



LESSONS LEARNED

In Water, Sanitation and Health

WASH Technical Series #1

Prepared by the National Water Research Institute
for the Water and Sanitation for Health Project



WATER AND SANITATION
FOR HEALTH PROJECT

Lessons Learned in Water, Sanitation and Health

**Thirteen Years of Experience
in Developing Countries**

**Compiled by the Staff of the
Water and Sanitation for Health (WASH) Project
with the Editorial Guidance of
Diane B. Bendahmane**

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In memory of
DAVID DONALDSON
RAYMOND B. ISELY
and
DAVID YOHALEM

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Foreword

Over a decade ago, the WASH Project was established by A.I.D. in response to the inauguration of the Water Decade in 1980. Since then, WASH has made important contributions to the shaping and implementation of A.I.D.'s efforts in water and sanitation, to which A.I.D. has allocated more than \$2 billion since 1980. While the project was originally designed with a strong engineering orientation, it became apparent that the long-term success of the water and sanitation sector was dependent on good planning, supportive policies, strong community participation, and adequate financing. These realizations led to pioneering work by the WASH Project in the areas of community participation, policy dialogue, training, team planning, health financing, and institutional and human resources development, and prompted WASH to publish the first "Lessons Learned" in 1990.

In the three years that have elapsed, WASH has continued to define the barriers and opportunities inherent in water and sanitation development. The emergence of cholera in the Americas, the plight of the Kurdish refugees, expanded work in Eastern Europe and the newly independent states of the former Soviet Union, and the burgeoning problems of the urban poor have provided further challenges and have added to the need for new and more flexible water and sanitation approaches. As WASH has responded to these new challenges, it has anticipated many of the themes A.I.D. has adopted to guide its work in the post-Cold War environment, including support for sustainable development, emphasis on participation, and integrated approaches and methods.

As we learn from this most recent edition of "Lessons Learned," sustainable development of the water and sanitation sector is not simply the completion of a facility or the installation of a handpump but the way in which these interventions help people improve the quality of their lives. Even more important, we see that sustainable development provokes change—change in how power is distributed and technologies disseminated.

The theme of participation is explored in this report through a discussion of partnership among donors, governments, nongovernmental organizations, and for-profit private firms. The notion of partnership imposes certain responsibilities on host governments and their communities. As illustrated through WASH's experience, these responsibilities and roles must be meaningful and clearly defined. It is the donor's role to assist, but the responsibility for development ultimately belongs to the recipient nation. Our goal through these partnerships is to empower individuals and communities, and increase the accountability of governmental and nongovernmental institutions to the people they serve.

Towards realizing this goal, women represent a particularly valuable partner. Because of the unique roles women play as workers, as food producers, as health providers and teachers of their children, as managers of natural resources, and as community leaders, they represent an enormous resource of untapped potential for implementation of community-based water and sanitation projects.

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Through the WASH Project we have also learned of the strategic importance of partnerships with other donors. Collaboration not only enables A.I.D. to share information and to leverage additional financial resources but also to tap the skills and talents of others.

The thirteen years of WASH have underscored the importance of integrated approaches and methods, the third new A.I.D. theme. When identifying root causes for the lack of potable water or adequate sanitation, WASH has taken a broad view and has examined not only technology needs but also social, economic, political, and cultural factors.

In July 1993, J. Brian Atwood, the Administrator for A.I.D., laid out the future course for the Agency, a course defined by four overarching principles for sustainable development: a commitment to democratic initiatives, economic development, environmental protection, and promotion of health and sound population programs. To meet the challenge posed by this new course, the Office of Health inaugurated the Environmental Health Project.

This new project will closely resemble the WASH Project in how it operates—that is, its main job will be to provide support to A.I.D. through technical assistance to missions and bureaus and to disseminate information. But, where WASH's scope of work was limited to water and sanitation, the Environmental Health Project will encompass nine subsectors: 1) tropical diseases; 2) water supply and sanitation; 3) solid waste; 4) wastewater; 5) air pollution; 6) food hygiene; 7) hazardous materials; 8) occupational health; and 9) injury. A.I.D. has already been active in the first four of these. The last five are new areas.

These nine subsectors were chosen because, as was illustrated in the World Bank's 1993 World Development Report on Health, they individually and collectively address the major causes of the world's health burden. They were also chosen because they offer recipient countries the opportunity, through assistance from A.I.D. and other donors, to develop a new paradigm for assessing and managing their health and social/economic burdens based on the linkage of each of these sectors to environmental problems ranging from the direct health impacts of human interactions with the environment to indirect health impacts of environmental degradation.

