

The following documents provide substantially more detail than could be covered in the scope of the WS&S Guide. These documents are all available via the Internet, and are also contained in their entirety on the CD-ROM version of the Urban WS&S Programming Guide.

Andrews, Richard N., et al. 1993. Guidelines for Improving Wastewater and Solid Waste Management. [CD ROM] EHP Technical Report No. 88. [cited in April 2001] Available on Internet: <http://www.dec.org/pdf_docs/pnabp925.pdf>

Available on WS&S CD ROM. Click Here to access the full document on CD ROM.

Bendahmane, Diane, ed. 1992. Water Reuse in Developing Countries Including Guidelines for Water Reuse. [CD ROM] Camp Dresser and McKee, Inc. (CDM) for USAID Bureau for Research and Development, Office of Health. [cited in April 2001] Available on Internet: <http://www.dec.org/pdf_docs/pnack837.pdf>

Available on WS&S CD ROM. Click Here to access the full document on CD ROM.

Cullivan, Donald, et al. 1988. Guidelines for Institutional Assessment: Water and Wastewater Institutions. [CD ROM] WASH Technical Report No. 37. [cited in March 2001] Available on Internet: <http://www.dec.org/pdf_docs/pnaaz336.pdf>

Available on WS&S CD ROM. Click Here to access the full document on CD ROM.

UNICEF, Programme Division, Water, Environment and Sanitation Section. 1999. Towards Better Programming: A Manual on Hygiene Promotion. [CD ROM] 1999. [cited in March 2001]. Available on Internet: <http://www.unicef.org/programme/wes/pubs/glines/hman.pdf>

Available on WS&S CD ROM. Click Here to access the full document on CD ROM.

"Presents methodologies to assist development workers in the promotion of behavioural change for safer hygiene practices, and to help make hygiene promotion programmes more effective."

UNICEF, Programme Division, Water, Environment and Sanitation Section, in collaboration with EHP. 1997. Towards Better Programming: Sanitation Handbook. [cited in April 2001] [CD ROM] Available on Internet: <http://www.unicef.org/programme/wes/pubs/glines/sanit.htm>

Available on WS&S CD ROM. Click Here to access the full document on CD ROM.

"A handbook prepared to help working groups of professionals responsible for sanitation programming prepare *realistic* and *better* sanitation programmes." A comprehensive treatment of planning and implementation of sanitation projects. It has sequential presentation of various issues in planning of sanitation programs: (a) Establishing A Broad Vision; (b) Identifying Communities; (c) Community Participation; (d) Technology Options; (e) Financing; (f) Institutional Arrangements; (g) Building Political Will. Includes case studies, checklists and samples of programming. Available at this Internet site in English, French and Spanish.

UNICEF, Programme Division, Water, Environment and Sanitation Section. 1999. Towards Better Programming: A Water Handbook. [cited in April 2001]. [CD ROM] Available on Internet: <http://www.unicef.org/programme/wes/pubs/glines/Wat_e.pdf>

Available on WS&S CD ROM. Click Here to access the full document on CD ROM.

"Part of the guidelines series on water, environment and sanitation. The Water Handbook is

the result of wide collaboration within UNICEF, and provides a broad overview of state-of-the-art programming for water management, protection and supply."

WELL. 1998. DFID Guidance Manual on Water Supply and Sanitation Programmes. [CD ROM] WELL, Loughborough University, UK. Available on Internet [cited on 07 March 2001]: <http://www.lboro.ac.uk/well/gm/contents.htm#anchor27834>

Available on WS&S CD ROM. Click Here to access the full document on CD ROM.

Comprehensive guide to the preparation of urban and rural water supply and sanitation projects. Prepared for the UK Department for International Development (DFID).

WHO Regional Office for Europe. 1999. "Community Participation In Local Health And Sustainable Development: A Working Document On Approaches And Techniques." In European Sustainable Development and Health, Series: 4. [cited in April 2001]. [CD ROM] Available on Internet: <http://www.who.dk/healthy-cities/pdf/book4.pdf>

Available on WS&S CD ROM. Click Here to access the full document on CD ROM.

