ENVIRONMENTAL HEALTH PROJECT

Strategic Report 3

Improving Sanitation in Small Towns In Latin America and the Caribbean

Practical Methodology for Designing a Sustainable Sanitation Plan

by

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This document is the result of the work of many people over the past two years.

Fred Rosensweig and Eduardo Perez are the primary authors and have been involved from the very beginning. Jeanine Corvetto provided valuable input on financial issues. Scott Tobias was directly responsible for overseeing the field tests, worked directly with the local consultant teams and contributed significantly in the final revisions.

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Acronyns

AWWA	American Water Works Association
EHP	Environmental Health Project
ENACAL	*Empresa Nicaraguense de Acueductos y Alcantarillados* (National Water Supply and Sanitation Company), Nicaragua
FIS	*Fondo de Inversion Social* (Social Investment Fund)
IDB	Interamerican Development Bank
LAC	Latin America and the Caribbean
INAA	*Instituto Nicaraguense de Acueductos y Alcantarillados* (Nicaraguan Institute for Water Supply and Sanitation)
MOH	Ministry of health
MOU	Memorandum of understanding
NGO	Nongovernmental organization
O&M	Operations and maintenance
PAHO	Pan American Health Organization
PIAS	Plan for Investment in Environment and Health (PAHO)
PVO	Private voluntary organization
SANAA	*Servicio Autonomo Nacional de Acueductos y Alcantarillados* (National Water Supply and Sewerage Company, Honduras
UN	United Nations
UNICEF	United Nations Children's Fund
USAID	U.S. Agency for International Development
VIP	Ventilated improved pit (latrine)
WEDC	Water, Engineering, and Development Center
WEF	World Environment Federation
WELL	Water and Environmental Health at Loughborough and London
WHO	World Health Organization
WS&S	Water supply and sanitation
WSSCC	Water Supply and Sanitation Collaborative Council

Preface

In the past five years or so, the international water supply and sanitation community has paid increasing attention to sanitation. Concerns about contaminated receiving waters, unhealthy living conditions, and high levels of morbidity and mortality from waterborne diseases—especially among children—have prompted this attention. Several key guidance documents have been published, and a number of international and national meetings have been organized. The result has been an increased understanding of what is involved in improving sanitation and a consensus on key principles.

The Pan American Health Organization reports that the proportion of the population in the Latin America and Caribbean region that has access to sanitation facilities is 80% (49% connected to conventional sewerage and 31% served by on-site sanitation systems, such as latrines and septic tanks). Only 10% to 15% of all domestic wastewater that is collected receives any sort of treatment before being discharged. Most of the treatment plants do not function properly and do not meet water quality discharge standards. Urban areas have much higher coverage than rural areas. Although there are no available data specifically for small towns, their situation is probably closer to that of rural rather than urban areas.

In addition, there has been significant and growing interest in recent years in improving water supply and sanitation services in small towns, typically defined as those with populations from 5,000 to 30,000. One of the principal reasons for the increased interest in small towns is the sheer number of municipalities that fall within this population range. However, the principal focus of efforts to date in small towns has been water supply with very limited attention to improving sanitation.

With support from the Latin America and Caribbean Bureau in USAID, EHP developed this document in response to this growing interest in small towns.

Purpose of the document

The document has three overall purposes:

- provide an overview of the issues involved in improving sanitation in small towns
- discuss the current situation of sanitation in small towns in Latin America and suggest a potential strategy to improve the sustainability of services
- provide a detailed step-by-step participatory methodology for designing sustainable sanitation services in small towns.

Organization of the document

This document is organized into two sections.

Section I provides an overview of the current state-of-the-art on sanitation, identifies the constraints for improving sanitation services in small towns in Latin America and proposes a strategy for improving services that includes key principles and an outline of a 10-step methodology. The key principles include a focus on town-wide solutions that expand coverage to as many residents as possible, financial sustainability, extensive consultation with the community and explicit attention to health and environmental issues.

Section II is a detailed practical methodology. This section provides the practical guidance for the methodology and is intended for those individuals who work directly to improve sanitation in small towns. The methodology includes suggestions on the programmatic context for its use and the preparatory steps that need to be taken to ensure that it is being applied in towns where there is a reasonable chance for success. The ten steps include the information to be collected, the activities that need to be carried out and practical tools. The application of the methodology will result in a plan for improving sanitation services that would then serve as the basis for funding.

The methodology was field tested in three small towns in 2001–2002: La Cabima, Panama; White Horses, Jamaica; and Macara, Ecuador. After the completion of the field tests, the document was revised based on the experiences of the field tests.

Although the focus for this document is Latin America, the principles and issues discussed should be relevant to other regions and the methodology should be transferable.

Section I: Overview

Chapter 1 — Introduction

Improved access to drinking water supply of adequate quality and quantity effectively reduces diarrheal diseases, but the impact is maximized when access is implemented in conjunction with good sanitation and hygiene practices. Access to adequate sanitation, however, has lagged behind access to safe drinking water, especially in rural areas. The *Global Water Supply and Sanitation Assessment 2000 Report* (World Health Organization [WHO] and UN Children's Fund [UNICEF], 2000) estimates that in the Latin America and Caribbean (LAC) region, 87% and 49% of urban and rural populations, respectively, have access to sanitation facilities, compared with 93% and 61%, respectively, who have access to water supply services. Moreover, the Pan American Health Organization (PAHO) estimates that only 10% to 15% of all domestic wastewater that is collected receives any sort of treatment before being discharged (PAHO, 1997). The results of inadequate sanitation are not unexpected: heavily contaminated receiving waters, unhealthy living and working conditions and high levels of morbidity and mortality from waterborne disease, especially among children.

The results of inadequate sanitation are not unexpected: heavily contaminated receiving waters, unhealthy living and working conditions, and high levels of morbidity and mortality from waterborne disease, especially among children.

In LAC, and especially in Central America, responsibility for the provision of urban services, including water supply and sanitation (WS&S), is increasingly devolving to municipalities and communities. Typically, however, these municipalities are not in a position—financially, technically, institutionally or socially—to provide adequate services. A number of donors, including the U.S. Agency for International Development (USAID), are providing assistance and resources to improve the capacity of small municipalities to provide WS&S services, often as part of broader municipal strengthening activities. Efforts to date, however, have focused primarily on drinking water supply.

In recent years, the Environmental Health Project (EHP) has carried out a series of activities related to the decentralization of WS&S services. These have included country-specific activities in the Dominican Republic, El Salvador, Nicaragua and Paraguay, as well as activities of a regional nature. One of these regional activities was an analysis of the status of decentralization of WS&S management in the Dominican Republic, El Salvador, Guatemala, Honduras and

Nicaragua (Walker and Velásquez, 1999). This analysis showed that every country except Guatemala, which had always been decentralized, was either engaged in the reform of the WS&S sector or, in the case of Nicaragua, had recently done so. In 2000, EHP developed six case studies on decentralization, of which three focused on management models for small towns (Fragano et al., 2001). More recently, the Water and Sanitation Program of the World Bank, as part of a Global Small Towns Water and Sanitation Initiative, began carrying out a global study through a series of case studies of experiences in small and medium-size towns. The goal is to identify key ingredients for success. Unfortunately, all of the case studies address only water supply. Good examples of small-town sanitation services have not yet been identified.

In the course of implementing the EHP activities, it became evident that very little attention had been given to sanitation in small towns in the LAC Region. Among the small towns studied by Fragano et al. (2001), sanitation was being addressed directly in only one: Marinilla, Colombia. This was attributable in part to the relative affluence of Marinilla compared with most other small towns in Latin America. In the other two towns studied—Itagua, Paraguay and San Julian, El Salvador—the focus had been on improving water supply services. Among the less developed countries in the region, there has been little progress in improving sanitation services in small towns. This is attributable to multiple factors, including the lack of access to financing, little demand for improved sanitation, an inadequate policy framework and limited institutional capacity to manage the sanitation systems. Sanitation projects have tended to focus on technical solutions, especially on developing lower-cost technologies for wastewater collection and treatment, rather than on the sustainability of those investments or on maximizing health benefits.

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In recent years, the international community has begun to pay more attention to sanitation in general. The World Bank document *Towards a Strategic Sanitation Approach: Improving the Sustainability of Urban Sanitation in Developing Countries* (Wright 1997) suggests a demand-based approach relying on increased stakeholder participation and the use of incentives to shape institutional behavior. Other documents, such as the *Guidance Manual on Water Supply and Sanitation Programmes* (Water and Environmental Health at London and Loughborough [WELL], 1998), *Better Sanitation Programming: A UNICEF Handbook* (Water, Environment and Sanitation Cluster, UNICEF, and EHP, 1997), and *Strategic Planning for Municipal Sanitation: A Guide* (GHK Research and Training in association with Water, Engineering and Development Centre [WEDC] and Water and Sanitation Program, South Asia, 2000) are important contributions to the literature—increasing understanding of what is involved in improving sanitation and building consensus on key principles. In addition, in Bellagio, Italy, in February 2000, a group of experts brought together by the Water Supply and Sanitation Collaborative Council (WSSCC) agreed on four principles

based on the objectives of "universal access to safe environmental sanitation, within a framework of water and environmental security and respect for the economic value of wastes."

However, these documents provide little direct guidance on the specific needs and challenges of improving sanitation in small towns. Most of their focus is on rural communities or on periurban areas of larger cities, and they provide very few Latin American examples.

There has also been significant and growing interest in improving WS&S services, specifically in small towns, but again the focus has been mostly on water supply. In 2000, the World Bank and WEDC organized a conference on small towns. The conference addressed such issues as the definition of a small town (which falls between a rural community and a medium size city), management models for small towns and ingredients for success. One of the benefits of this conference was to draw attention to the issues that are unique to small towns.

One of the principal reasons for the increased interest in small towns is the sheer number of municipalities that fall within this category. For example, according to the last census in El Salvador, only 13 of 252 municipalities in the country have populations over 20,000. In fact, only three municipalities have populations over 50,000. In Paraguay, there are 93 municipalities between 10,000 and 40,000 and only 15 with populations over 40,000. Small towns have not received the same attention as the larger cities. To date, there has been minimal interest by the private sector in small towns.

This document has three purposes:

- provide an overview of the issues involved in improving sanitation in small towns (specifically, the state of the art in sanitation in general and a summary of what has been learned in the past several years)
- discuss the current situation of sanitation in small towns in Latin America and suggest a potential strategy to improve the sustainability of services
- provide a detailed step-by-step participatory methodology for designing sustainable sanitation services in small towns.

Definitions

A number of key terms are used throughout this publication, including "small towns," "sanitation," "adequate sanitation," "adequate hygiene behavior," "level of services," "basic level of sanitation service," "sustainable sanitation services," "lack of services," "replicability" and "scale-up." These terms are briefly defined here:

Small towns are settlements that are sufficiently large and dense to benefit potentially from the economies of scale offered by piped systems but are too small and dispersed for conventional urban water utilities to manage such systems efficiently. Successful water

"Small towns" are settlements that are sufficiently large and dense to benefit potentially from the economies of scale offered by piped systems but are too small and dispersed for conventional urban water utilities to manage such systems efficiently.

supply and sanitation systems require formal management arrangements, a legal basis for ownership and management and the ability to expand to meet the growing demand for water. Small towns typically have populations between 5,000 and 30,000, but they may be larger or smaller (WEDC, 2000). Small towns have more administrative capacity and more economic activity than rural communities. Yet, in contrast to larger urban centers, small towns generally lack access to financing but have greater potential for meaningful community involvement. Small towns cannot all be described in the same way. A town of 5,000 in a rural area cannot be compared to a small industrial town of 30,000 that is close to a large city. The sanitation needs will be different, from the composition of waste to the cultural and educational backgrounds of the residents, to the funding options available to each.

Sanitation refers to the hygienic principles and practices relating to the safe collection, removal, or disposal of human excreta and wastewater.

Adequate sanitation for a household means the provision and ongoing operation and maintenance (O&M) of a safe and easily accessible means of disposing of human excreta and wastewater. These facilities should provide an effective barrier against diseases related to excreta, should be used by all members of the household, and should not have an unacceptable impact on the environment. Adequate sanitation refers not only to facilities on the site of the household and any pipes, treatment works and other elements that may be part of a public or communal disposal system, but also to the successful operation of the facilities and system.

"Sanitation" refers to the hygienic principles and practices relating to the safe collection, removal, or disposal of human excreta and wastewater.

Adequate hygiene behavior refers to those practices that reduce the number of disease-causing agents in the environment and protect individuals and families from contact with them. Such behaviors must be culturally and socially acceptable and effective. They can be clearly described and observed and they improve children's health by reducing the prevalence of diarrheal disease.

Levels of service can be expressed in technical design terms (for example, for sanitation, a simple pit latrine, a pour-flush latrine, a flush toilet or piped sewerage; for water supply, the quantity and quality of water available within a given distance) or in performance terms (for example, with a stipulated measure of reliability). The level of service for sanitation often depends on the level of service of water being provided.

The **basic level of sanitation service** for a household is defined by most governments and external agencies as having a ventilated improved pit latrine in a household that does not have a household-level water connection; or as a pour-flush toilet in a household that does have a household-level water connection—or the equivalent in terms of cost,

robustness, health benefits, and environmental impact. According to the *Guidance Manual on Water Supply and Sanitation Programmes* (WELL, 1998), the basic level of service also includes ongoing exposure to readily understandable information about correct hygiene practices.

Sustainable sanitation services are those that continue to operate satisfactorily and generate health benefits over their planned life and do not threaten environmental quality. Sustainability has health, environmental, institutional, financial, technical and social dimensions. Many agencies are carrying out small-scale sanitation projects that they hope will serve as models that can then be replicated and scaled up to meet the needs of a city or country.

Replicability means that pilot projects are repeatable in comparable small towns. Specifically, it means that the approach is technically feasible, affordable and acceptable to users. Sanitation services that are heavily subsidized are not replicable, fail to address the challenge of coverage and may make sanitation more difficult by establishing unrealistic expectations or standards.

Scale-up means that the approach to service provision is widely replicable in a substantial number of small towns.

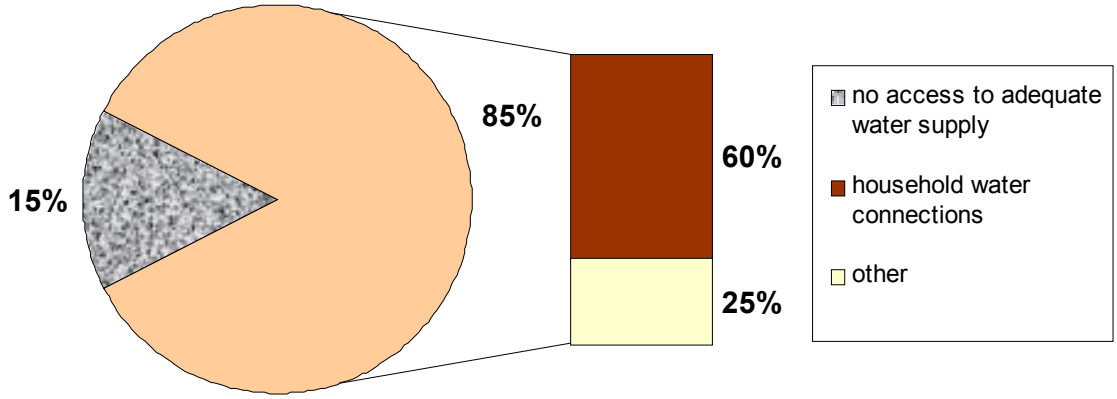
"Sustainable sanitation services" are those that continue to operate satisfactorily and generate health benefits over their planned life and do not threaten environmental quality. Sustainability has health, environmental, institutional, financial, technical, and social dimensions.

Existing Water Supply and Sanitation Coverage in Latin America and the Caribbean

The Latin America and the Caribbean (LAC) region includes all countries in the Americas except for the United States and Canada. *Global Water Supply and Sanitation Assessment 2000* (WHO and UNICEF, 2000) found that the LAC region has a population of almost 500 million—74% urban and 26% rural. Unfortunately, the definitions for *rural* and *urban* often differ among countries, and small towns are reported as rural in some cases and as urban in others. EHP could find no data that explicitly report on small towns. In addition, the report includes no data that disaggregate WS&S coverage for urban informal and periurban areas.

Global Water Supply and Sanitation Assessment 2000 also estimates that almost 85% of the LAC region population (425 million people) has access to an adequate (as defined by each country) water supply (Figure 1). Within the LAC region, 93% of the urban areas and 61% of the rural areas are reported as having access to an adequate water supply system. The WHO-UNICEF assessment further estimates that 60% of the LAC population (255 million people) with access to an adequate water supply has household water connections. This is a very high level of coverage, when compared with other developing-country regions, but PAHO (2000) notes that many of the household connections are served by operationally intermittent water supply systems.

Figure 1. Access to Water Supply in the LAC Region

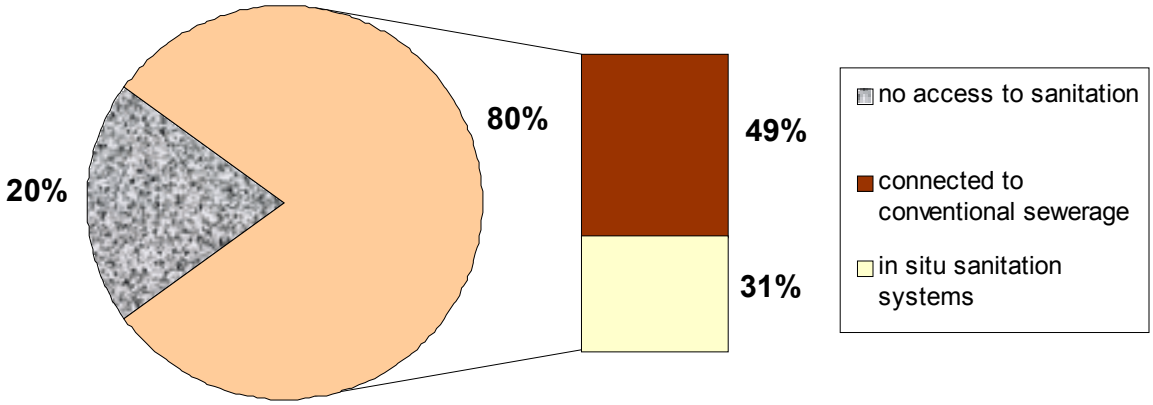


Data from preliminary regional report on the Global Assessment 2000 in the Region of the Americas (PAHO 2000).

PAHO (2000) reports that almost 80% of the LAC region population (400 million people) has access to sanitation (Figure 2), although the urban areas have a much higher level of coverage than rural areas. Of the population with access to sanitation, 49% (245 million people) is connected to conventional sewerage, and 31% (155 million people) is served by in situ sanitation systems (latrines and septic systems). The WHO-UNICEF assessment found that although 245 million people are connected to sewerage systems, only 13% of the collected wastewater goes to wastewater treatment plants. Regional experts report that many, if not most, of the treatment plants are not functioning properly and are not producing effluents that meet their countries' wastewater quality discharge standards (PAHO, 2000). The implications of this are that, in effect, untreated or poorly treated wastewater from 245 million people in the LAC region is being collected and disposed in surface and ocean waters throughout the region. PAHO also reports that the nitrogen content of groundwater has increased significantly, which PAHO attributes to an increasing use and failure of in situ (latrines and septic tanks) sanitation in the informal and periurban areas.

To assist with identifying regional needs, PAHO has grouped the data among subregions. The three regions that are most subject to assistance by USAID and other external support agencies are (1) the Andean countries, (2) the English-speaking Caribbean countries plus Guyana and Surinam and (3) the Central American and Spanish-speaking Caribbean countries. Table 1 provides a summary of population and coverage for WS&S for these three regions. Chile, Brazil, Uruguay, Argentina and Mexico are not included since they are the more developed countries in the region and not as representative of the issues discussed in this document.

Figure 2. Access to Sanitation in the LAC Region



Data from PAHO 2000.

Key observations that can be drawn from the above discussion include the following:

- A high (and increasing) percentage of urban households that have access to a water supply system have household connections. This implies higher levels of water consumption (which is good), but also a higher volume of wastewater (which is not good). As the data suggest, sewerage has not kept pace with the volume of wastewater generated.

- A high percentage of households that have access to sanitation are sewered. However, most of the sewage is not treated before it is disposed into the environment, and what little treatment does occur is poorly maintained and often does not meet a country's standards. This untreated sewage has been a significant contributor to water resource contamination throughout the region.

- It is difficult to draw trends from the data in regard to small towns, but it seems reasonable to assume that the percentage of household water connections and household sewers reported in "rural" areas are likely to be similar to percentages found in small towns.

Table 1. Water Supply and Sanitation Coverage by Subregional Grouping

	Andean Countries	*Caribbean Countries + Guyana, Surinam*	*Central American/ Spanish Caribbean Countries*
Population (million)	107	7.6	65
% population in rural areas	28	31	46
% population in urban areas	72	69	54
% with access to water supply	82	90	79
% urban population with water supply	90	100	93
% rural population with water supply	61	80	62
% served population with household water connections	72	no data	61
% served population with adequate sanitation	74	90	77
% urban sanitation coverage	85	92	91
% rural sanitation coverage	44	86	60
% of population with sanitation served by sewerage system (urban populations)	83	no data	33
% of sewerage that is treated	11.5	no data	24

Andean countries include Bolivia, Colombia, Ecuador, and Peru. Caribbean countries + Guyana, Surinam comprises more than 24 countries, of which Jamaica and Trinidad and Tobago make up almost 50% of the total population. Central American/Spanish-speaking Caribbean countries include Belize, Costa Rica, Cuba, the Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Haiti, and Puerto Rico.

Data from PAHO 2000.

- Although WS&S coverage levels in the LAC region are high compared with other regions of the developing world, there are still significant numbers of households that do not have access to an adequate water supply or sanitation system. PAHO has highlighted this as an important equity issue that governments and external support agencies must address. The implication of a more equitable approach is that as new funds are invested, they are targeted towards meeting the basic WS&S needs of the poorest rather than for upgrading the level of existing services for the better off.

- The WHO-UNICEF assessment does not report "coverage" for the hygiene behaviors necessary to ensure maximum health benefits from WS&S investments. It is likely that despite the high levels of WS&S coverage, there is still a need for extensive hygiene promotion programs.

Funding and Programming Trends among External Support Agencies and Governments

Sector trends reported by PAHO (2000) include the following:

- The majority of the countries in the LAC region have recognized the need for reforming and strengthening the WS&S sector. The trend is toward decentralization of responsibilities, often to the municipal level and toward greater participation by the private sector. In addition, many countries are beginning to recognize the need for establishing a regulatory framework and related agencies, but they have made very little progress in this area.

- In the LAC region, reform and modernization of the sanitation sector have been slower than in the water supply sector. One of the reasons for this is the cost of the investments required for collection and treatment of wastewater and industrial effluents.

- Water resources are gradually deteriorating in almost all of the countries of the LAC region as a consequence of population growth, urbanization and economic development. Inadequate disposal of human (and industrial) wastes has been a significant contributor to current contamination levels of water resources.

- The availability of water resources is reaching critical levels for many countries of the LAC region in terms of quantity and quality.

Trends suggest that the investments in sanitation will be far less than investments in increasing water supply coverage or maintaining existing water supply systems.

The investments required for WS&S services are large. According to the PAHO Regional Plan for Investments in Environment and Health (PIAS) (PAHO, 1995), the LAC region would require over U.S. $10 billion annually for the period 1993 to 2004 to meet infrastructure needs. The American Water Water Association (AWWA) and the Water Environment Federation (WEF) estimate an average annual investment of U.S. $33 billion over the next 20 years for both water supply and sanitation is needed. Sector specialists regard the PIAS estimate as accurate but not likely to be achieved by the LAC governments and the external support agencies. Trends suggest that the investments in sanitation will be far less than investments in increasing water supply coverage or maintaining existing water supply systems. Private-sector investment is increasing in water supply services (mostly in Argentina, Brazil, Chile and Colombia), but it is almost nonexistent in wastewater collection and

treatment outside of some capital cities. This relational trend will likely lead to the disposal of even more untreated wastewater into water bodies.

The major external support agencies providing WS&S infrastructure loan financing for the region are the World Bank and the Inter-American Development Bank. In addition, bilateral aid agencies also provide grant funding for WS&S infrastructure and hygiene promotion. Many of these funding agencies are working in small towns, mostly on water supply.