"This document briefly describes what community participation is and why it is important. Explores in detail the techniques and methods frequently used and categorizes them in relation to five aspects of an action planning model: assessing needs and assets, agreeing on a vision, generating ideas and plans for action, enabling action and monitoring and evaluation. The document provides specific guidance to people wishing to engage in their own community participation activities. Case studies, contacts and reference material are included."

WHO. 2000. Tools For Assessing the O&M Status of Water Supply and Sanitation in Developing Countries (WHO/SDE/WSH/00.3). [cited in March 2001] [CD ROM] Available on Internet: <http://www.who.int/water_sanitation_health/wss/O_M/ToolsAssess.pdf>

Available on WS&S CD ROM. Click Here to access the full document on CD ROM.

Guidelines and methods for assessing and evaluating the operation and maintenance of WSS. Also presents how to assess the institutional capabilities for O&M.

World Bank. Undated. "Toolkit on Gender in Water and Sanitation." In *Gendernet*. (web site) [cited in April 2001]. [CD-ROM] Available on Internet: <http://www.worldbank.org/gender/know/water.htm>

Available on WS&S CD ROM. Click Here to access the full document on CD ROM.

The toolkit is designed to provide practical guidance on incorporating gender issues into water and sanitation programs and projects. "The toolkit distills lessons from project and sector work experience and draws on examples of successful strategies, interventions, and promising approaches."

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World Bank. 1999. *Water & Wastewater Utilities Indicators* 2nd Edition. [Cited in April, 2001] [CD-ROM] Available on Internet: <http://www.worldbank.org/html/fpd/water/pdf/indicators.pdf>

Available on WS&S CD ROM. Click Here to access the full document on CD ROM.

Indicators have been collected from a selected group of utilities from industrialized and developing countries. They are grouped into three sets: (1) Operational Indicators; (2) Financial Indicators; and (3) Overview of Tariff Rates and Structures. The 1999 pdf file is based on the report 2nd edition report produced in 1996.

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CASE STUDIES

The following case studies were selected to further illustrate many of the ideas and methodologies that are mentioned in the Urban WS&S Guide. Some of the <hyperlinks> listed below will jump directly to the cited case study. Others are links to web sites that contain further links to case studies. Some of the case studies illustrate negative results of poorly planned or implemented projects, and all of the case studies should be treated as unique examples, not immediately transferable to other settings.

Alcázar, Lorena, Lixin Colin Xu, and Ana Maria Zuluaga. 2000. *Institutions, Politics, and Contracts: The Attempt to Privatize the Water and Sanitation Utility of Lima, Peru*. World Bank Working Paper No. 2478. The World Bank. [cited in March 2001] available on Internet: <http://wbln0018.worldbank.org/Research/workpapers.nsf/fc90c6f8c9a42fe6852567e50050df1e/c75b0b2a6601d2a685256989006d7430?OpenDocument>

Case study of political and other factors that led to the failure of a private water concession in Lima, Peru.

Briscoe, John, Pablo Anguita Salas, and Humberto Pefia T. 1998. *Managing Water as an Economic Resource: Reflections on the Chilean Experience*. Environmental Economic Series, Paper No. 62. The World Bank, Environment Department. The World Bank. [cited in March 2001] available on Internet: <http://www-wds.worldbank.org/pdf_content/000009265398101313461 7/multi_page.pdf>

Presents issues of water markets in general, based on a case study from Chile. Among its conclusions are the following: (a) Countries following the open market model must ensure that water is allocated to highest-value users and used efficiently; this requires resources management and movement toward the use of market-friendly instruments. (b) Water markets lead to the better use of water in irrigated agriculture and its release to higher-value urban and industrial users. (c) Water markets function best when rivers are well regulated. (d) Low transaction costs and the consistent and predictable interpretation of water law is essential. (e) The water markets in Chile, though developed during non-democratic political circumstances, are now broadly popular. (f) To deal with market imperfections, water markets need to be supplemented by effective dispute resolution.

Collignon, Bernard, Régis Taisne, and Jean-Marie Sié Kouadio. 2000. *Water and Sanitation for the Urban Poor in Côte d'Ivoire*. UNDP/The World Bank, Water and Sanitation Program. [cited in March 2001]. Available on Internet: <http://www.wsp.org/pdfs/af_ci_urbanpoor.pdf>

Case of successful WS&S services provided by private sector in a rapidly urbanizing city. Presents legal framework and subsidies and their impacts on the poor.

Foley, Sean, Anton Soedjarwo, and Richard Pollard. *Of The People, By The People, For The People: Community-Based Sewer Systems In Malang, Indonesia*. UNDP/The World Bank Water and Sanitation Program – South East Asia. [cited in March 2001]. Available on Internet: <http://www.wsp.org/pdfs/eap_malang.pdf>

A detailed case study of community based sewer system in Indonesia, including detailed analysis of finances and affordability to the community.

Fragano, Frank, et al. 2001. "Case Studies on Decentralization of Water Supply and Sanitation." In *Latin America*. EHP Strategic Paper No. 1, edited by Fred Rosensweig. [cited in March, 2001] Available on Internet: <http://www.dec.org/pdf_docs/pnack672.pdf>

Presents case studies on decentralization of water supply and sanitation, including six cases of five different countries: Columbia, Paraguay, El Salvador, Nicaragua, and Honduras.

IRC (International Water and Sanitation Centre). *Community Water Management*. PLA Notes 35. [cited in March 2001] Available on Internet: <http://www.irc.nl/products/planotes35/index.html>

Experiences from four years of a community management research project funded by the Government of the Netherlands. This June 1999 issue of PLA Notes (Participatory Learning and Action), contains 10 case studies and several other articles on the experiences from this Participatory Action Development project in 22 communities in 6 countries. The PLA Notes series is produced three times a year by the Sustainable Agriculture and Rural Livelihoods research programme at the International Institute for Environment and Development (IIED).

Katakura, Yoko, and Alexander Bakalian. 1998. *PROSANEAR – People, Poverty and Pipes, A Program of Community Participation and Low-Cost Technology Bringing Water and Sanitation to Brazil's Urban Poor*: UNDP/The World Bank, Water and Sanitation Program. [cited in March 20001]. Available on Internet: <http://www.wsp.org/pdfs/working_prosanear.pdf>

Describes the PROSANEAR I experience in detail as an innovative project that offers new hopes for bringing water and sewerage services to Brazil's *favelas* and perhaps to poor urban neighborhoods around the world. This case describes the process of community participation, technology adopted, management, and informal settlements.

Kessides, Christine. 1997. *World Bank Experience with the Provision of Infrastructure Services for the Urban Poor: Preliminary Identification and Review of Best Practices* Transportation, Water, And Urban Development Department, The World Bank. [cited in April 2001]. Available on Internet: <http://www.worldbank.org/html/fpd/urban//publicat/service_provision.pdf>

An informal paper based on a desk review of some 70 Bank-supported urban projects and a dozen water/sanitation projects with components aimed at the provision of basic infrastructure services to low income urban communities. It seeks to inform and stimulate the debate about future efforts to address the growing needs. The following questions are discussed: (i) What kinds of projects appear to be most effective in providing infrastructure services to the urban poor? (ii) Under what conditions have these services been sustained beyond the project duration? (iii) In what ways can Bank operations best influence non-Bank-financed activities in the sector to achieve broader impacts on larger numbers of beneficiaries—that is, increase the potential for "scaling up"?

Komives, Kristin, 1999. *Designing Pro-Poor Water and Sewer Concessions: Early Lessons from Bolivia*. World Bank Policy Research Working Paper No. 2243, The World Bank, Washington, DC, USA. [cited in April 2001]. Available on Internet: <http://www-wds.worldbank.org/pdf_content/000094946991214053053 13/multi_page.pdf>

Discusses the process adopted in Bolivia in designing concessions for WS&S services and the issues and lessons learned in the process.

MIT, Department of Urban Studies and Planning. "Interactive Community Planning." In *What Is Urban Upgrading? Issues and Tools*. (web site) [cited in March 2001]. Available on Internet: <http://www.mit.edu/afs/athena/org/u/urbanupgrading/upgrading/issues-tools/tools/Interac-Comm-Plan.html>

Presents comprehensive links to tools for participatory community planning. Includes case studies and a detailed planning chart.