Chapter 2 — Current State of the Art in Sanitation and Wastewater Programming: Basic Principles and Trends

This chapter provides a summary of current thinking on basic principles and best practices for improving sanitation. While the chapter makes reference to small towns and Latin America throughout, it is primarily intended to remind the reader what has been learned in the past several years and to establish the foundation for the more specific small towns analysis in Chapters 3 and 4. The principles and best practices in this chapter reflect a worldwide consensus among the major actors in sanitation and wastewater management. Many of these principles are documented in *Vision 21: A Shared Vision for Hygiene, Sanitation, and Water Supply and a Framework for Action*— a report prepared by the WSSCC for the Second World Water Forum held in the Hague, the Netherlands. Much of the following discussion draws upon the current literature on sanitation.

The major aim of a sanitation program should be to contribute to improving the health and quality of life of the population as a whole – including and especially the more vulnerable, lower-income families.

Basic Sanitation Principles

Sanitation Is about Health — According to the WSSCC, millions of children die from diarrhea every year. Many of these deaths are preventable by adequate sanitation and related hygiene behavior change. The major aim of a sanitation program should be to contribute to improving the health and quality of life of the population as a whole—including and especially the more vulnerable, lower-income families.

Properly Designed Sanitation Helps the Environment — The natural environment, especially surface and underground water resources, must be considered in all development activities, and appropriate protection must be applied. The provision of water supply services that have unacceptable impacts on the environment is not sustainable or adequate. Similarly, the provision of sanitation services should also avoid having unacceptable impacts on the environment.

The Root Causes of Inadequate Sanitation Are Insufficient Recurrent Revenues and Poor Management, Not Inappropriate Technologies — In the majority of cases where the provision of sanitation services has failed, the root causes have been poor management, lack of planning and failure to generate revenue sufficient to operate and maintain systems. Trying to solve the problem by introducing a new and "more appropriate" technology more often than not does not address the main constraints.

Summary of Basic Principles

- ***Sanitation is about health.***
- ***Properly designed sanitation helps the environment.***
- ***The root causes of inadequate sanitation are insufficient recurrent revenues and poor management, not inappropriate technologies.***
- ***Sanitation service provision is a local function.***
- ***Sanitation should be driven by informed household demand.***
- ***Users should pay for all recurrent costs, but sanitation interventions should be affordable by households.***
- ***Targeted subsidies may be appropriate.***
- ***Water supply, sanitation, and hygiene promotion must be seen as a coherent sector.***

Sanitation Service Provision Is a Local Function — The nature of sanitation makes it an inherently local function that requires the involvement of local government, the community as a whole and individual households. Central government does have a role, however, in regulation, setting standards, technical assistance and financing.

Sanitation Should Be Driven by Informed Household Demand — For sanitation interventions to be sustainable and successful in preventing diseases, households should explicitly demonstrate their demand for sanitation as a priority by expressing a willingness to pay for the recurrent costs involved in operating and maintaining a sanitation system. In many cases, it may be necessary to create demand by providing information about the need for and importance of sanitation and information about the options and related costs available. Worldwide experience has repeatedly shown that sanitation systems that are "supplied" inevitably end in failure.

Users Should Pay for All Recurrent Costs, but Sanitation Interventions Should Be Affordable by Households — For a sanitation system to be sustainable, the service provider must recover all O&M costs. For this to be feasible, any proposed sanitation system must have O&M costs that are within the ability of a household to pay. It is important that the recurrent costs for sanitation be recognized as distinct from the recurrent costs for water systems and that the related tariff of both together be affordable at the household level.

Targeted Subsidies May Be Appropriate — Given the high capital costs involved in the construction of basic infrastructure, governments and external donors may need to subsidize the initial capital costs for the minimum basic level of service for poorer households, as well as software costs, such as hygiene promotion and training. Governments and donors would need to prioritize even these targeted subsidies, given the insufficient amounts of subsidized capital funds available for sanitation. Governments and external donors and financial agencies should aim not to subsidize recurrent O&M costs, but cross subsidies between richer and poorer households may be appropriate and required.

Water Supply, Sanitation, and Hygiene Promotion Must Be Seen as a Coherent Sector — Sanitation improvement is not possible in isolation from other sectors, and special note should be taken of the relationships among water supply, sanitation and hygiene behavior change and their synergistic impact on health. Coordination is necessary among different departments and agencies and different levels of government. There is still much to be learned about how to provide incentives for this coordination to take place.

Institutional Trends

The role of public and private institutions in providing sustainable WS&S services is well understood for most of the conventional water supply and sanitation sector in large urban areas. This understanding is still developing for sanitation services that serve small towns.

Clarifying and Redefining National Institutional Roles — Increasingly, governments are considering the appropriate roles of national agencies and service delivery institutions as they reform their water and sanitation sectors. In Latin America, many countries see national agencies as having an important regulatory and planning role and are increasingly divesting them of direct service provision. This is a significant development, because national agencies have been the main service providers for the past thirty years. Service provision is becoming the responsibility of local governments and communities and, in some larger cities, the responsibility of the private sector under concessions or management contracts. For example, in 1998 the Nicaraguan government established the Nicaraguan Water Supply and Sewerage Company (Empresa Nicaragüense de Acueductos y Alcantarillados, or ENACAL) as a holding company whose eight

In Latin America, many countries see national agencies as having an important regulatory and planning role and are increasingly divesting them of direct service provision. … Service provision is becoming the responsibility of local governments and communities.

regions are constituted as autonomous companies with operational responsibility for service provision. The government also created a regulatory agency, the Nicaraguan Institute of Water Supply and Sewerage (Instituto Nicaragüense de Acueductos y Alcantarillados, or INAA) and transferred the planning function to the Ministry of Construction and Transport. In Honduras, the National Water and Sanitation Agency (Servicio Autónomo Nacional de Acueductos y Alcantarillados, or SANAA) has established six regions with substantial control over day-to-day operations. Municipalities also have the right to request full system ownership and responsibility for management.

In a decentralized system, the role of national-level institutions in sector planning, policy, and regulation is especially important. At the planning and policy level, national-level institutions must be responsible for assigning roles and responsibilities among institutions, setting goals, monitoring sector performance, providing financing for capital investments, targeting subsidies, determining technical standards, and providing technical assistance and training. At the regulatory level, national-level institutions have a role to play in determining the rules of the game for private operators, setting water quality and environmental standards, providing a fair and consistent framework for setting tariffs, and preventing monopolistic behavior. Few developing countries have put in place an effective regulatory structure that addresses these issues.

The long-range success of decentralized systems is inextricably linked to the decentralization of local government in general and the degree to which central governments are willing to give local governments the tools to work with, especially in the area of fiscal decentralization.

Roles and Responsibilities of Local Governments — In the past decade, many of these sector reform principles have become generally accepted, although not uniformly implemented in all countries. In particular, many countries have decentralized responsibility for a range of functions—including the delivery of services, such as WS&S and solid waste—to local government. However, despite assigning responsibility for such services, most national governments have not assigned the revenue-raising authority or agreed on an adequate formula for intergovernmental transfers necessary to fund the additional responsibility. For example, a central government agency may retain the authority to set WS&S tariffs, even though service provision is no longer a central government function, as is the case in Colombia. Local governments cannot provide improved services without the ability to raise resources. The long-range success of decentralized systems is inextricably linked to the decentralization of local government in general and the degree to which central governments are willing to give local governments the tools to work with, especially in the area of fiscal decentralization. Although it is an appropriate role for central government to protect consumers against unfair rate increases, local governments should be free to negotiate with their citizens for higher rates in exchange for improved services.

Small Town WS&S Management Models — Participants in the Electronic Conference on Water Supply and Sanitation in Small Towns in 2000 (Roche, 2000) discussed a number of

models for managing services. All but the first one can be implemented in a single town or multiple municipalities. The following is a summary of the models:

- *Direct municipal management.* The municipality provides services directly. The municipality may create a public works or water department. All staff are municipal employees. Finances often are merged with general revenues, although they could be separated from the municipal finances.

- *Autonomous municipal management.* The municipality sets up an autonomous company that is usually owned by the municipality. Typically, it is governed by a board of directors, consisting of citizens and municipal government officials. Employees work for the company, not for the municipality. Revenues are kept separate from the municipality's finances.

- *Cooperative management association.* Under this community-based model, an association (often called a water board) manages services. The association is made up of a general assembly of users that meets periodically, a board of directors and an operating entity. The cooperative is financially autonomous and administratively separate from the municipality.

- *Regional or national management.* This model is falling into disfavor, but it is still used in many countries. A national or regional utility plans, constructs and operates facilities. The utility is financially autonomous, but revenue is often pooled.

- *Management or concession contracts.* Either the national or the local government awards a contract to a private firm. In a *management contract*, the firm is responsible for O&M, but does not provide any investment capital. In a *concession contract*, the firm operates and maintains the facilities and provides capital investment, often in return for a longer contract.

All of these models are workable if they provide the financial and operational autonomy required to run a water supply and sanitation system.

All these models are workable if they provide the financial and operational autonomy required to run a water supply and sanitation system. The choice of a model is dependent on the political and legal context in a country. In some countries private sector models are supported by the public. In other countries public sector models are preferred.

Institutional Roles for Sanitation Services in Poor Communities — In most countries, there is an institutional void in the provision of sanitation services to the urban poor and rural communities. In the absence of clear institutional responsibility for these areas, sanitation becomes primarily a household matter, left entirely to the discretion of individual families.

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Insufficient attention is paid by institutions to quality and access to services when they are being provided at the household level. In some countries in Latin America, ministries of health are, at least on paper, responsible for household sanitation. But in practice, they do relatively little, except perhaps in rural areas.

Private Sector Roles — The past decade or so has seen an increase in the role of the private sector in service provision, especially in large urban areas. Although the best known examples have been in letting concession or management contracts for providing services in large cities, there have been a few examples of such contracts in small towns. Service contracts are the most common form of private-sector participation, but they are usually very limited in scope. Such contractors are typically very small and take on minimal commercial risk. In the past several years, donors, such as the World Bank, have made a careful distinction between the large private firms that contract to manage formal urban systems and small contractors that provide services in urban and, to a limited extent, rural areas. Although small contractors have generally focused more on water supply, they also can play a role in household sanitation improvements, such as latrines and septic tanks.

Institutional Coordination — It is now widely accepted that responsibility for service provision must be separated from sector planning and regulation. The various regulatory and planning functions at the national level typically are not carried out by a single institution. Environmental regulation is usually the purview of a country's ministry of environment. Water quality monitoring for drinking water and hygiene promotion is generally the responsibility of the ministry of health. If a national regulatory body exists, it usually is responsible for setting technical standards and for regulating prices and contracts. Financing may be the responsibility of any number of ministries, depending on the country. The key point is that several institutions should play a role at the national level, which makes the coordination of their actions all the more important. Although the importance of coordination is understood, it is rarely carried out effectively.

Financial Trends

As estimated by PAHO (2000), the required investments for meeting the basic sanitation infrastructure needs of Latin America are enormous (on the order of $U.S. 10 billion per year for both water supply and sanitation services). Unfortunately, the general trend in actual financing for sanitation has not come anywhere near the identified needs. Despite significant efforts to create market-driven credit financing mechanisms for municipal infrastructure over the past 20 years, it is difficult to find an example of a successful and functioning municipal credit mechanism. With the exceptions of loans to some of the larger cities in some of the more affluent countries (such as São Paulo, Brazil), relatively few funds have been invested in sanitation infrastructure in Latin America. In the poorer countries of the region, the general financing trend for sanitation has been through grants from external donors (such as USAID and UNICEF) or soft loans from multilateral banks (such as the World Bank and the Inter-American Development Bank [IDB]). These funds generally target sanitation infrastructure for the rural and urban poor,

and, as the PAHO data demonstrate, much of the investment in infrastructure has not been sustained: Expensive treatment plants have not been maintained and no longer function as designed; sewage pipes leak; and even many low-cost latrines stand abandoned or are used for purposes other than management of sewage and protection of families' health. Summarized below are current approaches being used in relationship to financing of sanitation infrastructure.

Private-Sector Investment — The private sector has always been involved in the water supply and sanitation sector in some form, from tendering for construction contracts in large urban supplies to the informal provision of vended water in unserved areas. Private-sector participation in both the formal and the informal sectors has seen an exponential increase, and this trend seems likely to continue. A relatively new role for the private sector in Latin America is as a source of capital for WS&S infrastructure. Three higher-income Latin American countries—Argentina, Brazil and Chile—have made successful efforts to bring private-sector investments into large cities. However, there are very few examples of private-sector investments to serve low-income and poor populations—even in the better-off countries—and even fewer examples for these populations in sanitation. One promising example is a private-sector concession to build, operate and manage condominial sewers for the urban poor in El Alto, Bolivia.

Demand-Driven Approaches and Willingness to Pay — In terms of approaches to financing sanitation systems, donors are also increasingly looking toward demand-driven approaches in which a menu of sanitation infrastructure options (with various levels of service and technologies) as well as clear associated costs (with transparent subsidies) are presented to the consumers, allowing consumers to choose which ones they are able and willing to pay for. Practitioners have noted, though, that the willingness or ability to pay for sanitation services is often low in most rural communities, whereas it may be higher in crowded urban areas, where privacy, dignity and status are important criteria. Although little is known about the willingness and ability to pay for sanitation services in small towns, it is likely that there is willingness to invest in private household improvements, but not necessarily willingness to cover full recurrent costs for off-site treatment and disposal. Because of the reluctance of donors and utilities to estimate the real costs of services over time for wastewater collection and treatment, there is inadequate information to establish the ability of small-town users to pay.

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Existing demand assessment techniques vary widely along a continuum of quantitative and qualitative research methods. Examples include economic techniques, such as contingent valuation methods, and qualitative techniques, such as participatory rapid appraisals and revealed preference surveys. A combination of these (or other approaches) may be appropriate. Factors affecting choice of a demand assessment technique include the scale of the sanitation project and the capacity of project designers and planners to carry out the assessment. The fundamental strategy of every demand assessment technique is for project planners to provide users with

sufficient information about the range of possible sanitation options and their implications in terms of benefits, initial and recurrent costs, and O&M requirements at the household and community levels.

Subsidies — Investments and operations in the sanitation sector have been heavily subsidized in most Latin American countries—in theory to keep prices low and make services affordable to all. A misaligned and improperly targeted subsidy policy has contributed to the current non-sustainability of utility companies, limited service coverage that excludes low-income populations and low quality of service throughout the region. An exception is Chile, a country that the World Bank identifies as the best example of effective subsidy design for water and sanitation, where there is virtually universal coverage for these services, but where a targeted subsidy (voucher scheme) ensures that all households can afford the basic consumption level (Kessides,1997). Most subsidies from central to local governments have applied to capital construction of facilities and have not closely targeted the groups who cannot afford to pay. In large cities, subsidies for capital construction generally accrue to those who use the service most—upper income groups, in most cases.

There is now considerable evidence that poor and low-income families are willing to pay for household sanitation services, even the more expensive options, as long as the services meet their specific needs.

Financing Household Sanitation — Ten years ago, there was a tendency to oversimplify the question of sanitation affordability by assuming that households would or would not be able to pay a certain amount without assessing which aspects of sanitation were most important to them. There is now considerable evidence that poor and low-income families are willing to pay for household sanitation services, even the more expensive options, as long as the services meet their specific needs. In this situation it is important to understand what elements of sanitation services are viewed as the most valuable to households. Clearly, services linked to removal of excreta from living areas are the first services that households are often willing to pay for. In many small towns, even poor households pay for such sanitation facilities as toilet pedestals, internal piping, latrines, external connections and septic tanks. Experience shows that the demand or willingness to pay for a sanitation service tends to decrease with its distance from the household.

Access to Credit for Households — In recent years, microcredit has emerged as a source of financing for household sanitation, most notably in Honduras, India, Bangladesh and Pakistan. The use of specialized microfinancial intermediaries to supply the credit needed to implement WS&S services seems to be a promising approach to improving service coverage in low-income urban, periurban and rural communities (Saywell, 1999). As in applying for credit for microenterprise schemes, borrowers must demonstrate debt capacity and creditworthiness. Varley (1995) notes that successful microcredit programs have a full range of sanitation options available, from pit latrines to full bathrooms with running water and storage. In addition, he notes that these are better supplied spontaneously by the private sector in response to the demand created by credit rather than under a project or program approach.

Paying for Operation and Maintenance Costs and Tariff Setting — The inability to recover recurring O&M costs for off-site systems is one of the primary causes of the lack of sustainability of sanitation systems. When some cost recovery is occurring, many municipalities fail to recover all system costs, such as depreciation and finance charges. (Typical operation and maintenance costs are listed below.) Also, overhead costs that are shared among different functions (for example, management time) are often not included, giving communities artificially low assessments of their costs.

Operation and Maintenance Costs
❑ ***Infrastructure:*** *repair of pipes, emptying septic tanks, unblocking sewers, labor, energy*
❑ ***Administration:*** *billing, labor, energy*
❑ ***Other costs:*** *depreciation, debt service, profit*
❑ ***Software costs****: health education, training, environmental awareness (will usually be subsidized)*

Tariff rates for water supply and sanitation can have important equity and environmental implications. In many areas, tariffs are set universally low to avoid the political repercussions of full-cost pricing, or the justification is that prices should be set so that the poorest family can pay the charges. Funds to cover the revenue shortfalls in these situations must come from general resources, or the needed O&M is not carried out. These situations result in effective subsidies for each liter of water consumed and each liter of wastewater discharged, ironically resulting in large subsidies going to large water users, such as industries and wealthy families. Artificially low prices also mask the economic cost of those services. For example, when the price of wastewater disposal is set lower than the cost, more wastewater is released into the environment than would be released if the price reflected the cost.

Financing "Software" Costs — More substantial resources for major capital investment in WS&S tend to be available from other donors and lending institutions, such as the World Bank. However, funds to finance the software costs are less often available for the various elements of such projects. USAID and other donors often finance "software" components of programs, which might include training, technical assistance, institutional development, hygiene education, community participation, complementary nutrition and health activities, and the development of national water and sanitation policies and plans. Donors are placing strong and increasing emphasis on the software and technical assistance componentsas part of a strategy to ensure the long-term viability of institutions and projects. However, more often than not, these software

components disappear with the termination of donor funding, because most central and local governments do not have other funding available or do not view software components as critical.

Technical Trends

Perhaps one of the most important trends over the past 10 years has been the increasing recognition that sanitation is about more than just *technology*. Technical innovations, especially those related to the sanitation infrastructure needs of the urban poor, have been significant contributions to the sector over the past decade. But among sector professionals, there is a growing recognition that improving a sanitation system takes much more than simply inventing and introducing a new and better technology. Professionals are also recognizing that the successful technical innovations have been achieved by engineers *in partnerships* with others, including social scientists and public health specialists.

The choices of sanitation technologies that are generally made in developing-country situations depend on whether the solution is on-site or off-site, how much water is available, and whether the facilities are household, shared, or communal.

Sanitation Technology Choice — Although a wide range of effective sanitation technologies exist, the engineering challenge is to work with the stakeholders to choose the technology that is most appropriate for a given community or segment of that community. Individuals should make the choice for household-level technologies, such as latrines or septic tanks. The choices of sanitation technologies that are generally made in developing-country situations depend on whether the solution is on-site or off-site, how much water is available and whether the facilities are household, shared or communal. Other factors influencing technology choice are the availability of space, funding, environmental concerns, ability to pay recurrent costs, cultural acceptability and capacity to manage the system. The range of potential sanitation choices for communities are listed on the next page.

Sustainability of Technologies — As suggested above, a sanitation "technology" is really made up of a train of technologies. There are choices of technology at each step—for collection at the

Range of Potential Sanitation Technologies	
On-site management of waste	❑ *Without water:* ventilated improved pit latrines ❑ *With water:* flush toilets with septic systems
Off-site collection of waste	❑ Latrines with septic tanks that are emptied and carted away ❑ Conventional wastewater systems ❑ Sewered interceptor tanks ❑ Simplified sewerage systems
Treatment of collected waste	❑ No treatment (by far the most common existing practice) ❑ Primary treatment (lagoons and oxidation ponds) ❑ Secondary and tertiary treatment (mechanical and biological treatment technologies) ❑ Treatment and reuse of wastewater for agricultural and other purposes

household level, disposal and collection at the community level and treatment at the town level. Collectively, they are key components of an overall sanitation system that must be sustained.

The following sustainability factors are important for each component:

- The technology must be understandable and within the technical capability of the people responsible for O&M.
- Spare parts and equipment must be easily obtainable, preferably in country.
- The technology must be affordable to operate and maintain.
- The level of service and the choice of technology provided must be attractive and culturally acceptable to the users.

Household-Level Technologies: On-Site Sanitation Systems — Given the inability to sustain off-site sanitation systems in Latin America, the WSSCC considers household level sanitation as the first option when designing a sanitation intervention (Bellagio, 2000). Experience has shown that such systems have very distinct advantages—not least that they are individual systems, which means that the disposal of fecal material is dispersed over a wide area rather than centralized.

In rural areas, the most appropriate and affordable technology for disposal of household excreta is generally provided by on-plot pit latrines, such as simple pits with precast slabs, which may be reinforced or domed; ventilated improved pit latrines; and pour-flush latrines. In urban areas including small towns, communities commonly encourage water supply and wastewater service providers to provide higher levels of service for water supply (especially household connections) that in turn lead to related higher levels of wastewater being generated. In such cases, pour-flush or cistern-flush latrines may be provided with on-site disposal if sewerage systems are not technically feasible or affordable. Household level sanitation may not be appropriate in some circumstances in small towns — for example, if there is no room available to construct a latrine with an on-site disposal system or if ground conditions are unsuitable for any kind of septic system.

Unfortunately, sewerage is very expensive, and the middle class as well as the urban poor usually cannot afford it.

Municipal-Level Technologies — When on-plot sanitation technologies cannot provide a solution, engineers consider alternative forms of sanitation. The trend in Latin America in nearly every case is toward sewerage. Unfortunately, sewerage is very expensive, and the middle class as well as the urban poor usually cannot afford it. As previously noted, the trend has been to subsidize sewerage—both construction and operation.

Work carried out in a number of countries (notably, Brazil and, on a smaller scale, Honduras and Bolivia) has shown that the cost of sewerage can be considerably reduced. The prime example of this has been the development of simplified sewer systems (known as condominial systems in Brazil) in which sewage collection pipes are designed to have a smaller diameter than in conventional sewerage systems and are installed in low-traffic areas. Past designs for sewerage systems have been based almost entirely on systems developed in North America and Europe. Engineers in many countries in Latin America are beginning to understand that many of the standards that were borrowed from developed countries are inappropriate for developing countries.

Treatment Technologies — Sewerage is a mechanical system for removing wastes (sewage) from the place where it is generated. Sewerage does not clean the wastes. At some point the wastes must leave the sewerage network either to be treated or to be discharged into the environment. The decision as to whether or not to treat the wastes is important because installing a sewage treatment plant may almost double the cost of the project. There can be no doubt that sewage treatment is preferable to discharge of untreated sewage into the environment. Treatment reduces the environmental damage done by polluted waters and removes a potential source of disease. The primary treatment option practiced in Latin America—especially in small cities—is

the waste stabilization pond. Experience with stabilization ponds has not been very positive because of lack of maintenance.

Increasingly, the trend worldwide is to view sewage as a resource to be used rather than a waste to be disposed. In Latin America, untreated sewage has often been reused for agricultural purposes through irrigation, particularly in relatively arid environments. It is recognized, though, that this practice carries significant health risks. A promising worldwide trend is the design of treatment processes that facilitate wastewater reuse in a wide range of industrial, agricultural and other applications. This trend is still largely at an experimental stage in Latin America.

The decision as to whether or not to treat the wastes is important, because installing a sewage treatment plant may almost double the cost of the project.

Social Trends

The priorities of donors and governments do not always coincide with those of the women and men in rural and urban communities, particularly the poor who are the users and consumers of the WS&S services. Before the 1980s, WS&S provision rarely involved consumers in decision-making and management. Donors and governments referred to recipients of WS&S projects as beneficiaries, and to the extent that they assessed felt needs, they did not do so on the basis of wide consultation and participatory methods. As a result, the services provided often did not reflect user preferences, were not maintained, and were used inappropriately or not at all, reducing potential benefits. This scenario was most frequent in relationship to sanitation projects or sanitation components of WS&S projects (even when the water supply component was successful). It is now accepted that donors and governments implementing these programs and projects need to consider households and communities as partners and that they need to be responsive to people's felt needs and genuine demand.