Municipal Infrastructure Investment Unit (MIIU). *Partnerships Newsletter.* [cited in April, 2001]. Available on Internet: < http://www.miiu.org.za/MIIUIndex.htm >

Partnerships is the newsletter of the Municipal Infrastructure Investment Unit. The MIIU was established by the government of South Africa to help municipalities find innovative solutions to critical problems with the financing and management of essential municipal services such as water supply, sanitation, waste, energy, and transport. These solutions include the involvement of new parties in service delivery, in various forms of public/private partnership

arrangements. Each issue of *Partnerships* contains articles about successful partnerships and the methods used to create and support them. Issues 4, 5, and 7 in particular contain information about water and sanitation projects.

Nankani, Helen. 1997. *Testing the Waters—A Phased Approach to a Water Concession in Trinidad and Tobago.* The World Bank, January, 1997. [cited in March, 2001] Available on Internet: <http://www.worldbank.org/html/fpd/wstoolkits/resources/frame.html>

"The government of Trinidad and Tobago has adopted a two-phase approach to privatizing its water services, first awarding a management contract through competitive bidding and then, after three to five years, converting it through negotiation to a long-term concession. With the management contract in place less than a year, it is too early to draw firm lessons about the strategy. And, two-phase strategy is proposed as an attractive one for a small country with limited regulatory capacity and poor information on the state of the business."

O'Toole, Lawrence J., and David J. Sencer. 1999. *Institutional Lessons Learned in Environmental Health Programs*. EHP Applied Study No. 8. [cited in March 2001]. Available on Internet: <http://www.dec.org/pdf_docs/PNACE688.pdf>

A collection of case studies on the role of institutions in promoting environmental health. Provides important lessons learned, with reference to cases (with overview) from Africa, Latin America, and Caribbean.

Ortiz, Fabián Gonón, et al. 2001. "Aguacatá in Guatemala: How Seven Communities Joined Hands." In *PLA Notes 35: Community Water Management*. IRC—International Water and Sanitation Centre. [cited in March 2001] Available on Internet: <http://www.irc.nl/products/planotes35/pnts8.htm>

Presents case study of community participation to improve water management in seven communities within the municipality of Aguacatán, Guatemala.

Reiff, Suzanne, and Guy Clégbaza. 1999. "The Experience of Non-Subsidized Household Latrines Through Social Marketing and the Promotion of the Small-Scale Private Sector—The Case of the Padear Program in Benin." In *Field Notes: Rural Sanitation*. UNDP/The World Bank, Water and Sanitation Program. [cited in March 2001] Available on Internet: <http://www.wsp.org/pdfs/afr_padear.pdf>

Presents a case of increase in demand for latrines through social marketing as an innovative approach. Includes a discussion of lessons learned.

Saywell, Darren. 2000. "Micro-credit for Sanitation." In *WELL Technical Briefs* (web site). [cited in March 2001]. Available on Internet: <http://www.lboro.ac.uk/well/services/tecbriefs/microcre.htm#anchor551704>

Discusses micro-credit as an alternative mechanism for financing sanitation, with recommendations and seven case studies of micro-credit in sanitation from South Asia, Africa, and Latin America.

Swiss Centre for Development Cooperation in Technology and Management SKAT. 1999. "Private Sector—Just a (New) Hope?." In *Report on the 15th AGUASAN Workshop (June 28 - July 2, 1999)*. [cited in March 2001]. Available on Internet: <http://www.skat.ch/ws/publ/download/Aguasan_15.pdf>

Presents results of private sector in WS&S with analytical illustration of six case studies from Bangladesh, India, Lesotho, Nicaragua, Romania, and South Africa.

UNDP/The World Bank Water and Sanitation Program—South Asia. 1999. *Community Partnership in Operation and Maintenance: Public Sector Water Corporation Leases Out O&M to Users (Meerut, India)*. [cited in March 2001]. Available on Internet: <http://www.wsp.org/pdfs/sa_meerut.pdf>

A case of community-managed O&M in water supply. Chronological description of the case with lesson learned.

University of Leeds, School of Civil Engineering. "Case Study—Conception and Installation of the Condominial Sewerage System in the Town of Santa Maria." In *Low Cost Sewerage Link* (web site). [cited in April 2001]. Available on Internet: <http://www.efm.leeds.ac.uk/CIVE/Sewerage/articles/condominial4.pdf>

The sewerage project installed in the town brings some innovations to condominial sewer systems, including (a) a new project methodology that rationalizes and simplifies the usual studies and procedures for this stage of the enterprise, taking advantage of favorable topography and plan flexibility offered by the condominial system; (b) use of economical components in the construction of the collection system; (c) adaptation of the structures of transport and treatment of sewage for future recycling of the effluents treated in the irrigation.

USAID. Undated. "Promoting Community Participation in Municipal Services: Potable Water Project in Matagalpa, Nicaragua." In *Participatory Practices #5: Learning From Experience.* [cited in March 2001]. Available on Internet: <http://www.usaid.gov/about/part_devel/docs/prtpract5.html>

"In collaboration with the Mayor of Matagalpa and his staff, the Regional Information Clearinghouse (RIC) in USAID/Guatemala assisted municipal officials in the design of a series of activities that, as a whole, would constitute an intensive, six-month effort to launch a campaign to encourage greater community support and participation. The campaign's objectives were to raise awareness among the municipal population of the problems being faced in the delivery of the water service and, by strengthening demand for municipal bonds, to improve the level of cost recovery for the water service and new projects."

USAID, Regional Urban Development Office, New Delhi. Various dates. *FIRE Project Notes.* [cited in April 2001] Available on Internet: < http://www.dec.org/partners/dexs_public/ > (enter the word FIRE in the search box and select the "search" button).

The "FIRE Project Notes" consist of more than 20 brief reports of activities and results of USAID's Financial Institutions Reform and Expansion (FIRE) Project, presented in newsletter format. The notes typically include case studies and instructive articles based on urban infrastructure projects, many including water or sanitation components. The FIRE Project supports the government of India in its efforts to strengthen domestic capital markets to enable them to serve as an efficient source of development finance. The Debt Market/Infrastructure Component (FIRE-D) seeks to expand the debt market through the financing of commercially viable urban environmental infrastructure projects.

Visscher, Jan Teun, et al. 1999. *Integrated Water Resource Management in Water and Sanitation Projects: Lessons from Projects in Africa, Asia and South America*. IRC—International Water and Sanitation Centre. [cited in March 2001]. Available on Internet: <http://www.irc.nl/pdf/publ/op31e.pdf>

Reviews experience with water resource management principles (strategic issues) from eleven projects in seven countries. Covers issues including water resources, stakeholders, economic value, capacity building, and gender balance.

Whittington, Dale, et al. 1997. *Urban Sewer Planning in Developing Countries and "The Neighborhood Deal": A Case Study of Semarang, Indonesia*. UNDP/The World Bank Water and Sanitation Programme. [cited in April 2001]. Available on Internet: <http://www.wsp.org/pdfs/working_semarang.pdf>

"The feasibility study described in this report was conducted to test a contingent valuation methodology for assessing consumer demand for sewer services. In essence, households and neighborhood groups were offered different theoretical pricing arrangements for house connections and feeder sewer networks, and the results analyzed to determine the deal preferred by each of the three sub-districts included in the study. While not a comprehensive assessment of willingness to pay for sanitation systems and services in Semarang, the data do provide some interesting and useful insights into consumer priorities for public and private investment in sanitation infrastructure."

WHO. 1998. “Sanitation Promotion.” In *WSSCC Working Group on Promotion of Sanitation*. (Document WHO/EOS/98.5). Edited by Mayling Simpson Hébert and Sara Wood. [cited in March 2001]. Available on Internet : <http://www.who.int/water_sanitation_health/Environmental_sanit/Sanprom/saniprom.htm>

A comprehensive document on the promotion of sanitation. Discusses issues such as political will, empowerment, partnership, advocacy, innovative technologies, and participatory approaches. Includes checklists with some references to specific cases.

ORGANIZATIONS

The following organizations are valuable sources of information and advice on the planning and implementation of water supply and sanitation programs. The list is by no means exhaustive. Many of these organizations maintain web sites that in turn contain lists of links to other WS&S organizations.