Household and Community Participation in the Sanitation Planning Process — Household and community participation ensures that the perspectives and knowledge of everyone affected by a sanitation program are taken into account in the development of any new program. It is important to recognize that, even within a community, consumers are usually not homogenous. They may be divided by religion, race or politics. It also is important to recognize that women and men may have very different priorities and views. A gender-sensitive approach takes the different responsibilities and needs of women and men into account in the design and management of projects. Participation of men and women in decision-making should occur in project planning, environmental assessment, monitoring, O&M and evaluation. Critical issues that require consumer involvement in decision-making include technology choice, level of service, costs and location of facilities (especially in regard to the sitting of wastewater treatment plants).

Participation in a small town offers greater involvement of consumers than in larger cities and requires more involvement of institutional stakeholders than in a rural community.

Participation in a Demand-Based Approach — Participation is critical in a demand-based approach. Assessing demand for sanitation before project preparation and design helps to achieve interventions that are socially acceptable. In a WS&S program, care must be taken not to assume that demand for water and a specific level of service translates into demand for sanitation and a related level of service. Sanitation demand assessment must be carried out parallel to (and in coordination with) water demand assessment.

Participation in Small Towns — Participation in a small town offers greater involvement of consumers than in larger cities and requires more involvement of institutional stakeholders than in a rural community. Municipal strengthening programs have developed approaches for citizen participation that are highly appropriate for use in small towns. These include public meetings, the use of town radio stations, focus groups and public information campaigns.

Environmental Trends

Communities have always used these environment, and particularly the water environment, as a disposal site for wastewaters. Water can dilute and disperse a high volume of pollutants, and the aquatic environment can treat some wastes. However, this capacity for self-treatment must not be exceeded. As communities grow and develop, the natural capacity for self-treatment will be limited. It is important that the environmental impact of sanitation (or lack of sanitation) be addressed at early stages of projects.

Household Versus Community Level — Any WS&S system needs to have a sustainable supply of clean water and a safe means of disposing of wastes. For WS&S projects in rural communities, local groundwater is the most widely used source of water, often replacing traditional surface water sources. Wastes are disposed of on the household plot (for example, in latrines), replacing the traditional use of nearby fields and streams. It is important to ensure that the latrines do not pollute the groundwater—especially if it is to be a drinking water source. (Nevertheless, the risk of groundwater pollution by on-site sanitation is generally low, and it should not prevent sensible low-cost sanitation projects.) For WS&S projects in urban areas, household water connections are more likely, with a resulting increase in water consumption and need for removing wastewater. Wastewater may be removed by drains and sewers connecting to major systems and discharged to surface water bodies with or without treatment. Using water to carry human waste through sewerage systems places heavy demands on water resources. The almost universal use of this waste disposal method in developed as well as developing countries urban areas does not mean that it should be an automatic choice in all situations, and it will rarely be a cost-effective solution for poor communities. Lack of treatment is a primary cause of river water pollution, but treatment systems may pollute the environment as well if they are not properly designed and maintained. In many situations in developing countries, sanitation systems may be based on off-site collection systems (sewerage typically), but without subsequent proper treatment or disposal of the collected wastes. The generally accepted estimate (PAHO, 2000) is that less than 2% (or 10–15% of the wastewater that is collected) of the domestic wastewater generated in Latin America is effectively treated before being discharged into the surrounding

water. This has resulted in serious degradation of water resources, which environmental programs must address. On-site sanitation systems (wet or dry) that are used and maintained can make a major contribution to pollution alleviation.

Incremental Protection and Improvement of the Environment — New WS&S programs should support improvements rather than worsen the environment. New sewerage and treatment systems should comply with effluent standards (if they exist) and should consider the impact on downstream users. If standards do not exist, assistance should be provided to regulatory agencies to set effluent discharge standards. However, standards should not be based solely on developed-country models (including donor-country standards), because conditions vary dramatically. Effluent standards should be based on real local problems, instituted incrementally (start small), realistic (affordable to achieve) and enforceable. An additional environmental issue is the disposal of greywater that accompanies an increased supply of water. Finding safe means of disposal including reuse of greywater should be part of any environmental protection component.

Effluent standards should be based on real local problems, instituted incrementally (start small), realistic (affordable to achieve), and enforceable.

Environmental Monitoring — If WS&S projects are to be sustainable, their environmental impact must be monitored. There is a need to measure and monitor; only then can problems be identified and preventive or remedial action be taken.

Health Trends

Health is one of the most important reasons for investing in sanitation. More to the point, investing in water supply projects (by increasing coverage, the level of service, or the quality of the water) does not improve health conditions if sanitation and related hygiene behavior change are not also addressed. Improving water supply service in small towns without addressing sanitation and hygiene behavior could create hazardous health conditions and contribute to polluting the environment. This has been particularly true in water supply projects that provide household-level water connections and significantly increase water consumption, resulting in sewage overflows in households, plots and communities.

Health Benefits from Sanitation — Water affects health in the developing world mainly by helping or hindering the transmission of communicable diseases, such as diarrhea, scabies, schistosomiasis and malaria. Diarrheal diseases include cholera and other illnesses that are spread by consumption of fecally contaminated matter containing the organisms that cause these diseases. The main health benefits of WS&S projects lie in the reduction of fecal-oral diseases, especially diarrhea. The WSSCC (2000) estimates that every year, diarrhea kills over 3 million people, the overwhelming majority of whom are children. The toll is not just in mortality, but also in heavy morbidity (sickness). Sanitation, with good hygiene practices, acts as a

fundamental primary barrier to transmission of diarrhea by ensuring that fecal matter is disposed of safely and that it does not spread in the environment.

Hygiene Behaviors — Even after substantial investments have been made in WS&S hardware, related hygiene behaviors often remain substantial threats to health. In many cultures, for example, the excreta of young children are considered safe and thus are not treated with the same hygienic concern as the excreta of adults. In fact, because children are the main victims of fecal-oral infections diseases, they constitute the main reservoir of infection. The feces of children are therefore more infectious than those of adults, because they are more likely to contain the disease-causing organisms. The practice of washing hands with soap after defecation is another example of a behavior that does not follow automatically from the provision of sanitation hardware, but that has major health implications.

Involving Health Professionals from the Beginning — A common difficulty in any multidisciplinary activity is the temptation for members of one discipline to involve the other disciplines only in the later stages of the work. In many sanitation projects the engineers take the lead and dominate the initial planning and design process. This can be particularly troublesome when activities with a substantial lead time (such as the baseline data collection about hygiene behaviors and training of hygiene promoters) are invited into the project only in the later stages, when fundamental decisions about the level of service and the types of intervention have already been made. If health benefits are likely to be a major justification of a project, it is critical that competent public health specialists be involved from the outset to assess the scope and plausibility of these health benefits. These specialists can then contribute to the development of relatively low-cost project activities that can ensure that health benefits are maximized.

Maximizing Health Benefits at the Household Level — Changes to centralized sanitation infrastructure are unlikely to improve health unless they reduce contamination at the household level. People are more likely to be at risk from contamination when it is present in places where they spend the most time. Investing in wastewater treatment plants for example, will not significantly reduce health risks if household sanitation coverage levels within the community are low. ✠

Chapter 3 — Constraints to Improving Sanitation in Small Towns in Latin America and the Caribbean

This chapter addresses the following question: Why do so few small towns have sustainable sanitation systems? Small towns in Latin America offer a context that is very different from formal urban areas, periurban communities and rural areas. These differences arise in part because of the tight linkage to municipal decentralization, an issue that is much less important in rural and urban areas. They also arise because of the unique characteristics of small towns as compared with rural areas: economies of scale, more administrative capacity and more economic activity. However, compared with larger urban areas, small towns typically have fewer financial, institutional and human resources.

Policy Constraints

Several policy issues create constraints for improving sanitation services in small towns. These issues extend beyond the WS&S sector to include local government, environment, and health. Small towns are units of local government and are therefore subject to the overall policies that determine the functions for which local governments are responsible and the financial resources that are at their disposal. No discussion of sanitation in small towns is complete without an understanding of the local government context and the specific policies that affect the delivery of municipal services.

National Policies Regarding the Assignment of Functions and Responsibilities to Local Government Are Unclear — One of the key overarching issues affecting local government in general is the assignment of functions and responsibilities to local government. In any policy discussion of municipal decentralization, one of the key points is whether municipal services, such as WS&S, should be assigned to local government. In many countries around the world, municipal services are considered inherently local services and are therefore assigned to local government, with the expectation that placing authority and responsibility in the hands of locally elected officials will result in decisions that closely match the preferences of citizens. However, in some countries in Latin America, the central government does not necessarily accept the premise that local governments in small towns can provide improved services, and it therefore retains the authority to make decisions on how to provide services. The role of local government

in service provision cannot proceed independently from the national-level discussion of the role of local government in general.

	Summary of Constraints
Policies	❑ *National policies regarding the assignment of functions and responsibilities to local government are unclear.* ❑ *The assignment of roles and responsibilities at the national level does not include the full range of national government stakeholders.* ❑ *Most countries in Latin America lack an effective legal and regulatory framework.* ❑ *Local governments have limited ability to raise their own revenues.* ❑ *Policies regarding subsidies are poorly designed.*
Institutional	❑ *National-level agencies cannot effectively provide sanitation in small towns.* ❑ *There is generally very limited understanding of which management models are most effective for providing sanitation services.* ❑ *Most small towns do not currently have the capacity to manage even simple wastewater collection and treatment system.* ❑ *The experience of the private sector in providing sanitation services in small towns is limited.*
Financial	❑ *Households in small towns are not willing or able to pay for the additional recurrent and capital costs involved in treating wastewater.* ❑ *Off-site sanitation systems remain dependent on donor or central government grants.* ❑ *Small towns generally lack access to credit.* ❑ *Small towns do not benefit from the same economies of scale as urban areas.* ❑ *The private sector is not likely to play a major role in financing capital investment in sanitation in the foreseeable future in small towns.*
Technical	❑ *There is a powerful technical bias among engineers to choose off-site sewerage systems to collect and dispose of wastewater, despite the poor O&M history of such systems.* ❑ *Existing technical, environmental, and health norms and standards favor technical solutions that small towns typically cannot afford.*

	Summary of Constraints (continued)
Participation	❑ *The involvement of consumers and communities in decision-making is not widely accepted by national governments as important to the success of sanitation programs.* ❑ *The involvement of institutional stakeholders requires approaches different from those appropriate with individual households.* ❑ *Most small towns lack the capacity in participation and promotion.*
Environment	❑ *The capital required for wastewater treatment for environmental protection competes with the capital required to extend sanitation services to an entire small town.*
Health	❑ *Hygiene behavior change is generally a low priority.* ❑ *The service provider is likely unable to plan and implement health activities, including hygiene behavior change.*

The Assignment of Roles and Responsibilities at the National Level Does Not Include the Full Range of National Government Stakeholders — Sanitation programs cannot be the responsibility of a single ministry or national agency. In addition to national water agencies, the ministries of environment, health, and local government must also be involved. To date, central governments have not clearly identified the national agencies that should be involved in sanitation and have not clearly defined their respective roles and responsibilities. Involving the full range of national agencies will require more effective coordination, which typically does not occur.

Most Countries in Latin America Lack an Effective Legal and Regulatory Framework — When authority is devolved to local governments to provide services, it is often not accompanied by an adequate regulatory framework for such issues as tariffs, environment and water resources, water quality, technical norms and standards and contracts. In Latin America, only Chile is considered to have established an effective regulatory framework for WS&S services. Countries have not agreed on what to regulate, at what level of government to place the regulator and how to pay for it. As a result, the rules of the game are not clearly defined, and small towns find it difficult to proceed. In El Salvador, the national government has tried several times over the past

ten years to create an effective legal and regulatory framework. The most recent attempt took place in 2000, but as with past attempts, it stalled.

Local Governments Have Limited Ability to Raise Their Own Revenues — Local governments commonly do not have adequate authority to raise their own revenues. Local taxing authority is inadequate, they cannot determine their own user fees, and their share of national tax revenues through intergovernmental transfers is insufficient. The result is that local governments depend on grants for WS&S infrastructure and cannot be assured they can charge tariffs that recover, at a minimum, all recurrent costs. Tariffs are often set at the national level without regard to local needs and preferences.

For the foreseeable future in Latin America, governments will need to subsidize sanitation in small towns.

Policies Regarding Subsidies Are Poorly Designed — For the foreseeable future in Latin America, governments will need to subsidize sanitation in small towns. In those towns with wastewater collection and treatment, subsidies will be required for capital costs as well as through tariff policy. For those municipalities emphasizing household-centered sanitation, subsidies will be necessary for program costs, including management, promotion and hygiene behavior change. Some of the costs for sanitation can be cross-subsidized from water supply revenues. In small towns, typically there are not enough individual families with sufficient wealth to make cross-subsidies feasible.

Institutional Constraints

National-level Agencies Cannot Effectively Provide Sanitation in Small Towns — As discussed in Chapter 2, many countries in Latin America now realize that national service providers are ineffective in providing services to small towns, and they are grappling with ways to reform the sector. These reform efforts fall along two broad lines. The first places responsibility for provision of WS&S services in local government. The second promotes the increased use of the private sector through contracts with a central government agency, often to the exclusion of local government. These two approaches need not be mutually exclusive. Responsibility for services can devolve to local government, which can in turn award a management or concession contract to a private provider. The fundamental issue is to determine whether the private firm is responsible to a national regulatory agency or to local government.

There Is Generally Very Limited Understanding of Which Management Models Are Most Effective for Providing Sanitation Services — Regardless of which management model is selected, the operating entity must have operational autonomy, adequate financial resources and the necessary technical capacity. In addition, water supply and sanitation services should be provided by the same organizations. This allows for better coordination, economies of scale and operational efficiencies. Chapter 2 describes five management models, three of which are purely local government in nature. As yet, there is very little understanding of how effective these models are for sanitation. Wastewater services are more costly to provide and more complex to

maintain than water supply. On-site sanitation requires the skills to work in full partnership with the community and take into account the social and cultural context. In most of the successful examples of local management, the focus is on water supply. In theory, these models can serve for sanitation as well, but the track record does not exist to demonstrate it.

Most Small Towns Do Not Currently Have the Capacity to Manage Even Simple Wastewater Collection and Treatment Systems — Even simple, low-cost, low-technology wastewater treatment systems require some technical skills for O&M of the physical facilities, as well as the financial resources to support them. Most systems in Latin America have failed because of lack of adequate O&M. Small towns generally lack the institutional, financial and technical capacity needed to manage a wastewater collection and treatment system. Understanding of what is required to provide services on a sustainable basis is limited. The systems and procedures are not in place, and the human resources are not available. The development of this capacity will require technical assistance and training.

Most systems in Latin America have failed because of lack of adequate O&M. Small towns generally lack the institutional, financial, and technical capacity needed to manage a wastewater collection and treatment system.

The Experience of the Private Sector in Providing Sanitation Services in Small Towns Is Limited — As yet, the private sector has very limited experience in providing services in small towns. Private sector participation is most appropriate in places where urban management is strongest and can negotiate contracts, monitor performance, enforce payment and regulate the provision of services. To the extent that there are some examples, most are for water supply, and not sanitation, and most are in the more developed countries in the region. Private firms recognize that water supply services are more likely to be financially sustainable than is sanitation, and, as a result, they do not seek to include sanitation in their contracts. For the foreseeable future, responsibility for sanitation is likely to fall to local government. That does not mean that the possibility of private-sector participation in providing sanitation services should not be explored, however.

Financial Constraints

Households in Small Towns Are Not Willing or Able to Pay for the Additional Recurrent and Capital Costs Involved in Treating Wastewater — To date, there is little evidence that small-town residents are willing and able to pay for the treatment of wastewater. None of the "successful" small-town WS&S case studies produced by EHP or others has indicated that households are willing or able to pay or that they are actually paying for wastewater treatment. Even a low-cost, low-O&M wastewater treatment system is not sustainable if users are not paying recurrent costs. The lack of willingness by households to pay additional tariffs for wastewater treatment can be attributed to a perception that environmental protection of receiving waters is a public good that should be paid by public funds and not by private households.

Off-site Sanitation Systems Remain Dependent on Donor or Central Government Grants — All the financing challenges facing the sanitation sector seem to be amplified severalfold in the case of small towns. The limited tax base of small towns reduces their infrastructure financing options, because small towns tend to generate fewer discretionary funds and to have less reliable cash flow to cover debt service for financing sanitation systems as compared with large municipalities, which may have their own tax-generated funds or access to funding through the capital markets. Therefore, small towns are heavily dependent upon donor and central government grants to finance the up-front costs of wastewater collection and treatment facilities. Small towns in many countries in Latin America are receiving lump-sum distributions from the national government (including distributions from social investment funds) for general infrastructure needs. After construction, many communities manage to keep their systems running to some extent for a while, but almost none has the resources to undertake major repairs, equipment replacement or service expansion. Experience indicates that the majority of small towns cannot afford the O&M costs of wastewater collection and treatment systems, because user fees and other revenues are set too low to cover these costs.

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Small Towns Generally Lack Access to Credit — If subsidies do not exist or are insufficient, small towns need to access credit for capital costs. However, small towns often have difficulty achieving creditworthiness to access credit, even if credit is available. Many organizations have attempted to address the issue of credit, but the track record of making small towns creditworthy is very weak. For household sanitation improvement, microcredit is a promising source of funding. In contrast to the credit experience with small towns, there is now a growing body of successful experiences worldwide at providing credit to households for a variety of home improvements including household level sanitation services (Varley, 1997).

Small Towns Do Not Benefit from Economies of Scale — Wastewater services are more costly to provide and more complex to maintain than is water provision, placing an additional burden on the limited resources available to small towns. Small towns cannot benefit from economies of scale, because the costs of building and maintaining sanitation facilities are distributed over a small population base, resulting in a higher cost per capita than in urban areas. The lack of professional staff with experience in rate setting and billings and collection systems is typical for most small towns, making it unlikely that system revenues are optimized. There also may be more reluctance on the part of small-town political leaders to impose and enforce taxes on their neighbors, further contributing to low cost recovery rates in small towns.

The Private Sector Is Not Likely to Play a Major Role in Financing Capital Investment in Sanitation in the Foreseeable Future in Small Towns — There is no documentation indicating that efforts to use private-sector capital to finance sanitation projects have been successful in small towns. The private sector is only interested in investing where there is a reasonable chance

of a reasonable return. In the absence of a regulatory framework, more favorable financial conditions (such as the ability of consumers to pay the real costs), and effective demand, it is not likely that the private sector will invest in sanitation in small towns in the near future.

Technical Constraints

As discussed throughout this section, inappropriate "technology" is not the principal reason why sanitation projects have been so problematic throughout the developing world, including Latin America. There is a wide range of technical options for both collection and treatment. Becoming knowledgeable about the options and making careful choices should, in most cases, provide successful components of an overall sanitation program. Nevertheless, a few technical constraints exist:

There Is a Powerful Technical Bias or Preference among Engineers, Urban Service Providers, and Donors to Choose Off-site Sewerage Systems to Collect and Dispose of Wastewater, Despite the Poor O&M History of Such Systems — Unlike traditional rural water supply projects, which tend to provide water at the community level, small-town water projects tend to provide a higher level of service by providing water at the household level. Most studies find that compared with community-level provision of water, household-level water connections result in higher levels of water use for consumption and washing. Field experience suggests that when household connections are provided, small-town households eventually prefer to build some type of flush toilet, which in turn leads to even higher rates of water use. As water consumption per capita increases, sanitation becomes increasingly water based.

Most engineers and small-town service providers see sewage systems as the appropriate, or even the only, technical solution in areas with high water consumption rates and population densities. This bias toward a specific type of solution is pervasive, despite practitioners' widespread recognition that sewage systems, more often than not, require initial capital costs that towns cannot afford and that tariffs are insufficient to recover costs, resulting in systems that are not properly operated and maintained. Even attempts to make that technology less costly and more affordable, such as the Brazilian simplified sewer programs, have met with limited success. (Imparato 2000). Therefore, the constraint is not that the technology for wastewater collection does not work or that it is inherently too expensive, but rather that engineers and program planners appear to be locked into this technical approach to solving the problem even when it may not be financially feasible.

… the constraint is not that the technology for wastewater collection does not work or that it is inherently too expensive, but rather that engineers and program planners appear to be locked into this technical approach to solving the problem even when it may not be financially feasible.

Existing Technical, Environmental, and Health Norms and Standards Favor Technical Solutions that Small Towns Typically Cannot Afford — Most of the countries in the region have existing national-level technical standards and norms that are often based on models

adopted in more developed countries (such as the U.S. Environmental Protection Agency standards) or WHO guidelines. In the Panama field test, for example, EHP found that national norms and standards require wastewater collection and treatment and that even septic tanks are technically not permissible. It is almost always the case that meeting national guidelines in small towns requires technologies that are not financially feasible and affordable, especially when national subsidies are not available to help meet these national standards.

Constraints to Participation and Promotion

The Involvement of Consumers and Communities in Decision-making Is Not Widely Accepted as Important to the Success of Sanitation Programs — As discussed in Chapter 2, lessons learned over the past ten years suggest that decisions on such matters as technology, level of service, cost, and location of facilities should be informed by consultation with consumers. Without consumers' willingness to pay for services, any sanitation program will not succeed, and willingness to pay cannot be determined without a focused effort to consult with users. Such consultation with consumers is common in rural areas, where communities are often under 1,000 in population, but it is less understood in small towns, especially where the population reaches 10,000 or more. Clearly the involvement of consumers becomes a different task in a larger community. Not only is the population larger, but consultation with economic interests and other institutional stakeholders may also be necessary.

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The Involvement of Institutional Stakeholders Requires Approaches Different from Those Appropriate with Individual Households — Some businesses generate waste that must be included as part of the sanitation program, especially if wastewater is discharged into a collection system. Other institutional stakeholders, such as schools and government offices, also must be consulted, because they also are sources of excreta. The techniques for consulting with these stakeholders generally involve the organization of individual and group meetings as well as the dissemination of written information.

Most Small Towns Lack the Capacity in Participation and Promotion — In small towns, it is difficult to find the skills necessary for organizing meetings, running them in a participatory manner, using the information to design a sanitation program and informing stakeholders.

Constraints to Meeting Environmental Objectives

The Capital Required for Wastewater Treatment for Environmental Protection Competes with the Capital Required to Extend Sanitation Services to an Entire Small Town — A major driving force for wastewater treatment is environmental protection. Household sanitation and, to some degree, wastewater collection are public health interventions. Compared with household sanitation and collection of sewage, wastewater treatment is relatively expensive. The

most prominent constraint to wastewater treatment in Latin America has been the lack of an explicit decision by national and local governments that the priority for investments should go first to addressing sanitation at the household and community levels. Given that wastewater treatment will likely necessitate subsidies, how does one balance the distribution of subsidies to address environmental protection needs with the distribution of subsidies to address public health needs at the household level?

Constraints to Meeting Health Objectives

Chapter 2 discusses the well-established connection between sanitation and health, the fact that sanitation infrastructure alone cannot improve health, and the need for specific efforts to reduce contamination at the household level. Although these points are commonly accepted as best practices, it is rare for sanitation programs in small towns to focus on health.

Hygiene Behavior Change Is Generally a Low Priority — In most small towns, sanitation improvement efforts focus on providing facilities and rarely on hygiene improvement activities. Even in those small towns that are trying to implement sustainable sanitation systems, they almost never include a hygiene behavior change component. To the extent sustainability is the goal, the focus is on developing institutional capacity and generating the financial resources to operate and maintain the facilities.

In most small towns, sanitation improvement efforts focus on providing facilities and rarely on hygiene improvement activities.

The Service Provider Is Likely Unable to Plan and Implement Health Activities, including Hygiene Behavior Change — A local service provider inevitably focuses on O&M of facilities and on billings and collections, and rarely on the health impact of those facilities. Given the difficulties in providing effective and sustainable O&M, it should not be surprising that local providers relegate health activities to lower importance. It may, in fact, be too much to ask of a local utility to organize hygiene behavior change activities. It is likely that the utility lacks not only the skills, but also the financial resources to pay for such activities. Adding the cost of a hygiene behavior change program to the tariff may not be acceptable to users. In addition, in many places in Latin America, public health organizations understand health education, but are not well versed in hygiene behavior change. The importance of identifying high-risk behaviors and developing programs focused on changing them is not widely understood and will require technical assistance and training.