American Water Works Association (AWWA)
1401 New York Ave, NW
Suite 640
Washington, DC 20005
USA

Tel: 1-202-628-8303

Internet address: <http://www.awwa.org/>

CINARA - Instituto de Investigación y Desarrollo en Agua Potable, Saneamiento Básico y Conservación del Recurso Hídrico
Universidad del Valle
sede Melendez, Edificio 344
Cali, Colombia
Contact: Gerardo Galvis Castaño, Ingeniero
Tel: (92) 3392345 - (92) 3308961
Fax: (92)3393285
E-mail: gegalvis@cinara.univalle.edu.co

Internet address: <http://cinara.univalle.edu.co/> or
<http://info.lut.ac.uk/departments/cv/wedc/garnet/lncla.html>

CREPA- Centre Regional pour L'eau Potable et L'Assainissement a Faible Cout
Mr. O. Guene
CREPA, 03 BP 7112, Ouagadougou 03,
Burkina Faso

Tel: +226 31 03 59
Fax: +226 31 03 61

Internet address: <http://info.lut.ac.uk/departments/cv/wedc/garnet/lncwa.html>

Environmental Health Project
1611 North Kent St., #300
Arlington, VA 22209 USA

Tel: 1-703-247-8730
Fax: 1-703-243-9004
E-mail: info@ehproject.org

Internet address: <http://www.ehproject.org/live/thisisE.html>

International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B)
Environmental Health Programme, ICDDR, B,
GPO Box 128, Dhaka 1000, Bangladesh

Tel: +880 2 600171
Fax: +880 2 883116

Internet address: <http://www.icddrb.org.sg> or
<http://info.lut.ac.uk/departments/cv/wedc/garnet/lncsa.html>

International Water and Sanitation Center (IRC)
P.O. Box 2869
2601 CW Delft
The Netherlands

Tel: +31-15-219 29 39
Fax: +31-15-219 09 55
E-mail: general@irc.nl

Internet address: <http://www.irc.nl/aboutirc/index.html>

International Water Association (IWA)*
Alliance House, 12 Caxton Street
London SW1H 0QS, UK

Tel: +44 (0)20 7654 5500
Fax: +44 (0)20 7654 5555
E-mail: info1@iawq.org.uk

*IAWQ and IWSA (International Water Services Association) were merged in 1999 to form IWA, the International Water Association.

Protection of the Human Environment
World Health Organization
1211 Geneva 27
Switzerland

Fax: +41 22 791 43 21
E-mail: pfistera@who.ch

Internet address: <http://www.who.int/water_sanitation_health/index.html>

STREAM – a coalition of water supply and sanitation resources centers from around the world.

Internet address: <http://www.irc.nl/stream/index.html>

USAID
David Painter
Director
Office of Environment and Urban Programs
USAID
Ronald Reagan Building 3.08-100
Washington, DC 20523, USA

Tel: 1-202-712-5113
Fax: 1-202-216-3714
E-mail: mailto:dpainter@usaid.gov

Water Environment Federation
601 Wythe Street
Alexandria, VA 22314-1994 USA

Tel: 1-703-684-2400
Fax: 1-703-684-2492

Internet address: < http://www.wef.org >

Water Environmental & Sanitation (WES) Section
Programme Division, UNICEF
3 UN Plaza
New York, NY 10017
USA

Tel: 1-212-824-6000
Fax: 1-212-824-6480
E-mail: wesinfo@unicef.org

Internet address: <http://www.unicef.org/programme/wes/weshm.htm>

The Water Page
The African Water Page
Water Web Management Ltd.
1 Dome Hill, Caterham
Surrey CR3 6EE, UK

E-mail: info@thewaterpage.com

Internet address: <http://www.thewaterpage.com/>

Water Supply and Sanitation Collaborative Council
c/o WHO (CCW)
20 Avenue Appia
CH-1211 Geneva 27
Switzerland

Tel: +41 22 791 3685
Fax +41 22 791 4847
E-mail: wsscc@who.ch

Internet address: <http://www.wsscc.org/index.html>

Water Supply and Sanitation Division
The World Bank Group
1818 H Street, NW
Washington, DC 20433
USA

Tel: 1-202-473-9785
Fax: 1-202-522-3313 or 1-202-522-3228
E-mail: info@wsp.org

Internet address: <http://www.wsp.org/english/index.html>

Water, Engineering and Development Centre (WEDC)
Loughborough University
Leicestershire LE11 3TU
UK

Tel: + 44 (0) 1509 222885
Fax: + 44 (0) 1509 211079
E-mail: WEDC@lboro.ac.uk

Internet address: <http://info.lboro.ac.uk/departments/cv/wedc/>

WEB SITES AND DISCUSSION GROUPS

The following web sites are valuable sources of information and advice on the planning and implementation of water supply and sanitation programs. The list is by no means exhaustive. Many of these web sites in turn contain lists of links to other WS&S web sites.

Afwater Electronic Discussion Group - Water in Southern Africa
Computing Centre for Water Research
c/o University of Natal
Private Bag X01
Scottsville 3209
Republic of South Africa
E-mail: afwater@aqua.ccwr.ac.za

Internet address: <http://www.ccwr.ac.za/hydro/elec.html>

DECNET - Water and Wastewater Decentralization Network and Discussion Group for Latin America and the Caribbean
Environmental Health Project
1611 N. Kent Street, Suite 300
Arlington, Virginia 22209, USA
Contact: Dan Campbell; campbelldb@ehproject.org
E-mail: campbelldb@ehproject.org

Internet address: <http://www.ehproject.com>

Environmental Health Webliography

<http://www.ehproject.org/Library/WebliographyEH.htm>

GENNET - The Gender Issues Network
International Water and Sanitation Centre
P.O. Box 2869
2601 CW Delft
The Netherlands
Contacts: Christine van Wijk and Jennifer Francis
E-mail: wijk@irc.nl or francis@irc.nl

Internet address: <http://info.lut.ac.uk/departments/cv/wedc/garnet/gennet.html>

Global Programme of Action (GPA) for the Protection of the Marine Environment from Land-based Activities
Contact: GPA Coordination Office
Fax: +31-70-3456648
E-mail: gpa@unep.nl

Internet address: http://gpanews.unep.org/ See also
<http://gpanews.unep.org/pdf/SewagePlan.PDF>

GreenCOM web site

Internet address: <http://www.usaid.gov/environment/greencom/index.html>

Hygiene Behaviour Network
Contact: Dr Eva Kaltenthaler
ScHAAR, University of Sheffield
Regent Court
30 Regent Street, Sheffield S1 4DA, UK
E-mail: e.kaltenthaler@sheffield.ac.uk

Internet: <http://info.lut.ac.uk/departments/cv/wedc/garnet/tnchygie.html>

Institutional Development Network
IHE Delft
Westvest 7
P.O. Box 3015, 2601 DA Delft
The Netherlands
Contact: Dr Richard Franceys
Fax: +31 015 122921
E-mail: rwf@ihe.nl

Internet address: <http://info.lut.ac.uk/departments/cv/wedc/garnet/tncinst.html>

IWA Specialist Group on Water and Waste Technologies and Management Strategies in Developing Countries
International Association on Water Quality
Alliance House, 12 Caxton Street
London SW1H 0QS, UK
Tel: +44 0 20 7654 5500
Fax: +44 0 20 7654 5555

E-mail: info1@iawq.org.uk
Internet address: <http://www.iawq.org.uk/grppage.htm>

Key International Organizations in Water and Sanitation

Internet address: <http://www.wsscc.org/interwater/keyorgs.html>

Low Cost Sewerage Discussion Group
Contacts: Mick China and Duncan Mara
E-mail: lcsewerage-request@mailbase.ac.uk

Internet address: <http://www.mailbase.ac.uk/lists/lcsewerage>

Low Cost Sewerage Network
Department of Civil Engineering
University of Leeds
Leeds LS2 9JT
United Kingdom
Contact: Professor D. Duncan Mara
Fax: + 44 0113 233 2308
E-mail: d.d.mara@leeds.ac.uk

Internet address: <http://info.lut.ac.uk/departments/cv/wedc/garnet/tnclowcs.html>