Chapter 4 — Strategy for Improving Sanitation in Small Towns

Chapter 3 details a range of constraints to improving services in small towns in LAC. The main constraints are as follows:

- lack of resources for financial investment for wastewater collection and treatment
- lack of demand for sanitation, manifested by small-town residents' inability or unwillingness to pay tariffs to cover even recurrent costs for wastewater collection and treatment
- limited institutional capacity, including operations and maintenance, to provide townwide sanitation services
- bias among engineers toward more conventional wastewater collection and treatment
- inattention to hygiene behavior change as a component of improving sanitation.

… lack of feasible technologies is not a constraint.

A key overall conclusion from Chapter 3 is that the lack of feasible technologies is not a constraint. Small towns have a range of appropriate and generally well-known technical options.

Clearly, some of the strategies to address these constraints require a long-term perspective (developing a supportive national sanitation policy, for example, will surely be time-consuming). Addressing these constraints is complicated and requires consensus that does not often come easily. The field tests of the methodology indicated, however, that policy or sectoral constraints can have an impact on the success of an effort to improve sanitation in a single town. In addition, the replication of the methodology in other towns is very much dependent on adequately addressing the policy constraints.

This chapter presents the key principles and major elements of a strategy to improve sanitation services in small towns. The strategy comprises 10 sequential steps that take into account the current state of the art in sanitation as well as the constraints specific to small towns. The starting

point for the strategy is the small town itself and what would be necessary to develop a strategy for that specific town.

Some small towns have existing collection and (rarely) treatment systems, but have not maintained them. Some towns will have a partial collection system covering a small percentage of the population, allowing the rest of the public to take care of their own needs on an individual basis. Some towns have no formal sanitation systems at all. The varied starting point will have to be taken into account when implementing the strategy.

Key Principles for Improving Sanitation Services in Small Towns

Based on an analysis of the key constraints to improving sanitation in small towns, the following key principles are suggested. These principles provide the underpinning for the strategy that follows.

Summary of Key Principles for Improving Sanitation Services in Small Towns
❑ ***Focus on townwide solutions that expand coverage to as many residents as possible***
❑ ***Ensure that any plan to improve sanitation services is financially sustainable***
❑ ***Consult households to understand what sanitation solutions are in use and what expectations people have***
❑ ***Use a public consultation process with stakeholders to discuss the options***
❑ ***Include a specific health component to maximize health benefits***
❑ ***Select an appropriate model for managing the provision of sanitation services to ensure sustainability***
❑ ***Identify the key policy issues that must be addressed***

Focus on Townwide Solutions that Expand Coverage to as Many Residents as Possible — Virtually all small towns already have some form of sanitation for some part of the population. In most towns, existing solutions consist of on-site sanitation facilities — generally latrines or septic tanks. A few towns have collection systems for at least a portion of the population, but these systems usually do not include treatment. For both health and environmental reasons, townwide solutions should be encouraged. Evidence shows that health benefits will not accrue without significant sanitation coverage (Bateman et al., 1991, 1993, 1995). If some households in a neighborhood have appropriate sanitation facilities and some do not, ensuring safe disposal of fecal matter from those households that have such facilities does not provide an adequate barrier to transmission of diarrhea. Based on studies in Guatemala, five African countries, and Bangladesh, Bateman et al. (1991, 1993, 1995) determined that this percentage of households

with appropriate facilities ranges from 67–75%. The conclusion to be drawn is that a target of 67–75% coverage should be the objective in any sanitation plan.

Having a townwide mentality may mean that an on-site sanitation strategy is the preferred solution because the capital and recurrent costs associated with wastewater collection and treatment are so much greater. Although it is important to plan for a townwide solution, practical considerations may lead to an approach that sets up a timetable to provide sanitation services in manageable stages. However, this approach should not be confused with pilot projects that are designed from the beginning to serve only a small portion of the population. A townwide approach does not necessarily imply that one technical option will be appropriate everywhere in the town—rather, different options may be appropriate in different parts of town.

Ensure that Any Plan to Improve Sanitation Services Is Financially Sustainable — Recurrent costs should be covered, preferably through user fees. Without reasonable assurance that users are willing and able to pay most if not all recurrent costs, it is pointless to construct a wastewater collection and treatment system. Although local governments in theory have other ways of raising revenue through taxes and fees, in practice most central governments have not delegated adequate revenue raising authority to local governments. The consequence is that tariffs are the most likely source of paying recurrent costs. Recurrent costs must be accurately estimated, and there must be willingness and ability to pay them. In addition to recurrent costs, resources must be identified for capital investment. For the foreseeable future, capital investments will depend primarily on either donor or central government grants. To use subsidies equitably, the technology should be affordable on a townwide basis, and not just for a small percentage of the population. If an on-site approach is chosen, the availability of microcredit at the household level will become important for the initial costs.

Without reasonable assurance that users are willing and able to pay most if not all recurrent costs, it is pointless to construct a wastewater collection and treatment system.

Consult Households to Understand What Sanitation Solutions Are in Use and What Expectations People Have — A demand-based approach requires a solid understanding of household sanitation practices and expectations. Very early in the planning process, a focused effort is necessary to determine what these practices and expectations are. This stage corresponds to market or formative research, but it must be done efficiently so the process is not prohibitively time-consuming and expensive.

Use a Public Consultation Process with Stakeholders to Discuss the Options — The public consultation process is a critical element of demand creation. The involvement of stakeholders should begin at the earliest stages of decision-making. The technical options identified should be shared with stakeholders so that they can make an informed decision before proceeding with the development of detailed plans. This process should include a presentation of the options for technology, level of service, cost, location of facilities and health and environmental issues. Stakeholders should be aware of the problems caused by lack of attention to sanitation and the

benefits that would result from a focused effort to improve these services. Stakeholders include in addition to households, local associations, businesses, women's groups, church groups, schools and government offices.

Include a Specific Health Component to Maximize Health Benefits — To maximize health benefits, a specific hygiene promotion component should be developed. The hygiene promotion campaign should focus on changing high-risk behaviors to reduce the incidence of diarrheal disease. Careful thought should be given to assigning responsibility for the hygiene promotion component. The local utility could be responsible for hygiene promotion, but this is generally not realistic. Money from either the municipal budget or user fees would have to cover the costs and the local utility would need to develop the capacity to plan and implement hygiene behavior change activities. The alternative is for other health organizations to provide this service and for the local utility to coordinate its efforts closely with them. Alternatives could include the local office of the ministry of health or a nongovernmental organization concerned with health that works in the town.

The hygiene promotion campaign should focus on changing high-risk behaviors to reduce the incidence of diarrheal disease.

Select an Appropriate Model for Managing the Provision of Sanitation Services to Ensure Sustainability — Chapter 2 identifies a range of potential management models appropriate to small towns. These models include a department within the municipality, a public company, a management contract and an association of users. Whatever model is selected, it should be accountable to the local population—not housed in a national agency, far removed from the day-to-day reality. Generally speaking, the same local institution that is responsible for water supply should also be responsible for sanitation. This allows for some cross-subsidies as well as improved coordination between water supply and sanitation services. It is important to recognize that the skills necessary to manage a conventional system are very different from those necessary to manage an on-site sanitation system. An on-site sanitation approach requires having the skills to assess household demand (including willingness and ability to pay) for various levels of service; to promote a sanitation program throughout the town; to design and develop hygiene behavior change programs; to monitor environmental impacts; to provide technical support to private contractors and households; and to arrange for financing, whether it be based on microenterprise, access to credit or administering subsidies.

Identify the Key Policy Issues that Must Be Addressed — Not all policy issues must be addressed prior to development and implementation of a sanitation improvement project in a specific small town. Resolution of some issues—such as fiscal decentralization, intergovernmental transfers, reassignment of roles and responsibilities among government agencies and changes in the law to allow broader private-sector involvement in the provision of public services—may require time, but these issues need not be resolved for the project to move forward. However, replication and scale-up of successful sanitation programs to other small towns will require a supportive policy environment at the national level. There may be a few policy issues that, if not addressed, will make it impossible for a town to even get started. For

example, it may be unclear whether local government has the authority to provide sanitation services, as sanitation may not be one of the competencies delegated to local government. Technical standards may not allow for the use of lower-cost technologies. The full range of policy issues should be identified and then subdivided into those, if any, that must be addressed to move forward immediately and those that are part of a longer-term agenda.

Strategy

Presented below is a 10-step guide for developing a plan to improve sanitation services in a small town. Section II provides detailed guidance for implementing the strategy.

Summary of 10-Step Guide for Developing a Sanitation Plan	
1.	***Determination of local officials' interest***
2.	***Organization of an introductory public meeting***
3.	***Preliminary data collection***
4.	***Identification and costing of the range of feasible technical options***
5.	***Discussion of feasible technical options with municipal stakeholders and households***
6.	***Specific analysis of selected technical options***
7.	***Public consultation to discuss detailed options***
8.	***Option selection by the municipality***
9.	***Development of a sustainable sanitation plan***
10.	***Development of an action plan***

1. ***Determination of local officials' interest***. The first step is the interest of local officials in improving sanitation services in their town. The strategy seeks to improve services on a townwide basis in a financially sustainable manner, so the municipality must be a willing partner. Ensuring that the mayor and the local council are fully supportive is a critical first step. To make an informed decision whether to participate in the development of a plan, local officials must understand the key issues requiring consideration as well as the process in which they are about to engage. This understanding must include a realistic picture of the time it will take, the commitment of time that they must make, and a recognition that there are no easy solutions. They must also be committed to addressing the financial issues and accepting the health and environmental goals of improving sanitation services.

2. ***Organization of an introductory public meeting.*** Once the local officials have formally agreed to participate in the activity, the next step is to develop and implement a strategy to introduce the process to the municipality in general. The purpose of this step is to inform the public, gain public support for the activity and send the message that the plan will be developed in a way that takes everyone's perspective into account. The basic principles underlying the activity should be explained with a special focus on the importance of financial sustainability and that residents must be willing to pay for services. It should be made clear to the public that this meeting is a first step and that they will be consulted at other critical points along the way. The strategy should involve both a representative group of consumers and representatives from institutional stakeholders, such as schools, commercial enterprises, hospitals and government buildings. The strategy for introducing the activity to consumers should draw heavily on the techniques used for citizen participation in local government strengthening programs. These approaches include public meetings at the town and neighborhood levels and information campaigns. The larger the town, the more reliance there will be on information campaigns rather than face-to-face approaches.

3. ***Preliminary data collection.*** Many sanitation projects fail because the project designers take shortcuts and apply standard approaches and technologies without first taking into consideration the specific conditions of a given small town and household preferences. It is not uncommon for engineers to decide on the technology for a project even before visiting the site. Designing an effective and sustainable sanitation project for a small town requires a good understanding of the town's existing water supply systems as well as sanitation practices and systems and a preliminary determination of the demand for sanitation services. Information to be collected includes current sanitation systems, physical setting and technical, financial, health, social and environmental conditions. This will provide project designers, the municipality officials, community members and other stakeholders with insights to guide their initial thinking and decisions regarding the range of sanitation technologies and approaches that would be appropriate and sustainable for the town. This step should include a focused effort to consult a representative sample of households about the current technologies in use, what they like or do not like about their current sanitary solutions, ideas for improving their sanitation solutions, their receptivity to on-site solutions, their understanding of the connection between sanitation and health, hygiene practices such as whether their children use the bathroom and how much they are currently paying for sanitation services.

The assessment of options should include household-centered approaches as well as more conventional wastewater collection and treatment.

4. ***Identification and costing of the range of feasible technical options***. This step builds directly on the information collected in Step 3. The purpose of Step 4 is to identify the range of sanitation-related technologies that may be feasible and acceptable in order to present them to the community in

Step 5. Each option should include an estimate of the capital and recurrent costs as well as the possible sources of financing, and how this information translates into tariffs. Conditions may vary greatly. In some towns, for example, on-site sanitation may not be feasible because of the density of population. If household connections for water supply are provided, collection and disposal of wastewater must be addressed. The assessment of options should include household-centered approaches as well as more conventional wastewater collection and treatment. The examination of these options should be at the pre-feasibility level, which implies a preliminary analysis that will provide enough information to narrow the range of options for more detailed consideration. This step is critical in designing a sanitation project in that it provides information to the stakeholders so that they can participate in an informed manner in expressing their sanitation needs and priorities. Options to be presented to the stakeholders should be confined to those that are likely to be cost effective in reaching the maximum number of households in the town, provide the type and level of benefits that household expressed interest in, and are financially sustainable.

5. ***Discussion of feasible technical options with municipal stakeholders and households***. The purpose of this step is to present to the municipality the full range of feasible technical options developed in Step 4. These options should be shared with stakeholders so that an informed decision can be made before proceeding with the development of detailed plans. This presentation should include the technical options, level of service, cost implications, location of facilities and health and environmental issues. As in Step 2, stakeholders consulted should include representatives of institutions, such as schools, businesses and clinics, as well as households. The strategy for presenting the options should be adapted to the size of the town and the number of stakeholders to be consulted. The result of this step should be the selection of one or two options that will be developed in much greater detail by the consultant team. The selection should be based not only on broad equity terms in reaching the highest number of households, but also on the community's financial capacity, willingness to pay and health and environmental concerns.

6. ***Specific analysis of selected technical options***. In this step the consultant team, in conjunction with the municipality, develops one or two options selected by the community and households in more detail. In addition to expanding the details of the technical and financial analysis that began in Step 4, this analysis should include a specific proposal for managing the services, a specific plan for incorporating hygiene behavior change, identification of the policy issues that must be addressed to move forward and a preliminary assessment of the environmental impacts of the proposed plan.

7. ***Public consultation to discuss detailed options.*** After one or two options have been thoroughly developed, they should be presented to the stakeholders for their reaction. As in the preceding steps that included consultation with the community, these discussions should include both stakeholders from the municipality in general and from other

institutions. The specific strategy for holding these discussions will vary, depending on the number of stakeholders involved and the complexity of their interests. The purpose of the meeting is to elicit stakeholder reactions and to use that information in making a final decision.

8. ***Option selection by the municipality.*** The final decision is the municipality's, using its normal decision-making mechanism. In many countries, the mayor and local council, in some combination, decide. One of the benefits of placing the decision in the hands of local elected officials is that it reinforces the role of local government in general. Local government must consider the expressed wishes of the community when making decisions, and the approach suggested in this strategic paper allows for this consideration. Ultimately, however, the decision about sanitation should be made by those who have been elected for that purpose, with some assistance from the consultant team in order to consider fully the technical, financial, social, institutional, health and environmental issues. The step also includes the communication of the decision to the public. Adaptations may be needed if the methodology is used in a town that is not a formal municipality with elected local officials or where government is still centralized. A representative body of the community will still be required, however, and additional consultations will be needed with those who retain formal responsibility for investment decisions in sanitation.

… the decision about sanitation should be made by those who have been elected for that purpose, with some assistance from the consultant team in order to consider fully the technical, financial, social, institutional, health, and environmental issues.

9. ***Development of a sustainable sanitation plan.*** Once the local government has made the decision, the plan should be written. The consultant team may decide to write a draft of the plan prior to the decision-making process. If that is the case, the plan will have to be modified after the decision is made. Because the plan may serve as a document to obtain funding, the consultant team may want to take into account the requirements for accessing a given funding mechanism.

10. ***Development of an action plan.*** Since the outcome of the methodology is a plan, it is especially important to ensure that there is a specific follow-up plan. If the plan is developed within the context of a larger financing program, then the next steps will generally be clear. If, however, the plan was not developed without reasonably assured financing, then a follow-up plan is critical. Any follow-up plan should clearly identify the next steps, the persons responsible and the timing. A timeframe of six months to one year is realistic. Generally speaking, follow-up should be the responsibility of the municipality itself, possibly with some external assistance.

The strategy presented above is intended to place the responsibility for improving local sanitation firmly with local authorities rather than a central agency. The implication of this decentralized approach is that the financing of improved services is more closely tied to

municipal finance. The strategy places clear emphasis on the sustainability—both institutional and financial—of the system. Simply looking for affordable systems for wastewater collection and treatment, without regard for financial sustainability, is not a sound strategy. Given the current financial and institutional constraints in LAC, it is likely that the strategy outlined above will inevitably lead to greater consideration of on-site sanitation, perhaps in combination with off-site solutions. This strategy will not overcome all constraints, but it will provide a way to be realistic and avoid unsustainable options. Finally, the strategy relies on a public consultation process so that a system is not developed where there is no demand.

Application of the Strategy

The detailed methodology presented in Section II was field tested in three small towns in LAC. These field tests served to test out the overall strategy and the detailed step-by-step methodology. EHP analyzed the results of each field test to determine the lessons learned and the revisions that were needed. Each field test is summarized below.

Summary of Field Tests in Three Small Towns	
Macara, Ecuador	Wastewater generated by the 12,712 inhabitants of Macará in Loja Province in Southern Ecuador has become an international issue. Macará is a point of entry on the Peruvian border and has high hopes for international economic investment. Unfortunately, the town's antiquated sewer system floods downtown with sewage during heavy rains and empties, along with other contaminated water-courses, into the Rio Macará—the international border with Peru. Water in the river is used by downstream communities in both countries. Macará is the seat of the Municipality of Macará and is legally responsible for provision of basic public services, according to Ecuador's decentralized system. Despite Macará's local decision-making autonomy, and the internal and external demand for improved service, the consulting team of three provincial professionals had difficulty mobilizing local participation on the issue of sanitation. The team members had experience in working with local municipalities and NGOs but were challenged by implementing a participatory methodology and producing a planning document. In particular, the team lacked a seasoned participation specialist and was challenged by a municipality that was politically polarized. The town was in the middle of a separate comprehensive municipal planning activity being supported by a regional project to improve drinking water supplies. The town of Macará also has a history of complete paternalism with respect to provision of water and sanitation. Despite these obstacles, the team proposed a sanitation plan with centralized collection and secondary treatment in two plants using a locally-familiar artificial wetland (biofiltro) technology.

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La Cabima, Panama	La Cabima is a sprawling, densely populated town (14,270 people) in the hills north of Panama City. It lies within the powerfully administered Panama Canal Watershed, and like the rest of the country is administered through a complex, centralized arrangement of local government levels and national ministries and offices. No less than eight GOP entities are involved in sanitation project in the Panama Canal Watershed and the technical norms governing technological options are quite strict. La Cabima is built on hilly terrain with clay soils and is currently served by mostly-failed onsite septic tanks. The raw wastewater flowing through yards and roadways has stimulated demand for improved sanitation. La Cabima is called a "poor" community by outsiders and by local citizens as well. It was assumed that a sanitation project would only be possible here with close to 100% capital design and construction subsidy. Nevertheless, most families have cars, televisions and microwave ovens, and the sound of beeping cell phones is a constant background noise. Early assumptions about ability to pay for sanitation services were proven wrong by the three national-level consultants led by an experienced participatory planning expert, who produced a high-quality sanitation plan through a highly participatory process. At the final public meeting in La Cabima, the consultant team facilitated a cost/benefit discussion. The meeting ended with the residents accepting a plan for sewers and a central treatment plant and an average monthly household tariff of US$6 (split evenly between recurring and capital repayment costs). The 40 participants of this meeting formed a committee to follow up on the planning work and to seek financing to decrease the US$6 tariff. The committee also educates the general populace of La Cabima on the tangible benefits to health and well-being that would be provided by the proposal.
White Horses, Jamaica	The community of White Horses is actually composed of four distinct communities—White Horses, Botany Bay, Pamphret and Shady Spring—located in St Thomas Parrish 26 miles from Kingston. The four communities have a total population of approximately 2,500, which is less than the "official" population of approximately 5,000. In Jamaica, small towns do not have clear political structures and can be a group of nearby communities. As a result, White Horses does not have its own budget or source of revenues. The town will be one of the inaugural participants in the island-wide IDB-sponsored Rural Water Project. Most of White Horses is perched on a rock-hard limestone strata sloping steeply to a seaside cliff, precluding sewers and central treatment for most of the area. In principle, this promised to be an optimal situation for a field test—collaborate with the ongoing project, educate the towns on how sanitation needs change when water supply increases and access the project's capital funding for the sanitation system. However, piggybacking the sanitation planning activity onto the IDB-sponsored activity proved challenging. Because the project is administered through the Jamaican ministry responsible for water supply (but not for sanitation), the project essentially has focused only on water supply. The consultant team formed three different institutional groups—a consultative group made up donors and interested institutions, a collaborative group consisting of those institutions that would be involved in decision-making and a local group made up of local government and ministry representatives. The team recommended improvement of existing systems, or in the case of 50 houses without sanitation, construction of new on-site systems. The White Horses Sanitation Plan is somewhat open-ended, given that each household will have to decide on its preferred option.

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Section II: Methodology

Overview of the Methodology

Section II provides a detailed step-by-step methodology for improving sanitation services in small towns. This methodology builds logically from the basic sanitation principles and constraints facing small towns that were identified and discussed in Section I. This section consists of an overview on how to use the methodology, followed by a detailed description of each of the ten steps.

Small towns in Latin America offer a context that is very different from formal urban areas, peri-urban communities and rural areas. These differences arise because of the unique characteristics of small towns, especially as compared to rural areas—economies of scale, more administrative capacity and more economic activity. Moreover, compared to large urban areas, small towns typically have fewer financial, institutional and human resources. The main constraints can be summarized as follows:

- lack of resources for financial investment for wastewater collection and treatment
- lack of demand for sanitation manifested by a lack of affordability by small town residents and willingness to pay tariffs to cover even recurrent costs for wastewater collection and treatment
- limited institutional capacity including operations and maintenance to provide sanitation services on a townwide basis
- bias among engineers towards more conventional wastewater collection and treatment
- inattention to hygiene behavior change as a component of improving sanitation.

The methodology takes into account these constraints and is based on the following key principles:

- Focus on equitable solutions that expand coverage to as many residents as possible.
- Ensure that any plan to improve sanitation services is financially sustainable.
- Consult households to understand what sanitation solutions are currently being used and what expectations they have.
- Use a public consultation process with stakeholders to discuss the options.
- Include a specific health component to maximize health benefits.

- Minimize environmental impacts of sanitation programs.
- Select an appropriate model for managing the provision of sanitation services.
- Identify the key policy issues that must be addressed.

The ten-step methodology for improving sanitation services is presented sequentially, focusing on both the content and process of each step. The methodology offers a very specific planning approach and includes a variety of helpful logistical details, such as the kind of information that needs to be collected at each step. However, this is not a technical manual and therefore does not attempt to provide technical specifications or similar materials that might be needed to design services. Technical references are provided, but it is assumed that technicians and other specialists who use this manual will already have a solid grasp of their particular area of expertise.

In effect, this document is a guide; it is not a cookbook that provides all the answers. For example, the document does say what should be included in determining the tariffs needed to recover recurrent costs, but it does not provide detailed guidance on how to calculate tariffs. Similarly, it identifies the basic technological options, but it does not explain each one in detail. This document is about a process—a blueprint for how to approach the problem of improving sanitation services in a small town. Another important point: To use the methodology effectively, a consultant team must become familiar with the basic sanitation principles and approach that are discussed in detail in Section I and be in agreement with those principles.

Programmatic Context

This methodology is best used within the context of a larger program that provides adequate resources to develop and implement the plan, including financing for sanitation infrastructure. Using this methodology as part of a larger program has several advantages. First, criteria will be established for the selection of small towns. Second, a large program will provide a broader platform to address the contextual issues that will affect the development and implementation of plans for sustainable sanitation services. Some of the key contextual issues are discussed below. Third, a larger program can draw upon a pool of consultants and other experts effectively, allowing small towns the use of their planning skills. Finally, working within a larger program allows for ongoing learning to occur and improvements to be made in the methodology. While the methodology is best used in the context of a larger program, it is expected that it also will be used on an ad hoc basis or in a relatively small program covering only a few small towns. The methodology provides useful guidance within this context as well.

Five key contextual issues that will affect the application of the methodology are the following:

- ***Degree of decentralization.*** The methodology is designed with the municipality as the primary decision-maker and client. Yet in many countries in Latin America, the WS&S sector is still centralized with a national water and sewer agency

responsible for making investment decisions. The degree of local government decentralization also varies with the country.

- ***Sources of financing***. While lack of investment financing for sanitation is a general problem, sources do exist for municipalities in some countries. These may be Social Investment Funds, loan programs from the IDB or World Bank, national government grants or commercial banks. The ability to access such investment funds will directly affect the development of sanitation plans.

- ***Technical norms and standards***. Some countries in LAC continue to have technical norms and standards that call for unaffordable wastewater collection and treatment technologies. The extent to which towns can choose from a range of technical options will greatly affect the affordability of the technical option.

- ***Vertical versus horizontal planning***. Sanitation is only one of many municipal services. When sanitation is planned vertically or in the absence of plans for improving other services, it may not prove to be a priority for the town or it may not be adequately coordinated from a technical or management standpoint.

- ***Watershed management***. In some countries, the primary driver for improving sanitation will be watershed management. When this is the case, it may provide a focal point for discussions on technical norms and standards and for ensuring that investment resources are available.

The field tests summarized in Section I all indicated that these issues are likely to arise during the application of the methodology and should be carefully addressed in order for the plan to be successfully implemented. To the extent they can be resolved in advance of the development of the sanitation plan, chances for implementation of the plan will be increased. All of these issues are more difficult to address if the methodology is applied in a single town.

Uses of the Guidelines

This document is expected to be used in several ways. In all of these uses, the municipality is seen as the central client and decision-maker. If this methodology is applied in a country in which a national agency implements WS&S projects, the agency should encourage the central role of the municipality. The methodology is designed to produce sustainable sanitation services and the assumption is that local ownership of the project is a critical element in achieving sustainability. Local ownership places the municipality in the role of decision-maker, taking into account community and stakeholder needs through a public consultation process.

The uses of the document are the following:

- ***As a tool to develop specific municipal level projects when funding already exists —*** Organizations such as the Interamerican Development Bank, the World Bank, USAID

and UNICEF have projects that provide funding that can be used for sanitation. Sometimes these projects are designed specifically for improving water supply and sanitation, and sometimes they are used for a range of municipal services including but not limited to sanitation. Depending on the project guidelines, sanitation plans have to be developed to access these funds. These guidelines would be a useful tool to assist in developing the plans to access these resources.

- ***As a tool for developing a municipal level project without an already identified source of funding*** — Occasionally, municipalities are proactive about improving services and on their own initiative decide to develop a sanitation plan and then seek funding. The municipality might contract its own consultants (possibly with external funding) and use these guidelines as the basis for developing a plan.

- ***As an assessment tool for a sanitation project that is already underway*** — Although the document has not been developed as an assessment tool but as a planning tool, with some modification it could be used to assess or evaluate a project that is already underway.

- ***As an approach to develop a new project to provide funding*** — This document could easily be used in the project design process as the basis for developing a funding mechanism for improving sanitation in small towns. A project design team for an international or national level agency could use this as a starting point for a project methodology.

Users of the Guidelines

These guidelines are intended to be used by knowledgeable local professionals or consultants who work directly with small towns. Since the document is not a detailed technical manual, the consultants are expected to be reasonably experienced in their technical areas. These consultants could come, for example, from NGOs, private firms, a donor-funded project or be independent. They could also work for a national agency that provides technical assistance to small towns. The field tests indicated that consultants with the right skills are available, but they work primarily at the national level. Because of limited budgets and the sheer number of small towns, international consultants are not expected to be primary users of these guidelines.

The guidelines are written with the expectation that a consultant team representing several disciplines will use them. These areas of expertise include:

- engineering
- finance
- public participation specialist
- institutional development
- health
- environment

The field tests indicate that the three core skills needed to use this methodology are engineering, finance and public participation specialist. The general recommendation is for a three-person team with these three core skills. The experience of the field tests also indicates that a strong participation specialist is critical to the success of the team and that other team members are unlikely to have those skills. These three team members must also be able to cover the areas of institutional development and health. All of the consultants are expected to have strong skills in rapid appraisal—the ability to collect information in a short time, analyze it and draw conclusions. One of the team members should be designated as the team leader.

Providing Oversight

Consultant teams that are responsible for developing sanitation plans will require some oversight by the sponsoring organization. If the methodology is used within the context of a larger program, there will be an implementing organization—NGO, private sector firm or national agency—that can provide this oversight.

The key oversight tasks are the following:

- Identify the towns.
- Identify the consultant teams.
- Conduct a one -week planning session to prepare the consultant team.
- Meet periodically (at least weekly) with the team to review progress.
- Review all written products developed by the team, especially the sanitation plan itself.
- Check with key decision-makers in the town and on a national level to see how work is proceeding.
- Attend the introductory meeting with the municipal officials and the three public meetings.
- Review the follow-up plan after the plan is developed.
- Provide any necessary follow-up.

Key Preparation Tasks

Development of Criteria for Selection of the Small Towns — Explicit criteria for the selection of towns should be developed. While each program should develop its own criteria, ones to be considered include the following:

- interest on the part of local officials
- likelihood of investment financing
- perceived need for sanitation services by the community
- local political situation that will not subvert the planning process
- previous experience with the town that indicates it will be a good partner.

Preliminary Assessment of the Suitability of the Town — Before the consultant team can effectively begin working with the town, a preliminary assessment must be made to determine if the investment of time and effort to develop a sanitation plan is warranted. For example, is the town amenable to a participatory planning activity for sanitation? This preliminary assessment may be done by the consultant team, but it may be more appropriate if it is done by the donor or NGO that is sponsoring the planning activity. The result of this preliminary assessment will be a "go/no-go" decision.

In order to make a determination on whether to proceed, the following information is needed:

- ***Need for sanitation services* —** A drive or walk around the town and conversations with residents and local leaders should provide enough information to identify whether existing systems are adequate for current or future loading rates and if there is a need for better services.
- ***Governance and decision-making systems at the local and national level* —** The team should have a good understanding of the legal and regulatory framework within which sanitation planning, project implementation and system management will occur. Centralized decision-making systems can make the implementation of the planning methodology more difficult.
- ***Normative and regulatory situation* —** Regulations and norms controlling sanitation systems and wastewater treatment systems can preclude the use of affordable technologies.
- ***History of the town in implementing projects and managing infrastructure* —** The team should talk with a few knowledgeable individuals outside of town to assess how it would be to work with a particular town. What is the history of attracting investment and implementing projects? How has infrastructure been maintained?

In order to collect this information, the team should do the following:

- Visit the town and observe physical conditions, settling patterns and existing facilities. Speak informally with residents and local leaders about local development, development priorities and status of public service provision.

- Speak with outsiders who know the town. These can be government officials, NGO representatives or private citizens. The team should try to find out what the reputation of the town is as a functional partner.

- Become acquainted with the institutional framework that governs decision-making on sanitation planning as well as the normative and regulatory environment. Also, confirm that norms and regulations are actually enforced in the country.

The decision on whether to proceed should be captured in a memo. The memo should note key issues to be addressed if the planning moves forward. If the decision is not to proceed, then the conditions that should change before the town proceeds with planning should be noted. These might include the need to build a new water supply system, a change in elected officials or the completion of a competing activity.

Development of a Scope of Work for the Local Consultant Team — The next preparatory step is the development of a scope of work for the local consultant team. The scope of work should be written for the entire team. The scope should be based explicitly on the steps in the methodology and should include the deliverables that are outlined in this document A local consultant team should be recruited (qualifications of the local consultant team are discussed above).

Organization of a Planning Session for the Local Consultant Team — Once the scope of work is developed, the local consultant team should have an orientation/planning session prior to any fieldwork to ensure that the team is familiar with the content of these guidelines and is prepared to use them. This planning session would normally require one week and should be run by someone external to the team who is very experienced in the subject of sanitation in small towns.

The objectives for the planning session include the following:

- Present the methodology for improving sanitation in small towns.
- Ensure that the team has a firm understanding of the technical concepts in the methodology.
- Discuss the background and context for the specific sanitation plan that will be developed.
- Discuss the key outputs that result from each step, especially the sanitation plan that is the main deliverable.
- Develop a detailed work plan to review with the municipality.
- Develop a clear understanding for how the team will work together.
- Plan the initial meeting in Step 1 of the methodology.

Overview of the Methodology

A suggested agenda for a typical one-week planning session appears below. The timing is illustrative, depending on the qualifications of the local consultant team and the specific context for the plan. For example, a less-experienced team may require more time in reviewing the detailed steps and technical content in each area.

	Monday	*Tuesday*	*Wednesday*	*Thursday*	*Friday*
Morning	**Introduction** Objectives and schedule of planning session **Principles** Develop a common understanding of sustainable sanitation systems and key principles	**Review Steps 1-4 of the Method** Review each step in detail Use planning matrix to capture key outputs	**Review Steps 8-10 of the Method** Review each step in detail Use planning matrix to capture key outputs	**Outline** Develop outline (table of contents) for sanitation plan	**Step 1 Meeting** Plan for Step 1 meeting Develop a list of resources needed by team Review of all outputs of planning session
Afternoon	**Background** Context for the town, ncluding key institutions to be involved **Method Review** Revew 10 step methodologoy, including use of a planning matrix*	**Review Steps 5-7 of the Method** Review each step in detail Use planning matrix to capture key outputs	**Work Plan** Develop a detailed work plan for the consultant team including: ❑ Timeline ❑ Plan for informing the public ❑ Consultant team meetings	**Team Building** Build an interdisciplinary team: ❑ Expectations for working together ❑ Role of the team leader ❑ Plan for developing an integrated product	**Institutional Leaders** Meet with key institutional representatives to discuss plan Next steps and wrap-up

* A planning matrix is intended to assist the team in capturing key tasks and identify resource needs as it goes through each step. This matrix will greatly facilitate the development of a work plan later in the planning session. An example of a planning matrix appears on page 60.

One of the keys to successful use of the methodology is the degree to which the three-person consultant team can work in an interdisciplinary manner. This requires the following:

- Set clear expectations for working in an interdisciplinary manner.
- Explicitly identify the interdisciplinary aspects of the assignment.
- Develop a plan for integrating the work.
- Maintain a team commitment to an interdisciplinary approach.
- Develop integrated findings and recommendations.
- Use an integrative process (team meetings) to produce the sanitation plan.

An interdisciplinary team will function best when the team members understand the perspectives of the different disciplines represented by the team members and appreciate how each discipline is vital. Success will require a team effort. Good teamwork involves developing a common language system, having regular and frequent communication including team meetings and being led by a team leader who is committed to working in an interdisciplinary manner.

Person-days Required to Develop a Sanitation Plan in a Small Town

The typical level of effort (LOE) required for a three-person team to develop a sanitation plan for a small town is outlined on the next page. The number of person-days for each step is meant to be inclusive of all the substeps. An additional preparatory step is included in the table to allow time for the team to prepare for the activity. The total number of person-days should provide a useful yardstick for identifying the local consultant team and for budgeting purposes.

Typical Level of Effort for a Three-member Team

Step	*Engineer*	*Financial Specialist*	*Participation Specialist*
Team preparation	5 days	5 days	5 days
1. Determine interest of local officials	3 days	2 days	3 days
2. Organize community meeting	3 days	2 days	3 days
3. Preliminary data collection	5 days	4 days	5 days
4. Identify range of feasible technical option	3 days	2 days	3 days
5. Discussion of options with community	3 days	2 days	3 days
6. Detailed analysis of selected options	5 days	4 days	5 days
7. Meeting with stakeholders to present detailed analysis	3 days	2 days	3 days
8. Decision by municipality	3 days	2 days	3 days
9. Write sanitation plan	4 days	3 days	4 days
10. Develop action plan	3 days	2 days	3 days
TOTAL	40 days	30 days	40 days

Organization of the Steps

The remainder of Section II is devoted to the detailed steps of the methodology itself. Each step follows a consistent format that includes the following:

- **rationale** — explains the purpose of the step and why it is important
- **expected outcomes** — lists what should happen as a result of this step
- **key information needs** — information required for this step
- **key activities** — specific activities to be carried out by the consultant team
- **products** — actual written products to be produced by the consultant team
- **tools** — suggested tools that the team can adopt or adapt as appropriate.

The tools were developed as a result of the field tests described in Section I.

Overview Tool — Sample Planning Matrix

Part of the planning matrix used during the planning session for White Horses, Jamaica, appears on the next four pages. Such a matrix is intended to be prepared by the team and updated as the team works through each step in the methodology. The example given here only includes the tasks for the first four steps. In the example, the Construction Resource and Development Centre in Jamaica, one of the organizations involved, is identified as CRDC. Initials of individual team members are given in the final column, "Responsible/LOE."

Overview of the Methodology

	TASK	RESOURCES	COORDINATION	DUE DATES	PREPARATION NEEDED TO BEGIN TASK	LOCAL ISSUES	RESPONSIBLE/LOE
Steps 1, 2, 5, 7	Put together communication and meeting strategy for diverse group of players	Meeting room	Advisory institutions, collaborative institutions, CRDC	By 31 March			Team ½ day
Step 1	Prepare information packet for local authorities	CRDC, background activity documents,	CRDC	By 3 April			SH ½ day
Step 1	Form collaborative and advisory groups of institutions	Phone, e-mail, office supplies and equipment	CRDC, Community leaders, all potentially involved GOJ Institutions	By 31 March	Communication Strategy	Community may work well or poorly with different institutions	BB1/2 day
Step 1	Plan and organize meeting with local authorities	Phone, e-mail, office supplies and equipment, venue, projector, transparencies, transport	CRDC, collaborative group, community organizations	By 3 April	Information packet	Must identify geographic boundaries, form local tech group	HM 2 days, team ½ day

	(continued) Task	*Resources*	*Coordination*	*Due Dates*	*Preparation Needed*	*Local Issues*	*Responsible/LOE*
Step 1	MOU prepared and signed with local authorities	Office supplies and equipment	Local authorities, collaborative group	By 9 April			SH ½ day
Step 1	Develop materials for public meeting and information campaign	Office supplies and equipment, maps, background documents	CRDC, Collaborative and advisory groups, other NGOs	By 9 April	Results of needs assessments	First meeting will inform	HM 2 days, SH 1 day
Step 1	Plan and implement the Information Campaign	Phone, e-mail, office supplies and equipment, venue, transport	Local authorities, CRDC, local reps of collaborative group	Begin on 4 April		Enlist local authorities at Meeting #1 to help	HM 2 day
Step 2	Plan and implement the public meeting	Phone, e-mail, office supplies and equipment, venue, projector, transparencies, transport	CRDC, Collaborative and advisory groups, other NGOs	11 April	Define activity boundaries, materials ready	Form local technical group if not done	HM 3 day

	(continued) Task	*Resources*	*Coordination*	*Due Dates*	*Preparation Needed*	*Local Issues*	*Responsible/LOE*
Step 1	Collect secondary Information	Phone, e-mail, office supplies and equipment,	NEPA, NWC, STATIN, Geo Survey, MOH, others	Through 20 April	List of information needs		Team 1
Step 3	Prepare and implement field assessment	Transport, office supplies and equipment, camera,	Local businesses, local reps of collaborative group, local NGOs, institutions	Conduct 8-16 April	Needs assessment, step #2 outputs	Define local context in previous site visits and step #1 meeting	HM days, SH 2 days, BB 1 ½ days
Step 3	Prepare materials and implement informational workshops	PLA materials, phone, e-mail, office supplies and equipment, venue, projector, transparencies, transport	Local authorities, local institutions, NGOs	Conduct 16 — 20 April	Information from field assessment		HM 5 ½ days, SH 1 day
Step 3	Organize information	Office supplies and equipment,	CRDC	By 24 April	All information from assessment and workshops		Team 1

	(continued) Task	*Resources*	*Coordination*	*Due Dates*	*Preparation Needed*	*Local Issues*	*Responsible/LOE*
Step 4	Identify preliminary technical options	Office supplies and equipment, design manuals, national design norms	Local technical group, other technical resource people and organizations	22-28 April	All information from steps, #1, #2, #3	Local technical group	SH 3 day
Step 4	Describe management and O&M options, training plans	Office supplies and equipment, national norms	Technical resources, Peace Corps, collaborative and advisory groups	25-30 April	Tech options, All information from steps, #1, #2, #3		BB 2 days, SH 2 days
Step 4	Describe public hygiene promotion options	Office supplies and equipment, design manuals, national design norms	NGOs, CRDC, MOH	22 –30 April	Tech options, All information from steps, #1, #2, #3	Local public health NGOs, or inspectors	HM 1 day
Step 4	Do basic financial analysis — costs, sources of funds	Office supplies and equipment, national norms, financial data	Financial institutions, advisory group	26 — 30 April	Tech options, All information from steps, #1, #2, #3		BB 2 days, SH ½ day

Step 1 — Gain Agreement of Local Decision-makers

Rationale

The purpose of this step is to gain the agreement of local and, if needed, national officials to participate in the activity and to understand what that participation entails.

The methodology is designed to support decentralization and reinforce the role of local government in service provision. As a result, the primary clients for the development of a sanitation plan are elected local officials and not the central agency in the capital city. Local elected officials generally refer to the mayor and the local council—those entrusted with the responsibility to make investment decisions for the municipality. Nevertheless, many countries retain centralized planning and decision-making systems for infrastructure investments. Therefore, the decision-makers in these central government organizations must be identified and also treated as clients. The degree of involvement of central government officials will be specific to the country and can vary from highly active involvement to merely being kept informed.

Even in centralized systems, this methodology assumes that local officials are the starting point for discussions with the community. Regardless of whether the country uses a decentralized or centralized system, decisions should be made in consultation with local officials and the public.

Expected Outcomes
❑ ***agreement that improving sanitation services is a priority for the municipality***
❑ ***agreement on the degree of involvement by the local/national officials that will be required***
❑ ***clear understanding by the officials/decision-makers that the process will take two or three months***
❑ ***willingness by the town to assist the team in implementing the methodology including, for example, the organization of public meetings***
❑ ***commitment in principle to seek funding for the sanitation plan (unless funding is already assured)***
❑ ***agreement with the local/national decision-makers on the basic sanitation principles regarding sustainability, health benefits, equity, and environmental impacts.***

Key Information Needs

The following information should be gathered prior to the initial meeting with the local/national officials.

- Determine how many meetings will be needed and who should attend from the local and central levels.
- Collect any previous related reports on water supply and sanitation for the municipality.
- Identify key local and regional or central government officials with whom to meet.
- Obtain relevant information on the sanitation sector, including who in principle has responsibility for providing services.

Key Activities

1. Prepare concise written materials about the approach to developing a sanitation plan that can be given to local and national officials. These materials should include a summary of the basic sanitation principles and key steps to be undertaken. (An example of a summary of a project is given on the next page.)
2. Decide who should be part of the decision-making group and whether any central government participation is necessary.
3. Conduct one or more meetings with the local officials that include central decision-makers as necessary. These meetings should be well planned. If this is connected to a donor-funded project, a representative from the donor agency also may want to participate in the initial meeting. (A sample agenda for an introductory meeting is given on page 69).

Products

The agreement should be reflected in a memorandum of understanding between the town and the donor or agency that is funding the technical assistance (TA) team (see page 71 for an example). The memorandum should detail the timeline and the roles and responsibilities of the municipality and the TA team in the design and planning phase and clearly express the intention by the local/national to seek funding for the plan. Government decision-makers at higher levels may require separate MOUs. The team must ensure that all decision-makers are identified and that appropriate agreements reached with them before proceeding.

Important note: If the team feels that there is insufficient commitment from the officials regarding the sanitation problem or to engage in the process, then the team should not proceed

with the next steps. Similarly, if the team feels that the officials agree that sanitation is a need but are not committed to the process of planning for a sustainable sanitation plan, then the team should not proceed any further. ✠

Step 1 Tool — Summary of the Planning Activity

Inadequate sanitation creates major threats to environmental and human health throughout the region. Sanitation is defined as the safe collection, removal and disposal of human excreta and wastewater. The Pan American Health Organization reports that the proportion of the population in the Latin America and Caribbean region that has access to sanitation is 80% (49% connected to conventional sewerage and 31% served by on-site sanitation systems). Only 10–15% of all domestic wastewater that is collected receives any sort of treatment before being discharged. Most of the treatment plants do not function properly and do not meet water quality discharge standards.

The problem of inadequate sanitation is particularly acute in small towns, defined as those with populations from 5,000–30,000. To date, most of the attention in small towns has been on improving water supply with very limited attention to improving sanitation. With increased water supplies there is a corresponding increase in wastewater. This lack of attention to sanitation needs has been attributed to a number of factors—a lack of local access to capital financing, a lack of articulated local demand for sanitation services (especially wastewater treatment) and institutions that cannot plan, implement or manage sanitation systems. These constraints are particularly acute in small towns, which often cannot provide the economies of scale, administrative capacity, access to financial and human resources and institutional capacity that exist in large cities. In addition, the traditional approach to sanitation provision has focused almost exclusively on technological solutions without sufficient attention paid to the human systems that must sustain the infrastructure, the benefits of sanitation to human and environmental health and without the support and participation of the users of the sanitation system.

USAID has developed a planning methodology presented in a series of steps that are designed to mobilize local stakeholders and residents to understand, embrace and contribute to a comprehensive sanitation solution for the town. The final output of the methodology is a comprehensive project plan that address technical, financial, institutional, environmental and health concerns. The plan contains enough detail to allow a budget to be formulated that details required capital outlays, recurrent costs and tariff scenarios. The plan can be used by the town to move forward with a sanitation project that has a funding pipeline, to generate local involvement in an already ongoing sanitation project or to solicit funding for a sanitation project.

The plan is designed with the following principles in mind:

- equitable solutions that provide coverage to as many residents as possible
- financial sustainability
- public consultation
- explicit attention to hygiene to maximize health benefits
- attention to minimizing adverse environmental impacts
- sustainable management systems.

Step 1

The planning activity is conducted by a team of three consultants over a two-to-three month period. The team will work closely with local government officials, ministry representatives and international donor and financing entities to produce the plan. The planning methodology consists of ten steps:

Gain Agreement of Local Decision-makers — This activity must result in an MOU between the team and the local government representatives. The activity also must produce a relationship between all appropriate decision-makers who will ultimately be involved in this sanitation project—from government ministries and other local government levels.

Introducing the Sanitation Planning Activity to the Public and Measuring Public Support — This is done primarily through public meetings but could also include an information campaign.

Gathering Detailed Information on Sanitation-related Conditions, Existing Sanitation Technologies and Hygiene Practices and Identifying a Range of Potential Solutions — The team uses a variety of information sources and information-gathering techniques to begin to focus on solutions to local sanitation problems.

Identification of Technical Options — The team analyzes all possible options using technical, institutional, legal and financial criteria.

Discussion of Feasible Technical Options with Stakeholders — The technical options are presented in one or more public meetings. The range of technical options is narrowed to one or two options that are most feasible.

Detailed Analysis of Most Feasible Technical Options and Development of Outline of Draft Sanitation Plan — Based on the recommendation of the stakeholders, the input of key decision-makers, and appropriate norms and standards, the most feasible options are analyzed in detail.

Meeting with Stakeholders to Discuss Detailed Options — The outline of the plan is presented to the public for their comments. These comments are important to the final technical design, financial and tariff scenario, institutional design and hygiene education campaign and should be taken into account by decision/makers.

Deciding on One Option by Decision-makers — The comprehensive sanitation plan is discussed and approved by appropriate decision-makers.

Final Sanitation Plan and Report — All external inputs find their way into the final document and a follow-up plan for the town is proposed that helps the town turn this sanitation plan into a sanitation project.

Development of Action Plan — The team assists the town to develop an action plan to follow up on the plan.

Step 1 Tool — Sample Agenda for First Meeting with Local Leaders

Duration: 2 hours 30 minutes

Meeting objectives:

- Ensure that there is sufficient interest by local leaders in sanitation to begin the process.
- Introduce basic principles of sustainability
- Discuss the importance of community involvement in the formulation of the sanitation plan
- Discuss the overall approach and timeframe.

Meeting plan:

1. Welcome and introductions (15 minutes)
2. Discussion of current status of sanitation in town (15 minutes)
3. Discussion of key underlying principles for developing a sanitation plan (15 minutes)
4. Presentation of the 10-step methodology and activity schedule (30 minutes)
5. Discussion of key basic parameters (30 minutes)
    - definition of the geographic area to be covered under the plan
    - discussion of objectives of the plan
    - identification of key stakeholders to involve
    - identification of key issues.
6. Discussion of preparation of Memorandum of Understanding (MOU) (15 minutes)
7. Confirm whether there is sufficient interest and commitment to proceed (15 minutes)
8. Next steps (15 minutes)
    - set date for signing MOU

Step 1

- set date for public meeting for Step 2
- specific plans for information gathering in Step 3.

Materials

- paper, markers, masking tape, acetates, overhead projector, bond paper, pencils/pens, photos, participant list
- summary of activity and planning activity schedule.

Step 1 Tool — Sample Memorandum of Understanding

The following is an example of an MOU used in 2001 with the city of Marcará:

MEMORANDUM OF UNDERSTANDING FOR CONSULTANCY ON HUMAN WASTE MANAGEMENT (SANITATION) IN THE CITY OF MACARÁ MUNICIPALITY OF MACARÁ, PROVINCE OF LOJA.