Night Soil/Sludge Treatment Network
Water and Sanitation in Developing Countries (SANDEC)
Ueberlandstrasse 133, CH-8600
Duebendorf, Switzerland
Contact: Martin Strauss
Fax: + 41 1 823 53 99
E-mail: strauss@eawag.ch

Internet address: <http://info.lut.ac.uk/departments/cv/wedc/garnet/tncnight.html>

Participatory Action Research Network
Cornell University
Ithaca, New York
Contact: Carla Shafer

Internet address: <http://www.parnet.org>

Participatory Approaches Network
Regional Water & Sanitation Group for East Asia and Pacific
UNDP-World Bank Water and Sanitation Programme
P.O. Box 1324/JKT
Jakarta 12940, Indonesia
Contacts: Nilanjana Mukherjee or Priya Tuli
Fax: +62 21 252 0432
E-mail: Nmukherjee@worldbank.org
Ptuli@worldbank.org

Internet address: <http://www.wsp.org> or
<http://info.lut.ac.uk/departments/cv/wedc/garnet/tncparti.html>

Pit Latrines Network and Pitnet Electronic Discussion Group
Water, Engineering and Development Centre
Loughborough University
Leicestershire LE 113TU
United Kingdom
Contact: Darren Saywell; d.l.saywell@lboro.ac.uk
E-mail: pitnet-request@mailbase.ac.uk

Internet address: <http://www.mailbase.ac.uk/lists/pitnet>

SOURCE Water and Sanitation News Weekly

Internet address: <www.wsscc.org/source/>

“Source Water and Sanitation News Service is a joint endeavour of the Water Supply and Sanitation Collaborative Council (WSSCC) and IRC International Water and Sanitation Centre. [A] weekly update of short news and a bi-monthly special features edition including news from the WSSCC and IRC.” Available on Internet or by e-mail distribution.

The Sanitation Connection: an environmental sanitation network

Internet address: <http://www.sanicon.net/index.php3>

Wastewater-Management Electronic Discussion List
Water, Engineering and Development Centre
Loughborough University
Leicestershire LE 113TU
United Kingdom
Contact: Darren Saywell; d.l.saywell@lboro.ac.uk
E-mail: wastewater-management-request@mailbase.ac.uk

Internet address: <http://www.mailbase.ac.uk/lists/wastewater-management>

Water Magazine <http://www.watermagazine.com>

Water Quality Monitoring Network
IDRC
250 Albert Street, P.O. Box 8500
Ottawa, Ontario. CANADA K1G 3H9
Contact: Dr Gilles Forget
Senior Scientist (Toxicology), Programmes Branch, IDRC
Fax: +613 567 7748
E-mail: Gforget@idrc.ca

Internet address: <http://info.lut.ac.uk/departments/cv/wedc/garnet/tncwq.html>

Water-and-San-Applied-Research Electronic Discussion List
Global Applied Research Network (GARNET)
Water, Engineering and Development Centre
Loughborough University
Leicestershire LE 113TU
United Kingdom
Contact: Darren Saywell; d.l.saywell@lboro.ac.uk
E-mail: water-and-san-applied-research-request@mailbase.ac.uk

Internet address: <http://www.mailbase.ac.uk/lists/water-and-san-applied-research>

Water-Distrib-Systems Electronic Discussion List
School of Engineering and Computer Science
University of Exeter
United Kingdom
Contact: Dragan Savic; d.savic@exeter.ac.uk

E-mail: water-distrib-systems-request@mailbase.ac.uk

Internet address: < http://www.jiscmail.ac.uk/lists/water-distrib-systems.html >

GLOSSARIES

The following are <hyperlinks> to specialized water and sanitation glossaries that are available on the Internet.

Drinking Water Glossary. On the Office of Groundwater and Drinking Water home page. [cited in April 2001]. U.S. Environmental Protection Agency. Available on Internet: <http://www.epa.gov/safewater/glossary.htm>

Glossary of Water Resources Terms on the Edwards aquifer home page [cited in April 2001]. Available on Internet: <http://www.edwardsaquifer.net/glossary.html>

Glossary of Water-Related Terms by Center Interdisciplinary Studies, Virginia Tech University. [cited in April 2001]. Available on Internet: <http://www.cis.vt.edu/choices&challenges/1996-97/glossary-96-water.html>