Meeting together in the city of Macará on this date, 12 November, 2001 are **Ing. Vicente Román** y **Ab. Luis Padilla** the Mayor and Official Attorney respectively of the City of Macará whom will hereafter be called the CITY, and señores **Lcda. Grace Cambizaca**, **Ing. Rodrigo Jumbo** y **Eco. Manuel Orbe**, who will hereafter be called the Consultant Team.

I. BACKGROUND

1. In the past five years, the international water and sanitation community has paid increasing attention to sanitation, pressured by concerns related to receiving waters contamination, unhealthy living conditions and the levels of adult and infant mortality caused by diseases transmitted through contaminated water.

2. Additionally, in recent years there has been a growing interest in improving sanitation services of towns by international agencies.

3. Finally, EHP, through the office of CARE/Ecuador in Loja is providing a consultant team that will be using a practical planning tool. This tool will be used by the consultant Team to develop a plan for the Improvement of Sanitation Services for the City of Macará.

II. OBJECTIVE

To work with the government of Macará.and its citizens to produce a comprehensive Plan for Sustainable Sanitation Services for the city of Macará.

III. OBLIGATIONS AND RESPONSIBILITIES OF THE PARTIES

CONSULTANT TEAM: Creation of the Plan for Sustainable Sanitation Services for the city of Macará. Follow-up plan for the city to help use the Plan to generate a Sanitation Project.

CITY OF MACARÁ: Facilitate the provision and documentation of technical, financial, and social information, or other information as needed by the consultant team.

Provide assistance of a person when needed to assist consultant team in organizing meetings and inviting local residents.

Collaborate with the information campaign, education and communication through whatever means the city has at its disposal.

Once the sanitation plan has been delivered, the city will be responsible for using the plan to obtain financial and other support for project implementation.

IV. FINANCING AND TOTAL COST

The total cost of the study "Waste Management" for the city of Macará.will be paid for by EHP. EHP will not be responsible for financing the plan.

V. DURATION

The duration period for this consultancy is six weeks as of the date of signing of this Memorandum of Understanding with the City.

As a sign of acceptance of each and all of the detailed points in the previous clauses, the parties will together sign this Memorandum of Understanding on four copies of the same text.

For the City:

Ing. Vicente Román

Mayor of the Municipality of Macará

Ab. Luis Padilla

Attorney, Municipality of Macará

For the Consultant Team:

Ing. Rodrigo Jumbo

Team Leader

Eco. Manuel Orbe

Economist

Lcda. Grace Cambizaca

Participation and Public Health Specialist

Step 2 — Introducing the Sanitation Planning Activity to the Public and Measuring Public Support

Rationale

The primary purpose of this step is to gauge whether or not the public feels that sanitation is a priority problem. Assuming the answer is "yes," the second purpose of this step is to inform the public about the planning process, gain public support for the activity, and send the message that the plan will be developed in a way that takes everyone's perspective into account.

Once the pertinent decision-makers have formally agreed to participate in the activity, the next step is to develop and carry out a strategy to introduce the activity to the public. Step 2 will provide an important opportunity for the team to interact with the town and gather basic information. The strategy should target both a representative group of consumers and institutional stakeholders such as schools, commercial enterprises, hospitals and government building. The strategy for introducing the activity to consumers should be a blend of public awareness activities such as written materials, posters and public meetings. The meetings should include an activity to assess whether there is consensus that sanitation is seen as a need and a relative priority in comparison to other community needs. This should confirm the findings of the preliminary assessment that there is sufficient interest to proceed. The meetings also should allow for two-way communication, so the community can provide information to the team about ideas that the public may have about potential solutions.

Participation in a small town is harder than in rural communities because of the number of people involved and may require multiple strategies and multiple meetings The strategy for informing institutional stakeholders will be written materials and group meetings. Participation from the beginning is a fundamental element of a demand-based approach. Step 2 is the first of three explicit steps for consulting the public in the development of the plan, the others being Steps 5 and 7.

Expected Outcomes

- ***general consensus by the public that inadequate sanitation in their town is a problem and that improving sanitation services is a priority for the town***
- ***understanding of the major steps and duration of the planning activity***
- ***understanding by the public that the outcome of the activity is a sanitation plan for improving services that will lead to improved health and environmental quality***
- ***principle established that the activity would be carried out in full consultation with the public at key points in the process but that the final decision on the plan will be made by the designated decision-makers***
- ***clear understanding what financial resources, if any, the technical assistance team (and related donor agency, if appropriate) is bringing to the activity and what the likely financial implications are for the town and consumers.***

Key Information Needs

Prior to interacting with the community in meetings or through an information campaign, the team should gather the following information:

- *A general idea of the existing sanitation coverage and hygiene practices in the town.* This should include both quantitative and qualitative information (e.g., only 50% of the town has access to sanitation, but over two thirds of the existing coverage is in the form of latrines that are not functioning properly with the new town water system).
- *List of key institutional stakeholders.* These should include larger institutions that generate human waste and may include small businesses. Examples include schools, government offices, hospitals, local engineering and construction companies, hotels, restaurants and other commercial enterprises.
- *Basic information needed to develop a consultation strategy.* This information includes population; number of neighborhoods; ethnic, religious or other basic make-up of the community; map of entire town, if available; economic make-up of the town (agricultural base, industrial, etc.); institutions (public or private).
- *Previous public consultation efforts.*
- *Identification of community leaders.*
- *Local or regional representative of the national water supply and sanitation agency and ministry of health.*

Step 2

Key Activities

This is a critical step in that it will be the first time that the public is directly engaged in the process. It will allow the technical assistance team to gauge public concern about sanitation and the public's interest in addressing sanitation problems. If the public does not perceive sanitation as a problem, then proceeding with a sanitation planning activity will be fruitless. This initial public consultation process provides an opportunity to present information about the sanitation conditions, problems and impacts and to emphasize the importance of public support to address the sanitation problem.

Involving the public should include activities that provide one-way communication (e.g., radio announcements and posters) and those that provide two-way communication (e.g., public meetings). Public consultations are naturally interactive, and the team should use these opportunities not only to provide information, but to gather it as well.

Although the specific activities in this step depend on the size and nature of the town and the public consultation strategy that is developed, the activities are likely to include the following:

Collect basic background information on the town (as detailed in the above Key Information Needs). Particular emphasis should be placed on collecting and presenting information on the existing sanitation problem and the impacts on health and the environment that an inadequate sanitation system creates.

Develop a strategy for introducing the activity to the public. The strategy will depend on the size and complexity of the town as well as past experience with public consultation efforts. Care should be taken in developing this strategy since it also will be used in Steps 5 and 7, two other explicit points in the process for public consultation. The strategy is likely to consist of a mix of one or more public meetings and targeted meetings with institutional stakeholders. In a small town of (e.g., 5,000 people), one public meeting might suffice. However, in a town of 25,000 people, several meetings would be necessary. Similarly, in a town of 5,000 one meeting with institutional stakeholders might suffice, but more would be needed in a larger town. In addition, using local media such as radio stations is an extremely effective way to reach people. Neighborhood meetings are another option.

Develop written materials summarizing the project that can be used in an information campaign and distributed at public meeting. These materials should describe the ten steps in the process, the timeline, the basic principles underlying the project (e.g. financial sustainability, equity, health and environment), roles and responsibilities, and the special role of the community. The materials also must describe the type of responsibilities they would assume in implementing a sanitation project and managing it over time.

Implement the strategy. A sample agenda for the public meeting is given on page 78.

Summarize the results of the information campaign and public meetings in a memo.

Products

The issues and insights gained from this initial public consultation should be captured in written form, probably in memo format. The memo should not simply be a summary of what happened, but should identify the suggestions and concerns that were expressed, including lessons learned for how to involve the public effectively throughout the planning process.. The memo should outline a strategy for maximizing community involvement during the planning activity. Leverage points should be identified and communication messages developed that will raise community awareness and motivate action. Leverage points include homes without any sanitation facilities, poorly functioning infrastructure that creates nuisance conditions, adverse health impacts, the impact of a coming water supply system and complaints of downstream communities. In Step 3, the team will gather further information that will help the team create messages to mobilize the community.

Important note: If the team feels that there is no public consensus that inadequate sanitation conditions pose a significant problem, then the team should not continue with the planning process. Instead, the team should return to Step 1 and meet with the local/national officials to consider abandoning the process or repeating Step 2 with a stronger focus on discussing the sanitation problem and discussing the impact to the community and households. The team should not move forward with the additional steps if the public does not feel that sanitation is a priority problem. ✠

Step 2 Tool — Sample Agenda for Initial Public Meeting

Duration: 2 hours 30 minutes

Objectives:

- Sensitize the community about sanitation as a priority.
- Promote the importance of community involvement in the formulation of the sanitation plan.
- Inform community about the schedule of activities.
- Assess the degree of interest by the community in sanitation.
- Gather basic background information.

Meeting Plan:

1. Opening. Local political representative. (5 minutes)

2. Introduction of team, participating agencies and participants. (10 minutes)

3. Introduction to the purpose of the activity including discussion of the benefits of improving sanitation services and the key principles (e.g. sustainability, participation, etc) that must be followed. (15) minutes

4. Presentation of methodology and schedule of activities. (15 minutes)

5. Group discussion to determine if sanitation is a local priority. (45 minutes)

Form working groups to analyze/discuss:

- What are the local development priorities?
- Is sanitation a priority?
- What are current sanitation systems and practices—successes and problems?

6. Plenary presentation of results of group discussions. (30 minutes)

7. Conclusions and recommendations of plenary. (15 minutes)

8. Discuss next steps and follow up. (15 minutes)

Materials:

Paper, markers, masking tape, acetates, overhead projector, bond paper, pencils/pens, photos, area map, participant list.

Step 3 — Gathering Detailed Information on Sanitation-related Conditions, Existing Sanitation Technologies and Hygiene Practices

Rationale

The purpose of this step is to collect information to define the range of potential options.

Many sanitation projects fail because the project designers often take shortcuts and apply standard approaches and technologies without first taking into consideration the specific conditions of a given small town. It is not uncommon for engineers to decide what kind of technology is to be used in a project even before visiting the site. Designing an effective and sustainable sanitation project for a small town requires a good understanding of the town's existing sanitation practices and systems. This requires the collection of existing information on current sanitation systems; technical, economic, health and environmental conditions; and the social cultural context in which they operate. This will provide insights to guide the initial thinking and decision-making process regarding the range of sanitation technologies and approaches that would be appropriate and sustainable for the specific town.

Expected Outcomes

The overall outcome of this step is the following: Collection of sufficient information for the consultant team to determine the range of sanitation approaches and technologies that may be feasible for the specific town so that it can be presented and discussed with the municipal officials, community members and other stakeholders. This information will form the basis for the identification of feasible sanitation technologies and the development of the sanitation plan as described in Step 9. Specific outcomes are listed below.

Expected Outcomes

- ***an approximate quantitative estimate of the number of households that do not have adequate sanitation services***
- ***description of physical conditions such as population densities, lot size, soil types, slopes and drainage courses***
- ***inventory of existing household level sanitation technologies chosen by households and their perceived benefits***
- ***an understanding of the condition of existing sewerage collection and treatment systems***
- ***an assessment of how well or how poorly the existing sanitation systems are being operated and maintained at the household, community and town levels***
- ***an assessment of the town's human and institutional resources (such as availability of skilled WS&S technicians and bookkeepers, capacity of local water utility, and private sector resources) that may be needed to fill specific roles and responsibilities for future sanitation programs***
- ***an understanding of current and future level of service for water supply at the household, community and town level in order to better assess the amount of wastewater that will need to be managed***
- ***basic information on health conditions and hygiene practices—especially of the children—in the town and a qualitative assessment as to whether inadequate sanitation is a contributing factor***
- ***identification and assessment of the institutions and organizations responsible for service delivery, tariff policy and financing of water supply and sanitation systems***
- ***basic information on the existing environmental conditions of surface and ground waters in and around the town including what, if any impact the current sanitation system (or lack of it) has on environmental conditions***
- ***information on the financial opportunities and constraints for a new sanitation program including relative levels and percentages of wealth and poverty in the town, the identification of the sources of capital for the initial investment, the amount users are paying for their current sanitation services, and whether the town is receiving any subsidies.***

Key Activities

Experience has shown that quantitative data is often non-existent or hard to get in small towns and much of the preliminary information that is collected will be qualitative. The information collection activities will include qualitative findings from household visits, interviews with key informants, focus groups and direct observations. While the team members are responsible for gathering the information, it should be collected in cooperation with the local institutions and organizations as much as possible. For a small town, this initial data collection process should not take more than a week for the three-person team.

The key information collection activities are:

1. Develop a plan to collect the information outlined above. (The Step 3 Tool on page 90 provides an overview of the data to be collected, how to collect it and how it will be used.) This will include assigning specific topics (e.g. finance, technical) to team members.

2. Collect any existing background information on water supply and sanitation in the town.

3. Interview key informants including municipal officials, key institutional stakeholders, key private sector interests, representatives of NGOs working in the town, and key staff of relevant national agencies (if any).

4. Conduct direct observations of existing sanitation and related environmental conditions and sanitation management practices. This includes driving or walking through the entire town and inspecting the existing sanitation infrastructure. The team should take photos for use in community meetings in Steps 5 and 7.

5. Visit samples of households throughout the town to observe existing household sanitation practices. With household members, informally discuss the benefits of sanitation, current expenditures on sanitation, willingness to pay for a higher level of service and current health and hygiene practices. This discussion is not intended to be a rigorous survey but seeks to provide basic household level data. The team should visit houses in different parts of town. Although the exact number of households to visit cannot be determined for each situation, three to five households per neighborhood might be sufficient. The team will need to exercise some judgment in determining how many to visit. The neighborhoods should be representative of all the town's social and economic demographics. The team also should make sure to interview women, who are more likely to spend time at home and look after the family's sanitation, especially the needs of the children.

6. Collect basic financial information from the municipality and other relevant agencies on current costs for sanitation and potential sources of funding for capital investment.

7. Use professional judgment based on experiences in other situations to assess the information.

8. Document the information in a manner that will be useful in later steps of this methodology including the sanitation plan (see Products on page 89 for more details).

Key Information Needs

At this stage of the project design process, the focus is on collecting and reviewing information that already exists and is easily accessible and making observations at the household and community level. Key needs include information on existing sanitation practices, existing water supply levels and plans for the future improvements, current expenditures by the households and community, health and hygiene conditions and practices, and institutional and financial factors that guide the range of technical options that may be feasibly operated, maintained and sustained over the long term. The team should be familiar with the analysis required in Steps 4 and 6 and the presentation of the plan to the community in Step 7 to ensure that the right information is collected.

Specific information needs follow.

Baseline Technical Information — Collect baseline information that will provide insight into the feasibility of the range of technical sanitation solutions. Key questions include:

- What are the boundaries of the town? Are the boundaries clearly defined? Are they physical or political boundaries?

- What is the population of the town? How many households? What is the approximate annual population growth (or decline) rate? Note that in some small towns, the population is getting smaller as people migrate to larger cities. Is the population stable or does it fluctuate during the year?

- What is the housing density (may not be the same in different parts of town)? For example, are there large densely populated informal urban/squatter areas? What are the lot sizes? Is the housing single or multiple stories? Is lack of land tenure a concern? Is there a large population of renters? Is space available for central collection and treatment systems?

- What are the predominant soil types? What is the topography of the town? Are their slopes?

Water Availability — The nature of the water supply system in a small town is the overarching factor in determining what sanitation technologies are feasible. Questions include:

Step 3

- What are the available water sources (wells, springs, reservoirs, rain water, rivers, etc.). Are the water sources protected? Are they contaminated?

- What is the average daily household water consumption and the range? To the degree possible, this information should be disaggregated within the small town. Some neighborhoods may have high levels of daily water consumption and other may have very low levels.

- What is the nature of the water supply system? Is it piped and delivered to household taps or to community or yard taps? Is water delivered to the neighborhood by water trucks/tanks (either through the public or private sector) and carried to the house in buckets? Is water available seven days a week, 24 hours a day? If not, when is it available and how much is available? Does the level of water service and related consumption vary during the year?

- Are there plans to improve water supply in the service area that will lead to increased water use?

Current Sanitation Systems and Practices — Most small towns have some sort of existing sanitation system for at least part of the town or many of the households are managing their excreta waste at the household level. Any new sanitation system designed by the consultant team should try to build on the existing sanitation systems or practices. Questions to answer include:

- How do households currently manage their excreta? Are there common approaches or technologies or do they differ depending on economic conditions of the household? This information should be disaggregated among households that have different levels of water consumption that impact their excreta management options. For example, does a household use a dry pit latrine in the back yard or, flush toilets within the home? Does the home use a septic tank or open sewer?

- What appear to be the factors/benefits (convenience, cost, health, cleanliness, odors) that are most important to the households?

- Is there an existing water-born sewerage system? Is there any form of sewage treatment? If so, is the treatment plan working effectively or is it simply passing poorly treated effluent on to water bodies? If there is a sewerage network, is it likely that the pipes are leaking sewage?

- Is there an existing map of the city? Sketch out/overlay the existing sanitation services—including an indication of level of services.

Health and Hygiene Practices — Given that improving and protecting health is one of the main reasons for designing and implementing a sanitation program, it is important to get information related to health and hygiene practices. Most of this information should be available through the

local health authorities in the small town and through structured observations in visits to households and neighborhoods. If possible, try to get information by neighborhoods or at least disaggregate the information between parts of the town that may already have some sort of sanitation and parts that do not. Specific information related to health and hygiene practices include:

- What do people feel is the most important health issue in the community?
- What is the mortality rate of children under five years of age? What is the diarrheal disease rate of children under five?
- Is there an existing health/hygiene promotion effort within the town? If so, who leads this effort: local health promoters/doctors, local NGOs? Try to get a description of the health/hygiene promotion program, including copies of any training materials.
- Is there an existing household sanitation inspection program? If so, who is responsible: local municipal authorities or local health authorities? Try to get a description of the inspection protocol.
- Is drinking water treated at the source and/or at the point of use? How is drinking water stored at the home? What utensils are used for pouring out water from the storage vessels? Do they appear to be clean?
- Is there evidence of fecal contamination outside the house and/or inside the house?
- What are the key hygiene issues affecting women and children? Where do infants/young children defecate? What do parents do with infant's excreta? How is water stored in the household?
- How close are hand-washing facilities to the bathroom/latrine?
- What are the most common anal cleansing materials? How are these disposed of? e.g. into the vault/sewer, burial, burning, etc.

Environment — In addition to protecting human health, a sustainable sanitation project should seek to protect or improve the environment. It is unlikely that the consultant team will find any officials in a small town who are responsible for environmental standards. As such, most of this information will be based on observations and discussions with community members. A question to keep in mind is what would be the *relative* impact of a new sanitation program? And if water supply is also part of the TA/donor package, then a critical question is what will be the environmental impact of increasing water supply to the household level and NOT providing appropriate wastewater management?

Step 3

Key questions include:

- Is the existing water born sewerage system contributing to the pollution of local surface waterways or underground aquifers? Is sewage being transported and dumped untreated into local water bodies?

- If there is no existing sewerage system but there is household water supply, where is the existing gray water and wastewater going? Do households have effective septic systems? Or is wastewater being channeled into the rainwater drainage system? What environmental problems is that creating?

- Are there other existing sources of water pollution? Is there a local industry within the town that produces wastewater? If so, is that wastewater being treated? Where is it being disposed?

- Are farmers using any untreated wastewater for irrigation?

- What are the environmental regulations that govern wastewater discharge?

- What are the observed impacts of current sanitation systems on water quality and the environment? Are there any water quality monitoring data?

Institutional Questions — The existence and capacity of an institutional structure to operate and maintain the sanitation systems is one of the most critical factors in the sustainability and effectiveness of any system installed. This is true whether the sanitation technology selected is "low cost" and "low tech" or whether it is household/on-site based or an off-site system. In a small town where institutional and human resources are often limited, this is often a limiting factor that can constrain the range of technical and management options that are feasible. Information that will help the design team better understand this includes:

- What institutions have the legal responsibility for managing different types of sanitation systems? How is the legal responsibility implemented?

- If the municipality is playing a role, does it have a separate excreta sanitation or WS&S department or is this responsibility integrated into the overall public works department? Are funds for operating and maintaining the sanitation systems (or at least WS&S) monitored separately? How many sanitation employees does the municipality have? What are the responsibilities and skills of the employees?

- Are there any public or private sector institutions, either in town or outside of it, that are responsible for different aspects of sanitation (funding, hygiene education, on-site inspections)? For example, does the country's ministry of health have a role? Does the ministry have sanitation inspectors who inspect household septic

tanks? Do their health personnel (nurses and doctors) provide hygiene education in the small town urban areas?

- Are there NGOs involved in providing sanitation services? If so, how? For exasmple, NGOs may be playing a lead role in hygiene education and in creating a demand for sanitation by households or they may be involved in creating water management boards that may or may not also have sanitation provision responsibilities.

- Is the private sector involved in sanitation? If so, how? For example, is the private sector involved in emptying septic systems, building latrines and supplying household sanitation or in building latrines or selling materials for latrines?

- Is there an adequate billing and collection system for the existing sanitation system? If there is not currently an existing sanitation system? Is there an adequate billing and collection system for an existing water supply system?

- Have water management boards been formed that have unbundled water supply from sanitation? Is there more than one water management board for different parts of the town?

Financial Questions — An important aspect of developing a viable sanitation plan is to determine whether there are sufficient financing sources for the different technical options to fund the up-front capital cost and support the system's on-going operation and maintenance. The consultant team should be aware that it is typical to see different funding sources for capital investments and O&M. The consultant team also should identify financing sources available for household sanitation services such as latrines, septic tanks, plumbing and toilets. Specific financial questions include:

- What are the sources of investment capital for sanitation projects? Has the town or other organizations received grants or loans for sanitation from sources such as the central government, social investment fund (FIS), multilateral organizations and NGOs? How have any existing sanitation projects been financed? If there are loans for sanitation, what is their source of repayment, and are they current? Are commercial banks a potential source of financing?

- What financial mechanisms are available to support on-going maintenance of the sanitation system? Does the municipality have the authority to impose user fees and charges? Are general municipal revenues available to finance O&M? Are there any municipal services where recovery of operating expenditures is occurring, such as solid waste, telephone or electricity?

- What are the local policies regarding tariffs? What is the breakdown of system users—industrial, commercial, government and residential? Are there cross-subsidies in water fees?

- How are the capital costs associated with household sanitation (e.g., latrines and septic tanks) being financed? Is it being provided through current income, informal loans or retail vendors?

- What is current spending for recurrent costs (e.g. emptying a septic tank) as a percentage of income for household sanitary services? How does this compare to what households are currently spending on other municipal services such as electricity and telephone? Given current expenditures, what would people pay to improve sanitation?

- Would homeowners consider borrowing for improved sanitation? Would improved household sanitation increase the value of the property?

- Is there a NGO or PVO providing access to credit to finance household improvements and more specifically sanitation household improvements? If there is no micro credit organization serving the municipality? Is there an NGO with national or regional presence that could organize a micro credit program to finance household sanitation in the town?

Public Consultation — Citizen involvement is a critical component in the success of a sanitation project and developing mechanisms for their input and "ownership" in the plan can result in cost reductions, increased cost recovery and more effective operation and maintenance of the system. The level of citizen involvement can vary greatly among municipalities, and it is the role of the consultant team to ensure that the public and key stakeholders are both represented and involved in the decision process. Information collected by the team should include:

- Are there community leaders, NGOs, community organizations or religious groups currently working to address issues related to health, water quality, sanitation or environment? Have issues, priorities and potential solutions been identified? Are there NGOs collaborating or working closely with the local government to address these issues? Is this work conflicting in any way with this planning activity for sanitation?

- Are there administrative committees or service cooperatives composed of community representatives in the areas of sanitation, water or other services?

- Does the local government have a history of including community participation in the delivery of its services? If so what mechanisms are used to inform and involve the public—regular public meetings, participatory budgeting, information

bulletins or media? Are there particular formats or methodologies used to communicate information to the public?

- Are there clear definitions of roles and identification of ways the community can participate in the sanitation project—i.e., construction, financing, management and operation?

- How does the community operate and maintain other infrastructure for which they are responsible? Examples include schools, streets, solid waste collection, public spaces such as markets and parks and hospitals.

Product

The main product from this step is information that will be used throughout the process of developing a plan. The main purpose of this information is to provide practical information to the project design team members, the public, businesses, NGOs and other stakeholders for engaging in an informed discussion regarding the range of technical and management options that may be feasible for this specific town.

The information collected will be needed in Step 4 to identify feasible options, in Step 5 for discussions with the community and stakeholders, in Step 6 for further analysis of specific technical options and in Step 9 in writing the final report. Therefore, as the information is being collected, it should be documented in a manner that will be useful during other steps. Before documenting the basic information collected in this step, teams members should discuss the different disciplinary perspectives of what information can mean and agree upon which team member will be responsible for the final documentation of the information. Although it is up to the team to decide how to document the findings, one suggestion is to use the same headings used above in Key Information Needs (baseline technical information, water availability, etc.).

Step 3 Tool — Techniques for Information Gathering in a Community

In general, the team should use information-gathering techniques that they already are comfortable using. This tool briefly describes four participatory techniques that a team might use.

Neighborhood-level Workshops — Neighborhood-level workshops can be used to supplement household visits to determine community practices and preferences. These workshops should be designed so they are highly participatory, using a mix of small groups and plenary discussions. Typically they are a half-day in length and would focus on the following:

- determining current sanitation and hygiene practices
- determining knowledge of sanitation
- identifying environmental concerns and location of contamination
- assessing ability and willingness to pay for services
- determining community expectations for investment financing
- assessing local experience in managing infrastructure.

Community Mapping — Mapping is a technique that asks community members to produce maps. This technique both provides information to the consultant team and serves as a way to find out how much people know about their community. Mapping can be use in three ways:

- asking participants to identify problem areas on an existing map
- asking participants to draw maps from memory that indicate problems or geographic features
- asking participants to go out into the community to gather information and develop a map.

Maps can include actual community boundaries, existing infrastructure, industrial and commercial buildings, homes without sanitation, sources of existing pollution, and key geographical features.

Household Visits — Information obtained during household visits is relatively informal and subjective and does not involve a rigorous survey. A household visit consists of two parts:

- observation of household water and sanitation facilities, lot size and physical conditions, household hygiene conditions and the socio-economic situation (electricity, TV, house construction, etc.)

- conversation with residents regarding community priorities, household health, current sanitation practices, sanitation facilities, payment for services, household income and expenditures, and quality of public services.

Household visits should be about 20–30 minutes in duration. The information gathered should be cross-checked with information gathered through other means. In addition to gathering useful information to develop the sanitation plan, these visits will also serve to better determine demand for services.

Interviews with Local Leaders — The team will also identify key local leaders and interview them individually. Local leaders include both elected officials as well as key business and community leaders. The questions will be similar to the ones asked in public meetings and neighborhood workshops. These interviews are typically one hour in length and conducted by one or more team members.

Step 3 Tool — Data Collection Matrix

This matrix shows how information gathered in Step 3 is used by the consultant team to help shape the plan's technical, institutional, financial and health components.

Information Need	Example of Data	Collection Method	Information Used to…
Baseline Technical	Community boundaries, population, growth potential, lot size, slopes, soils, drainage, aquifer; housing types, renters	Visits; Existing data; community mapping exercise	▪ Develop technical design ▪ Inform public of risks to human health associated with demographics, density, population growth
Water Availability	Availability, service, quality	Visit to system; review of existing data, interview water service providers	▪ Calculate current and future wastewater loading rates. ▪ Inform about implications of increased water provision ▪ Assess how community maintains infrastructure
Sanitation Systems and Practices	Current systems used - link to water supply and income; problems; locally familiar technologies; resident opinions on service, costs of systems	Visit to systems; visits to households, interview residents	▪ Assess local sanitation systems ▪ Determine community preferences ▪ Inform selection of technical option
Health and Hygiene Practices	Priority health issues; diarrheal disease incidence; current hygiene education; household hygiene conditions and behaviors; public health system	Household visits; interviews with residents; health center data; ministry of health data	▪ Better understand current hygiene practices ▪ Inform hygiene promotion strategy ▪ Inform community of health improvements offered by sanitation system

Environment	Pollution caused by gray water; management of treatment systems; regulations on wastewater discharge and receiving waters; current environmental impacts of wastewater, receiving water downstream use	Ministry data, legal documents, visit to area	▪ Articulate environmental impacts in plan ▪ Address need for formal EIA ▪ Identify receiving water standards that impact technical options ▪ Identify environmental deterioration to motivate community participation
Institutional	Legally responsible institutions; ability to form legally recognized institution at local level; private sector involvement; municipal offices involved	Interview local and national govenrment officials; review of legal documents	▪ Determine who builds, manages, charges for service, provides O&M
Financial	Community payment for current services; sources of capital investment; household income and expenditures; actual expenditures for sanitation	Household visits; interview local officials, financial institutions; donor agencies, ministries;	▪ Determine cost of sanitation system ▪ Determine tariff scenarios ▪ Information for affordability analysis
Public Consultation	Current development activities in community; history of community self-help; history of participatory decision-making; conditions of community-managed infrastructure	Interview residents, leaders; visit community	▪ Plan indicates how community is ready for sanitation project ▪ Community shows that it can implement and sustain projects ▪ Community decides how to proceed to use the plan

Step 4 — Identification of Technical Options

Rationale

The purpose of this step is to identify a range of sanitation-related technologies that may be feasible in the town, in light of the information collected in Step 3.

This is a critical step in the methodology in that it provides information to the stakeholders so that they can participate in an informed manner in expressing their sanitation needs and priorities. This step is largely done by the consultant team and municipal engineer, if one exists. The goal is to identify all options that are likely to be effective and sustainable. It is also important that the team consider ALL of the possible feasible options—and not just those that the design team thinks are the "best" in their opinion.

Expected Outcomes

The general expected outcomes of this step include the identification of a range of sanitation technologies that would be effective and sustainable for the entire town. It will be important to keep in mind that the starting point for the sanitation project is a plan that is townwide—addressing the sanitation needs of all the town's population. It also is important to keep in mind that, within the town, it is unlikely that one technology will be appropriate everywhere. Rather, a combination of technologies that are most effective in reaching the largest number of households may be needed.

Specific outcomes are listed on the next page.

Expected Outcomes

- ***Select options for technologies that would be appropriate:***

  at the household level — *including dry options and options that require water;*

  for collecting the excreta or wastewater from the bathroom — *including on-site options and off-site options;*

  for treatment and disposal of the excreta and wastewater — *at the household, community and town level as appropriate.*

- ***Prepare implications for the operation, maintenance and management of the sanitation systems—at the household, community and town level— in terms of cost and technical capacity.***

- ***Approximate initial capital and recurrent costs for each of the options presented.***

- ***Prepare a presentation of the above for the public consultation activity described in Step 5.***

Key Information Needs

No new information is needed for this step—other than reviewing reference literature describing sanitation technologies.

Key Activities

This step is carried out internally, within the consultant team. The entire team should be involved to ensure an interdisciplinary perspective on the options. In addition, if the town has its own municipal engineer or technician, he or she should also be involved. This step can be carried out while team members are in the town, or it can be conducted at the consultant team's offices. Key activities include the following:

1. Review and assess the information collected during Step 3. Identify any critical gaps in the information that may need to be collected for this step and during future stages of the sanitation planning activity.

2. Based on the information collected, identify a range of technical options that may be appropriate and feasible for the town. The identification of the technology

options should be based on the assessment of the information collected and professional judgment. As needed, consult professional references that describe sanitation technology options including conditions under which the options are feasible. (The Step 4 Tools at the end of this chapter, Comparison of Sanitation Systems and Options for Secondary Sewage Treatment, provide key points to consider in reviewing different technical options.) This level of analysis is consistent with a pre-feasibility process, which is a very preliminary step in the engineering process. This is NOT meant to be an engineering design stage.

The range of technical options identified (to be presented to the stakeholders in Step 5) should be at a simple descriptive level. The range of sanitation technologies that are generally feasible options in developing-country small towns is relatively small. These options are largely determined by whether on-site or off-site solutions are appropriate, housing density and where and how much water is available. Regulation on effluent quality and construction norms also will have an impact on the decision. In addition, the sanitation planning team should give some consideration to staging or phasing in higher levels of technologies or services over a period of time. For most small towns, the basic options include:

- Household-level on-site management of excreta:

  Without water: VIP latrines or variations

  With some water: pour flush toilets with on plot septic systems (when sufficient land is available)

- Off-site collection of wastewater (when water in sufficient quantities is present):

  Latrines with septic tanks that are emptied and carted away

  Sewered interceptor tanks

  Simplified sewerage systems

  Conventional wastewater systems (rarely appropriate or affordable in small towns)

- Treatment of collected waste:

  No treatment (by far the most common existing practice)

  Primary treatment—lagoons and oxidation ponds

Secondary and tertiary treatment through mechanical treatment technologies (almost never appropriate or affordable in small towns)

Treatment and reuse of the wastewater for agricultural and other purposes.

3. Using the list of options identified in the second key activity above, calculate an estimated budget for both capital and recurrent costs for each of the options on a per household basis, as well as total townwide costs. Any available/known subsidies should also be identified at this stage. In the case of treatment facilities where users will be expected to pay tariffs sufficient to cover recurring costs, an order of magnitude calculation should be made regarding recurrent operations and maintenance costs. This order of magnitude calculation would then allow the team to estimate a range of tariffs for both residential and commercial users.

4. Using the list of options in the second key activity above, identify the operations and maintenance requirements in general for each of the options. For example, it is important to highlight for stakeholders that a simplified sewerage system will require significant operations and maintenance at the household and neighborhood level, whereas a conventional sewerage system will require significant O&M to be carried out by a service provider.

5. For each of the options identified as potentially feasible, a realistic list of potential sources of financing should be identified. For example, there may be a fund available by a donor or NGO to subsidize household latrines, but no known funding sources for condominial sewer systems or wastewater treatment plants. Another example would be the availability of a home improvement loan program that allows loans for wastewater systems hook up fees or for the construction of bathrooms. This list of financing sources also should note clearly when actual cash or in-kind financing would be expected from the household (such as for building a household latrine or pour flush bathroom) or from the municipality.

6. Identify the benefits associated with each option. These benefits would be determined by the results of the informal household interviews as well as other data collected in Step 3. Benefits include convenience, environmental protection, better public health and socio-cultural norms and increases in property values.

7. Prepare a presentation of the feasible technical options for Step 5. The presentation must present the conclusions from the analysis of the information collected in Step 3.

Products

The main products of this step will be used in Step 5. They are the following:

- Revised and updated description of existing sanitation conditions and needs in the town
- Presentation of the range of practical options to address the needs to present to the public, so they can engage in an informed discussion and determine which options have the most demand. As such, thought and effort should be put into presenting the options in a manner that the public will understand and in such a way that they can easily compare the pros and cons of each option. The team should prepare the information in visually effective ways—with maps of the town, drawings, photographs, charts, tables, etc. An example of a visual presentation is given below, preparing a table that compares all the feasible options (only one option is given in the example). The Step 4 tools that begin below provide a comparison of the basic sanitation options and an overview of options for secondary sewage treatment. A pictorial presentation may also be helpful, if the team expects community members to have difficulty understanding graphs and charts.

Technical Option	*Capital Costs (including hardware and software)*	*Recurrent Costs*	*Operations and Management*	*Potential Sources of Financing*	*Benefits*	*Comments — (including health and environment issues)*
Household level VIP latrine	$350 per household	U.S. $10 annually per home to have the pit emptied	Responsibility of each household, including contracting for pit emptying; requires on-going hygiene education	NGO grant program to fund 50% of costs; household expected to provide 50% of costs (including sweat equity)	Reduces raw sewage in open drains	Will need to be upgraded if household level water supply is provided in future

Step 4 Tool — Comparison of Sanitation Systems

Sanitation Option	Relative Construction Costs (per person)	Relative O&M Costs	Water Required for Operation (liters per person per day	Land Density & Soil Requirements	O&M Skills Needed	Technical Skills for Design & Construction	Possible Levels of Management
Dry Sanitation: On-site Systems							
Simple Pit	1	1	0	Low density with water table>1 m deep	Cleaning only	Similar to local house building	Household level
VIP Pit Latrines	2	1	0	Low density with water table>1 m deep	Cleaning only	Building skills plus specific knowledge for pipe placement	Household level
Double-vault Above Ground Latrines	3	1	0	Low density	Changing and emptying pit every two years	Similar to local house building	Household level
Wet Sanitation with On-site Liquid Disposal and Off-site Solids Disposal							
Pour-flush Toilet with Septic Tank	15-25	2-3	5-25	Low density with water table>1 m deep	Periodic tank emptying	Knowledge about septic tanks needed	Household level with private/public sector cartage
Dry Sanitation with Off-site Disposal							
Pit Toilet with Cartage	1	2	0	Low density with water table>1 m deep	Periodic tank emptying	Similar to local house building	Household level with private/public sector cartage
Above-ground Vault Toilet with Cartage	2	2	0	Low density	Periodic tank emptying	Similar to local house building	Household level with private/public sector cartage
Conventional	30-80	10	>100	High density	Regular maintenance of sewers	Requires engineer	Government

(Continued on next page)

Step 4

(Continued from previous page)

Sanitation Option	*Relative Construction Costs (per person)*	*Relative O&M Costs (per person)*	*Water Required for Operation (liters per person per day*	*Land Density & Soil Requirements*	*O&M Skills Needed*	*Technical Skills for Design & Construction*	*Possible Levels of Management*
Water-borne Sewage Collection							
Simplified	10-60	10	>100	High density	Regular maintenance of sewers	Requires engineer	Community and municipal government
Sewered Interceptor Tanks	5-60	10	2-20	Moderate density	Regular maintenance of sewers & emptying of tanks	Requires engineer	Household, community and municipal government
Conventional	30-80	10	>100	High density	Regular maintenance of sewers	Requires engineer	Government

***Sources: The UNIQUE Challenges of Improving Periurban Sanitation, WASH Technical Report No. 86*, July 1993 and *DFID Guidance Manual on Water Supply and Sanitation Programs*, LSHTM/WEDC, 1998.**

Step 4 Tool — Options for Secondary Sewage Treatment

Treatment Process	Description	Key Features
Land treatment (soil aquifer treatment)*	Sewage is applied in controlled conditions to the soil	Soil matrix has quite a high capacity for treatment of normal domestic sewage, as long as capacity is not exceeded. Some pollutants, such as phosphorus, are not very well removed. Can be used as a method of recharge of aquifers.
Reed beds (or "constructed wetlands')*	Sewage flows though an area of reeds	Treatment is by action of soil matrix and particularly the soil/root interface of the plants. Requires significant land area, but no oxygenation requirement.
Waste stabilization ponds ('lagoons' or 'oxidation ponds')*	Large surface area ponds	Treatment is essentially by action of sunlight, encouraging algal growth, which provides the oxygen requirement for bacteria to oxidize the organic waste. Requires significant land area, but one of the few processes with no power/oxygen requirement. Often used to provide water of sufficient quality for irritation, and very suited to hot, sunny climates.
Aerated lagoons	Like WSPs but with mechanical aeration	Not very common — oxygen requirement mostly from aeration and hence more complicated and higher O&M cost.
Oxidation ditch	Oval-shaped channel with aeration provided	Has more power requirement than water stabilization ponds, but has much reduced land requirement, and not as difficult to control as processes such as activated sludge process (see below).
Rotating biological contactor (or biodisk)	Series of thin vertical plates which provide surface area for bacteria to grow	Plates are exposed to air and then the sewage by rotating with about 30% immersion in sewage. Treatment is by conventional aerobic process. Used in small-scale applications in Europe.
Trickling (or 'percolating') filters	Sewage passes down through a loose aggregate bed — bacteria or aggregate threat sewage	An aerobic process in which bacteria take oxygen from the atmosphere (no external mechanical aeration). Has moving parts, which often break down in developing-country locations.
Activated sludge process	Oxygen is mechanically supplied to bacteria which reed on organic material and provide treatment	Sophisticated process with many mechanical and electrical parts, which also needs careful operator control. Produces large quantities of sludge for disposal, but provides high degree of treatment (when working well).
Upflow anaerobic sludge blanket* (Note: Other anaerobic processes exist, but upflow anaerobic blanket is the most common.)	Anaerobic process using blanket of bacteria to absorb polluting load	Suited to hot climates. Produces little sludge, and no oxygen requirement (no power requirement) — but does not produce as high a quality effluent as processes such as activated sludge process.

* Indicates a process that is more suitable for developing countries. Source: *DFID Guidance Manual on Water Supply and Sanitation*, LSHTM/WEDC, 1998

Step 5 — Discussion of Feasible Technical Options with Stakeholders

Rationale

The purpose of this step is to discuss the feasible technical options identified in Step 4 with key stakeholders and decide on one or two options to study in more detail.

This is the second time in the process that stakeholders will be consulted, the first time being when the community was introduced to the project in Step 2. While Step 2 only provides a general introduction and an opportunity for interaction between the team and community, Step 5 involves a detailed presentation of the full range of feasible options. These could include on-site and off-site options for the collection, disposal and treatment of excreta and wastewater.

Guidelines for the preparation of the options are provided in Step 4. Step 5 also is the first opportunity for the community to receive the results of the information-gathering activity in Step 3. The importance of this step is to ensure that stakeholders have an opportunity to participate in the narrowing of options by expressing their preferences and concerns. Since limited resources preclude a detailed study of all feasible options, this step is intended to narrow the choices.

Expected Outcomes

- ***agreement on one or two technical options to be studied in greater detail***
- ***understanding by the community of the management and financial implications of the technical options***
- ***increased awareness by the community of the current situation regarding sanitation and hygiene***
- ***commitment by the public to continue participating in key decisions.***

Key Information Needs

A list of key institutional stakeholders will be needed. Normally, these stakeholders will be the same as those who participated in Step 2 and will include representatives of schools, government offices, commercial enterprises and hospitals. If appropriate, they also should include the appropriate officials from central government agencies that are legally mandated to oversee sanitation activities.

Other key information includes the presentation materials that were prepared in Step 4 on the full range of options.

Key Activities

1. Design a strategy for presenting and discussing the options with the community. Normally this strategy will be similar to the one used in Step 2, but it is possible the municipality and consultant team may want to make some modifications. Depending on the size of the town, this strategy is likely to include one or more public meetings intended to reach consumers and possibly other meetings designed for institutional stakeholders.
2. Organize the meetings, making sure that everyone has adequate advance notice and the logistics are assured. Ensure that the key external institutions are invited to the meeting. (A sample meeting agenda is given on page 104).
3. Ensure that the presentation materials are prepared and all handout materials are ready. The presentation should use visuals, preferably overheads or, if the technology is available, computer slides, such as a PowerPoint presentation.
4. Hold the discussions with stakeholders on the current sanitation conditions and related impacts and the technical options, management implications and health benefits of the proposed sanitation options. Make sure that the meeting allows for ample discussion time and that a few people do not dominate the meeting.
5. The meeting should result in a clear selection of one or two options to study in more detail. Summarize the results of the discussions with the stakeholders in a memo. This memo should clearly state which options were recommended for more detailed study and how recommendations were achieved.
6. Before initiating the detailed study in Step 6, discuss the recommended options with the appropriate local and national officials to ensure that they are in agreement.

Products

As mentioned in the fifth activity listed above, the results of the stakeholder discussions should be captured in a memo. This memo should summarize the stakeholder strategy used and the comments from the meetings. It should include a clear recommendation regarding which options to study in more detail.

Step 5 Tool — Sample Agenda for Second Public Meeting

Duration: 2 hours 30 minutes

Objectives:

- Present to the participants the results of the information gathering and analysis activities and present the participants with the range of technical options.
- Facilitate a discussion that results in the participants' recommendation for the preferred technical options.

Meeting plan:

1. Opening and introductions. (5 minutes)
2. Present key findings and information gathered (30 minutes)

   status of sanitation services
   technical issues
   health and hygiene issues
   environmental findings
   financial findings (household income and current expenditures for water and sanitation).

3. Discuss findings and their implications with participants. (30 minutes)
4. Develop conclusions on the sanitation situation in the town and the need for sanitation system. (30 minutes)
5. Present technical options (30 minutes)

   technology
   costs (capital and recurrent)
   institutional implications
   potential financing options
   benefits.

7. Discuss and select recommended technical options. (30 minutes)

Materials:

- Overhead projector, prepared acetates, paper, blank acetates, felt tip markers, photos of local problems
- Summary of findings and conclusions

Step 6 — Detailed Analysis of Most-feasible Technical Options and Development of Outline of Draft Sanitation Plan

Rationale

The purpose of this step is to further analyze the one or two technical options identified in Step 5 as most promising.

In addition to a more detailed technical and financial analysis that began in Step 4, Step 6 expands the overall analysis to include a draft plan for a way to manage the services and for maximizing health benefits, a preliminary assessment of the environmental impacts of the proposed plan and identification of any policy issues that must be addressed to move forward. It is critical that the plan include the level of equity needed to reach the maximum number of households in the town with the available resources.

Expected Outcomes

The expected outcome of this step is a plan outline showing detailed information regarding feasible comprehensive options for a townwide sanitation system. The outline, and the finished plan that will ultimately be produced, allow the municipality to make an informed decision as to which option to pursue.

Expected Outcome

The expected outcome is an outline of feasible options, including:

- ***a detailed description and discussion of the most feasible technical options on a townwide basis including, if needed, identification of different options for different parts of the town***
- ***a comparison of the benefits and costs of each option, including each option's effectiveness in reaching the entire town***
- ***a plan for managing the provision of services, including specific institutional roles and responsibilities as well as estimate of human resource requirements to estimate recurrent costs***
- ***a hygiene improvement plan, including specific institutional roles and responsibilities***
- ***a detailed analysis of capital costs and the recurrent costs for O&M (best compared when presented as monthly tariffs)***
- ***description of financing sources for the capital costs***
- ***identification of potential health impacts and benefits of each option***
- ***identification of potential environmental impacts and benefits***
- ***identification of policy issues that may need to be addressed.***

Key Information Needs

Technical, financial, health, institutional and environmental information will be required during this step. Much of the information required already should have been collected during the earlier steps. But additional information may need to be collected at this point in order to do a more in-depth analysis of the possible options. In addition, the consultant team may need to refer to appropriate reference materials at this stage.

Key Activities

Six key activities are outlined below: (1) conducting a technical feasibility analysis, (2) preparing a financial analysis, (3) determining a management model, (4) assessing health benefits, (5) conducting an environmental assessment and (6) determining critical policy constraints.

1. Technical Feasibility Analysis — Up until this point, the primary focus of information gathering, analysis and consultation with the stakeholders, including the general public, has been for the purpose of identifying reasonable technical options for managing excreta and/or wastewater at the household level, transporting the wastewater out of the household/plot and community and appropriate treatment and disposal or reuse. Based on the information gathered to date and the input received from the community, the consultant team should be able to narrow the possible options down to one or two comprehensive feasible sanitation solutions. A solution may involve a combination of options, using different approaches for different parts of the town.

Further analysis is now required to assess and compare the feasibility of options more precisely, and to consider the implications of choosing which options to pursue. The consultant team analysis should be focused on the application of the viable technical options on a townwide basis. The technical analysis must also be done in close coordination with other key activities of Step 6—the financial, health and environmental analyses—to insure that the sanitation options are not only technically feasible, but also are financially sustainable and are likely to achieve public health benefits and environmental protection goals. Important aspects of this key activity include the following:

- The team should have a reasonable map of the town at this point in the process. Make sure that it includes all populations involved, including families that may be living in informal urban areas. This map needs to have sufficient detail to be used as a planning tool (e.g., soil types, slopes, population density, etc.)
- Do preliminary engineering designs for on-site options (e.g., latrines, flush toilets with soak away pits, septic tanks, etc.). This may be different for different parts of the town, and if so, the differences should be indicated on the map. If certain parts of the town have adequate household water supplies and other parts do not, then technical solutions likely will be different in the different parts of town. List materials that would be appropriate for infrastructure (building materials if building a latrine, for example). Identify where the bathroom/latrine should be located (in the house or outside the house on the plot). Describe the kinds of toilets and what they should be made of (porcelain, concrete). What are the pros and cons of the options? What is required for operating and maintaining the options? Describe the potential for future upgrading of facilities.
- Describe in detail the feasible technical options for collection and conveyance systems (sewers). Do preliminary engineering designs for each option. Analyze and compare on-site options (if they were indicated as viable at this point) such as septic systems, etc. or off-site options, such as condominial sewer systems.

Describe the key engineering design parameters. For example, what dimensions should the septic tanks/pits have? Should they be lined? What are the operation and maintenance requirements? What are the pros and cons of each option? As in the step above, this analysis needs to be done on a townwide basis and may result in different options for different parts of the town.

- It is also possible that at this stage, some form of the timing of options should be analyzed. For example, it may be that for certain parts of the town, only dry VIP latrines are technically feasible, but if the town has existing plans to increase the level of service for water supply to those parts of town, then the analysis should consider appropriate future technical options (for example upgrading the latrines to pour flush toilets). All of the parts of the plan need to come together in a coherent management plan for excreta/wastewater.
- Describe in detail the feasible technical options for treatment and final disposal of the excreta/wastewater. Prepare preliminary engineering designs for each option. Assess whether wastewater treatment and reuse of the effluent is a feasible option. Calculate how much land would be required for land-intensive treatment options (e.g., lagoons, oxidation ponds or wetlands). Determine whether the land is available and the distance to the available land. Assess whether the options meet existing effluent standards. Describe the operations and maintenance requirements of each option and the pros and cons of each option.
- Analyze and compare on-site options with sewage collection and central treatment options. This analysis will take into consideration technical criteria, norms and standards, community preferences, future water supply enhancements, population growth and cost.

2. Financial Analysis — Once the consultant team has completed the technical analysis and identified technical options that are the most viable, a more detailed financial analysis is necessary. It is at this point that the technical team identifies as accurately as possible the capital and recurrent costs of each technical option, both up-front and ongoing and whether the municipality and individual households have the capacity to generate the resources necessary to support the sanitation options. The results of this substep may require a re-thinking of the technical options. On a townwide basis and over the long term, what are the viable and on-going sources of revenue to support the sanitation options identified? To answer this question, the consultant team should develop a simplified financial model that estimates the project costs (capital and recurrent) and identifies sources of revenue including tariffs and fees for each option. The cost and financing information needed for the model are summarized below:

Financial Analysis — What Are the Costs?

- ***What are all the capital costs for the project? — The costs of constructing the technical solution should include all equipment costs associated with the construction of the system.***
- ***What are the financing costs associated with the capital investment? Who will be expected to pay debt service on the loan?***
- ***What are the ongoing operating and maintenance costs projected to be over the next 10 years for the various townwide solutions? These should include estimated costs for personnel, repair and replacement of parts, energy, transportation and billing and collection systems. Inflation also should be factored into the projected costs. For on-site solutions how much is the on-going maintenance?***
- ***What would be the estimated connection cost for system users (if appropriate depending on the option)?***
- ***What are the programmatic costs, such as training, engineering design and hygiene promotion? Who will pay for these costs?***
- ***Based upon projected population growth, will there need to be system expansion in the near future? If so, this cost should also be included in the model.***

Summarize the above information and show the TOTAL initial investment requirements and annual costs for each technical option. The information should be added together to come up with the estimated annual costs to finance and operate each respective technical option. Calculate these annual costs by subcategories, such as: household (latrine, hookups, tariffs), community or municipality (sewerage and treatment), since it is likely that revenue sources will be different for each subcomponent of the sanitation solution.

Financial Analysis — What Are the Financing Sources?
❑ ***What are the financing sources for the capital costs? Will the community contribute labor and other in-kind financing to the project? Is the central government, local government, NGOs, other donors or the community providing grants or funding for the project? Is it feasible for the municipality to borrow the funds?***
❑ ***Are there annual revenue sources that the local government can allocate to the project for recurrent costs, keeping in mind that user fees (tariffs, connection charges, etc.) should cover all recurrent costs, if possible?***
❑ ***Are there any national ceilings that cap the connection fees or tarifs that can be charged?***
❑ ***For off-site solutions, what is the estimated tariff required to support the system? The model should show projected tariffs into the future, taking into account population growth and inflation.***
❑ ***Are there sufficient commercial, governmental or industrial users to support a subsidy to residential users? The model should provide sensitivity analysis showing the tariff effect of cross-subsidies on both commercial and residential users.***
❑ ***What are the monthly costs, tariffs and fees that must be paid by users for each technical option?***

The consultant team will need to evaluate the public's attitude and make a professional judgment about whether these costs are affordable and whether households perceive sufficient value from the options.

Performing a study to evaluate willingness to pay for sanitation services is not likely to be affordable for most small towns. However, with the information collected in the informal interviews in Step 3 and some additional data, the consultant team should have enough data to judge public perceptions in a professional and balanced manner. Factors to consider include the following:

- On average, what percentage of income does the technical option demand in terms of costs, fees or tariffs as compared to existing service? Does the technical option represent a significant increase in expenditures for sanitation on average? This information should provide a measure as to the affordability of each option based on a percentage of current income. How does this percentage relate to fees for water supply service?

- What are the additional benefits provided by each technical option? The consultants should identify all the perceived benefits (e.g., health, convenience, environmental, etc.) provided by each option. Many of these were identified in Step 3, during the household interviews.

- Which options are people willing to pay for? This should have been determined from the informal interviews held in Step 3. If the interviews were not sufficient to determine willingness to pay, it might be necessary to hold a focus group or two to obtain better information on this question. It cannot be stressed enough that these activities to evaluate affordability are not as rigorous as a formal study on willingness to pay. The aim of this smaller effort is to have some reliable information to make an informed determination about affordability.

3. Management Model — For each technical option being given serious consideration, the consultant team needs to identify the institutional and human resource requirements for proper operations and management of the sanitation system and propose a management model that is feasible in the town with current resources or which could be feasible with appropriate training and technical assistance. Whatever model is recommended, it should have significant financial and operational autonomy. Direct municipal management is not a preferred option because of the tendency to use the revenues for other municipal services. In general, the model should combine water supply and sanitation to allow for cross-subsidies and better coordination and provide a means to enforce payment.

- Who will be responsible for the oversight function during the construction of the project? What mechanisms will be put in place to ensure transparency and accountability, e.g., citizen oversight, institutional oversight including government and NGOs?

- What types of management models are appropriate for each option? Examples of models include a municipal company, a cooperative management association and a management contract. What will be the roles of the municipality, central government, private sector, NGOs and community in the management of the system under each option? Describe the appropriate models for each option including the number of people that will be required and the skills that are needed.

- What impact does each option have on the operations of the town? Is there sufficient local capacity and technical expertise to provide oversight of the operating entity?

- Are there sufficient human resources in the municipality to carry out the financial, technical and management functions? What kind of training would be necessary to prepare people to manage the system? Who would pay for this training?

- Does the technical option have implications for other governmental organizations or authorities? Will there need to be approvals outside of the community and municipality? Will the community have to form a legally recognized entity?

4. Health Benefits Assessment — One of the principle objectives for a sanitation program is the protection of the health of the community. The team should describe the health benefits that will be provided by the selected options. This assessment must be carried out in the context of other health factors, such as the implications for water supply. This information will be used by the team in Step 7 to motivate the community to implement the plan. In addition, the team must propose a hygiene promotion plan that targets key hygiene behaviors. The team must identify the key issues to be addressed in a hygiene promotion program and propose a strategy for its implementation. During Step 3, preliminary information was gathered through household visits. During Step 6, additional information may be needed to determine whether the specific technologies being considered will provide adequate health benefits.

Activities during the health benefits assessment include the following:

- Review the main water and sanitation health issues from the information gathered in Step 3, especially the hygiene behaviors at the household and community level relevant to excreta disposal (most importantly children's behaviors). For example, if wastewater treatment and reuse is being considered as a viable technical option, then the team should gather information on the practices of farmers and their families in handling wastewater/excreta when irrigating crops.

- How do the proposed sanitation technology options address these health and hygiene behavior concerns? Compare the different options in terms of level of health benefits received.

- How do the proposed sanitation technology options compare to existing sanitation practices? Will the technical options being proposed require changes in household and community behaviors in order to make proper use and get maximum benefits of the proposed technologies? If so, what are they? Is it feasible that a hygiene behavior change program could achieve the required changes?

- How will the hygiene promotion program be implemented? Is it realistic for the management model being proposed to be responsible for hygiene promotion? If

not, what other institutional options exist? What would be required for designing and carrying out a hygiene promotion program?

5. Environmental Assessment — Any sanitation plan—especially one that is townwide—will have an impact on the environment. The purpose of this key activity is to identify those impacts—both good and bad—and to suggest changes that may avoid negative impacts. It is particularly important in this activity to be practical and to think in the long term. Key aspects of this activity include the following:

- Characterize the current condition of the water resources environment at the household, community and town level. This should be based on information gathered in Step 3.
- Do existing sanitation technologies and hygiene practices at the household, community and town level contribute to environmental contamination or do they improve the environment?
- Are the proposed sanitation technologies likely to improve the environment? Will they have any harmful impacts? If so, where—at the household, community or town level?
- Develop a table for the sanitation system that compares the environmental benefits versus environmental harm. This table should be included in the proposed plan and discussed with the community in Step 7.
- Provide suggestions on how harmful environmental impacts may be curtailed, including long-range activities.

6. Policy Constraints — Are there any policy constraints at the national level that would pose serious obstacles to implementation of the sanitation plan? Examples of potential obstacles include the following:

- required engineering design parameters
- effluent levels for different types of receiving waters
- legal requirements for the community to run the system, including the authority to borrow and manage financial resources
- ground water regulations
- allowable technologies.

Can these obstacles be addressed so the project can move forward?

Products

The overall analysis carried out in Step 6 will be presented in Step 7 to the town. This analysis should be captured in summary form for presentation. The presentation should have the following components:

- detailed description of the technical options, including a comparison of benefits and costs
- financial analysis including summary of costs, potential sources for financing capital investments and tariffs and user fees required to support the system on a sustainable basis
- description of the model for managing the improved sanitation services
- hygiene improvement plan, including the institutional roles and responsibilities
- identification of environmental impacts and benefits
- identification of any policy issues that must be addressed before implementing the plan
- identification of next steps and the role of the community in supporting the plan.

This presentation should be prepared in written form. It should include key points on transparencies or other slides, such as a PowerPoint presentation.

Examples of expenditure and affordability tables, as well as financial presentations, are among the tools provided for the Step 6, beginning on the next page.

Step 6 Tool — Expenditures and Affordability Tables

Below are two simple tables to assist in determining the affordability of the proposed sanitation plan—one showing current household expenditures and the other illustrating how to assess affordability.

Current Expenditures	
Key Data Needed	***Expenditures***
Average household yearly income	
Average yearly household expenditures for water supply	
Percentage of household income for expenditures for water supply	
Average yearly recurrent household expenditures for sanitation	
Percentage of household income for yearly expenditures for sanitation	

Affordability of Proposed Sanitation Plan	
Key Data Needed	***Annual Averages***
Projected average yearly bill for sanitation	
Average yearly household income	
Average yearly sanitation bill as % of household income	

Step 6 Tool — Sample Financial Presentation

The financial presentations given below show the line items in determining the cost of the project and the impact of financing options on tariffs.

Timeline for Project Expenditures

Project Item	Year			Total Expenditures (U.S. dollars)
	1	2	3	
Engineering studies and final designs	$300,000			$300,000
Purchase of land	40,000			40,000
Training	20,000			20,000
Supervision		$56,835	$40,365	97,200
Administration		47,362	33,637.50	81,000
Physical Works		947,250	672,750	1,620,000
Subtotal	360,000			2,158,200
Contingencies:				
Technical		52,572.38	37,337.63	89,910
Price-related	9,000	84,115.80	59,740.20	143.856
Total	**$369,000**	**$1,188.135.68**	**$843,830.33**	**$2,400.966**

The above is taken from a 2002 sanitation plan for La Cabima, Panama. The plan calls for construction of a sewage collection and a treatment plant for a town of 2,500 households and total population of approximately 14,000.

Tariff Calculation under Differing Financing Scenarios and Investment Options

This table shows the impact of the terms of capital investment on tariffs. It assumes interest rates during construction of 1% for inspection and supervision, ¾% for commission of credit on non-disbursed funds and an annual interest rate of 2% over a 20-year repayment period for capital received.

Detail of Costs	**Financing of…**						**Grant**	
	100%		65%		50%		0%	
	Tariff $	**∑ $**	**Tariff $**	**∑ $**	**Tariff $**	**∑ $**	**Tariff $**	**∑ $**
Operation and maintenance	2.50		2.50		2.50		2.50	
Depreciation	1.25		1.25		1.25		0.50	
Interest	1.25		0.75		0.50		–	
Amortization	2.00	7.00	1.00	5.50	0.50	4.75	–	3.00
Cost increase at year 6	10%	7.70	–	–	7.5%	5.1.35	–	–

Taken from the environmental sanitation plan for La Cabima, Panama, these tariffs were calculated for illustrative purposes and show average monthly tariffs per household under different capital financing scenarios. The tariffs presented are not linked to consumption but represent averages per household.

Step 7 — Meeting with Stakeholders to Discuss Detailed Options

Rationale

The purpose of this step is to present the detailed options developed in Step 6 to the community in order to obtain the community's reaction and comments.

The community must have a clear understanding of what the options entail, especially the financial implications. This is the third and final time during the development of a sanitation plan that the community will be consulted through public meetings. The public will need to be reminded that their input is essential and that no formal decision can be made without their support. In addition to consulting with the entire community, it also may be necessary to consult separately with institutional stakeholders.

Expected Outcomes

- ***general acceptance of the tariffs required to make the sanitation services sustainable***
- ***general acceptance of the technical options, especially the level of service provided***
- ***acceptance of the management options for the system***
- ***acceptance of the proposed approach to hygiene promotion***
- ***understanding of the tradeoffs required to achieve an equitable solution in terms of benefits and costs and the number of people served***
- ***identification of outstanding issues that will need to resolved before moving forward***
- ***clear understanding of next steps.***

Key Information Needs

The following information will be needed in Step 7:

- presentation materials prepared in Step 6
- list of key institutional stakeholders (should be the same as those in Steps 2 and 5)
- list of representatives of each section or key interest of town to ensure broad-based participation.

Key Activities

1. Design a Strategy for Presenting and Discussing the Detailed Options with the Community — Normally, this strategy will be similar to the one used in Steps 2 and 5, but it is possible the community and consultant team may want to make some modifications. Depending on the size of the town, this strategy could include more than one public meeting. In addition to a general public meeting, sessions might be designed for institutional stakeholders or central government decision-makers responsible for sanitation. A sample agenda for the public meeting appears on page 120.

2. Hold the public meetings — After a strategy is developed, the meetings should be scheduled and organized, making sure that everyone has adequate advance notice and the logistics for the meeting are prepared. Ensure that the presentation materials and handout materials are ready. The presentation should use visual materials, preferably slides such as overhead projections or, if the technology is available, a PowerPoint presentation.

3. Meeting Memorandum — After discussing the options in meetings with stakeholders, summarize the results in a memorandum. This should summarize the reaction of the community to the presentation and identify any issues needing resolution. These results should be discussed with key local officials and the officials should help determine how any unresolved issues will be addressed.

Products

As mentioned above, the results of the stakeholder discussions should be captured in a memorandum, which will become the product of Step 7. This memorandum should summarize the reaction of the community to the presentation, identify those issues needing resolution and suggest next steps. Because Step 7 is the final participatory meeting between the consulting team and the community, the meeting should result in the identification of those individuals who will continue to promote and market the sanitation plan, if needed.

Step 7 Tool — Sample Agenda for Final Public Meeting

Duration: 3 hours

Objectives:

- Discuss and analyze with participants the key points proposed for sanitation plan.
- Gain community understanding and agreement on the technical options, the institutional designs, and the costs and financing strategies.
- Ensure that there is a community group responsible for following up on the plan.

Meeting plan:

1. Opening — introductions and review of activities to date. (10 minutes)
2. Present and discuss technical option—team engineer. (40 minutes)
3. Present and discuss management/institutional option—team engineer. (20 minutes)
4. Present and discuss hygiene promotion strategy—participation specialist. (20 minutes)
5. Present and discuss cost/financing scenarios—financial specialist. (45 minutes)
6. Discussion of overall plan and summary of key issues raised by the community. (30 minutes)
7. Discuss next steps. (15 minutes)

Note: Agenda items 2-5 should be evenly divided between presentation and discussion.

Materials:

Overhead projector, prepared acetates, paper, blank acetates, felt tip markers, photos of technology and system

Step 8 — Deciding on One Option by Local/National Decision-makers

Rationale

The purpose of this step is to assist the appropriate local and national leaders responsible for making the key decisions involving the sanitation plan.

In a decentralized system where responsibilities rest with the municipality, the decision-making responsibility lies squarely with the municipal elected officials. In more centralized systems, national agencies responsible for sanitation are also involved in decisions.

Decisions should take into account the preferences expressed by the community during the public consultation process. This step brings together two important themes woven throughout the methodology—the need to improve sanitation services and the value of strengthening local government. In a decentralized system, local government should have the responsibility for the provision of public services, including sanitation. This does not diminish the importance of the public consultation process, but ultimately the key decisions should be made by those elected to represent the community. At both the municipal and national central agency level, key leaders may require help from the technical assistance team in order to make a well-informed final decision that considers all the technical, financial, health, environmental and institutional issues.

Expected outcomes

The major outcome of this step is a decision by the municipality or responsible central agency on all the main elements of the sanitation plan. The specific elements are listed on the next page.

Expected Outcomes

- ***Selection of the technical option for managing excreta or wastewater at the household level, transporting the wastewater from the household and community, and treatment and disposal.***
- ***Clear understanding of the capital costs and a realistic plan for financing them.***
- ***Agreement on the tariffs and fees for financing recurrent costs.***
- ***Agreement on the way the sanitation services will be managed and the steps that will be required to put a management model in place.***
- ***Understanding of the environmental impacts of the plan.***
- ***Agreement on the steps necessary to maximize health benefits.***

Key Information Needs

At this point in the process, most of the information needed for this step should already have been collected. It is possible that, as a result of the consultations in Step 7, some additional information will be needed to make revisions in the proposed plan. Such information should be collected prior to organizing the meeting with municipal officials, described below.

Key Activities

1. Make Final Revisions to the Outline for the Sanitation Plan — These revisions should reflect comments from the community in the public consultation process conducted in Step 7.

2. Organize a Meeting with Municipal Officials (Mayor and Local Council) and Other Key Decision-makers — This meeting should be carefully prepared and the issues that need discussion clearly identified. The team should identify the decision points for the municipality in the following areas:

- financing capital costs
- financing recurrent costs to ensure sustainability
- technology selection for the sanitation trains

- environmental impacts (including a plan for explaining to the public why it is important to consider environmental protection)
- management model to manage the system
- plan to maximize health benefits
- follow-up on the plan.

3. Meetings with Decision-makers — Hold a meeting or series of meetings with the appropriate municipal leaders and, if necessary, national agency officials. The municipality or central agency involved should manage their meetings, with the assistance of the consultant team. The result of these meetings should be an agreement on all the major points of the sanitation plan. The process should include agreements with the municipality leaders on how the community will be informed of their decisions and what the next steps will be. The municipal officials should be responsible for informing the community—not the consultant team.

Products

Capture the decisions and agreements in writing, to be used in preparing the detailed plan in Step 9. This should be shared with municipal and community representatives who will become responsible for managing the plan.

Step 9 — Final Sanitation Plan and Report

Rationale

The purpose of this step is to prepare a final plan and report that can be submitted to municipal authorities and potential donors as appropriate.

The final document should follow closely the agreements reached in Step 8. The exact format for the final product will vary depending on the requirements of the financing source. Each donor and national agency generally has its own requirements for submission of funding proposals, and these should be followed.

Although it is expected that the consultant team will write the plan, the municipality's leadership should be closely involved, so they feel ownership over the document.

The expected outcomes for this step are listed below.

Expected Outcomes

The primary outcome will be a plan that does the following:

- ***Summarizes the process undertaken to involve all stakeholders in decision-making.***
- ***Describes the quality and quantity of information collected and clearly state any deficiencies in the data.***
- ***Briefly describes various options considered and their comparative costs and benefits***
- ***Describes the demand from the users—what benefits they are looking for in sanitation and how much are they willing to pay.***
- ***Describes in detail the actual sanitation plan.***
- ***Identifies any factors that may be of concern.***
- ***Clearly lays out the next steps for implementation of the sanitation plan.***

Key Information Needs

No new information should be needed at this point.

Key Activities

1. **Prepare a First Draft of the Final Report** — Submit the draft to the municipality and/or responsible agencies for review.

2. **Revise the Report** — Submit the report to the appropriate funding agency. It may be more appropriate for the municipality to submit the report.

3. **Finalize the Report —** Based on comments from the funding agency, revise and finalize the report.

Products

A final report and plan is the product for Step 9. On the next page, a suggested outline is provided for the final report. As previously indicated, the appropriate funding may suggest revisions to a draft of the report, and may require a different format.

Step 9 Tool — Typical Outline for Sanitation Plan

Title: Plan for Sustainable Sanitation Services in (Name of Town)

Acknowledgements

Acknowledge all people in the town and elsewhere who provided information and played key roles in the process.

Executive summary

Overview of the plan (not to exceed three pages)

1. Introduction

Describe the principles and process for developing the plan.

2. Description of the town

- boundaries of the town
- local government
- population
- economic development
- municipal services
- experience with participatory planning.

3. Current status of sanitation

- existing sanitation coverage and level of service
- existing water supply coverage and level of service
- existing management of WS&S
- current expenditures by households on WS&S
- current health conditions and related hygiene practices
- current environmental conditions of water sources

4. Recommended technical option

- summary of the options considered and why this one was selected
- environmental impacts

5. Proposed financing arrangements

- capital costs
- recurrent costs

- affordability analysis
- financing sources

6. Recommended management option

- management model (management contract, public company, etc.)
- staffing plan

7. Recommended hygiene improvement program

- key messages
- roles and responsibilities

8. Timeline for project implementation

9. Conclusion

- outstanding issues
- next steps

Step 10 — Developing an Action Plan to Implement the Proposed Sanitation Plan

Rationale

The purpose of this step is to assist the town in developing the actions needed to follow up on the plan.

If the planning methodology is implemented within the context of a program that includes financing, then follow-up steps are likely to be clear. However, if the plan has been prepared with a town that is not participating in a larger program—or does not have assured financing to implement the sanitation plan—the town will need a specific follow-up plan. The plan will serve to access capital resources for engineering designs and system construction.

In these cases, the team should work with the town and other entities (e.g., national government agencies, NGOs) to form a town strategy to access financing. The team can assist in preparing the town leaders to present the project to audiences and to market the project to different types of financing entities—banks, donor agencies, government investment funds. This same town group also may need to continue marketing the sanitation plan to the residents of the town itself—to follow up with those residents who may not have participated in the planning activity.

The expected outcomes are listed below.

Expected Outcomes

- ***A town strategy for marketing the project to different types of financing organizations.***
- ***A town committee that is responsible for marketing the plan to community and to possible financing institutions.***
- ***Identification of local businesses — engineers and construction firms — that can act as local technical resources.***
- ***A clear understanding what financial resources may be available and what the follow up is for the municipality and community to pursue them.***

Key Information Needs

- List possible sources of funding or technical assistance for the project. These sources and contact information should be collected by the financial specialist on the team.
- Obtain a clear understanding of how each of these funding entities work—what criteria they use to award funding, what paperwork is required and how decisions are made.
- If the town or municipality is not a legally recognized entity, information is needed on how to obtain legal recognition that would allow the group to collect and manage funds and to act on the behalf of the town.
- List key people outside of the community who could help promote the town sanitation plan (not necessarily people affiliated with a funding entity). These people could be representatives from government ministries, NGOs, or elected officials.

Key Activities

Although the specific activities in this step depend on the nature of the town government and the external funding/financial environment, the following activities are likely to be included:

1. Collect Required Information — As detailed above, collect the needed information. A good deal of this information would have been collected already during earlier stages of the planning methodology.

2. Hold Meetings with Key Decision-makers and Local Leaders — As appropriate, hold meetings that can facilitate a process resulting in:

- creation of a committee than can provide follow-up
- an outline of a strategy that identifies the process and steps to implement the sanitation plan, including capital financing and follow-on technical assistance (likely to consist of making presentations to key financial or donor organizations, government ministries or elected officials to gain their support)
- an outline of a public information campaign to inform town residents about tariffs and other important details (during planning,, only a small percentage of residents are likely to participate in the public meetings)
- identification of local technical resources that can assist the committee.

Products

Step 10 may result in two products:

- a written strategy for external capital investment (if needed)
- a strategy for local information dissemination about the project intended to build local support.