The recent focus on environmental issues world-wide has served to spotlight the close relationship between the environment and public health. Environmental health programs, however, have barely kept pace with rural needs and have fallen far short of the needs of the more rapidly growing peri-urban populations. Since these poor rural and urban populations are the basis for both agricultural and industrial productivity, provision of basic environmental health services is a first step towards improved health and economic development.

As we within A.I.D. prepare to meet the challenges laid out for us by the Administrator, we will have to do so without WASH. After thirteen years and over 800 technical assistance assignments in 85 countries WASH will be coming to an end. The end of the WASH Project does not mean, however, any less of a commitment on the part of A.I.D. to the water and sanitation sector. In many ways, WASH has been a pioneer. It was the first centrally funded project to provide spe-

cialized technical services for A.I.D. Also, WASH has identified the limitations of addressing the burdens of environmental degradation through a single sector.

As A.I.D. moves forward with the new Environmental Health Project, WASH staff members can look back with pride on their solid accomplishments and appreciate that much of what A.I.D. will be doing in the future is owing to their efforts and to the efforts of the A.I.D. technical staff who helped to formulate the lessons contained in this report. On behalf of the Office of Health, I would like to congratulate the WASH family—staff, consultants, and A.I.D. personnel—for a job well done. In reality they are the authors of "Lessons Learned."

In the years to come, through the broader mandate of the Environmental Health Project, more lessons will undoubtedly be added to the twenty presented here. We personally look forward to sharing those lessons with all who are striving to lessen the burden of ill health in the developing world.

*Bob Wrin
Acting Director
Office of Health*

Preface: The Road Ahead

This revision of the 1990 edition of "Lessons Learned from the WASH Project," timed to coincide with the end of the Water and Sanitation for Health Project, gives WASH a chance to have its last word on water and sanitation technical assistance. WASH has always been a learning organization, one that is able to examine its experience critically and own up to its mistakes. Also, WASH has had the good fortune to be allowed to use a portion of its resources to carry out applied research, write think pieces, host conferences, and so on, to advance the state of knowledge about water and sanitation. WASH has always tried to maintain a steady technical assistance course, concentrating on capacity building and sound development practices, and to stay flexible enough to adjust its course based on its learning and the needs of its client, A.I.D. For these reasons it seemed natural to end the project by looking back over all thirteen years of WASH history—especially the three years since the first edition was published—to make sure that we communicate to our colleagues in the water and sanitation sector the fruits of our experience.

Preparation of this volume has obliged all WASH staff to look back on their work for the project. I too have looked back on my own eight years with WASH: first as the associate director for engineering and for the last five years as the project director. I came into the project with a strictly technical perspective, but my perspective has changed dramatically. The multi-disciplinary nature of WASH exposed me to ideas that have broadened my viewpoint beyond the technical and profoundly shaped my understanding of development and management. While I appreciate more than ever the importance of sound technical advice, I have an even stronger appreciation for what it takes to establish the right context in which sound development takes place.

I have also come to understand that, while strong management is essential for a project as complex as WASH, the course the project should take is best set through teamwork by people with varied skills and experiences and with the courage and imagination to constructively challenge fundamental assumptions. I now believe that WASH's success is the product of good communication and trust, both internally and with A.I.D. In fact, all sound development relies on communication and trust. My own lesson learned is that the project director's job, above all, is to foster the maximum participation of staff and subcontractors. The principles that WASH has lived by—teamwork, communication, trust, wide participation, and a willingness to challenge accepted wisdom—have benefited developing countries, and I hope that they will become common practice in international technical assistance projects.

In the preface to the 1990 edition I mentioned that the lessons reflected WASH's realization that bringing about improvements in water and sanitation is mainly a human rather than a technical problem and that consequently, many of the lessons could be applied to all development activities, not just water and sani-

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tation. These statements are still true; if anything, WASH is even more convinced that changes in people and their institutions are key, even in fields as technical as wastewater management.

Admittedly, WASH cannot take credit for having formulated all these lessons on its own; the insights of many persons and organizations with whom WASH works have contributed to the lessons, as has our collaboration with other water and sanitation organizations that now speak almost with one voice about how the task before us should be achieved. Thus are the lessons validated and substantiated.

The style established in the first edition was followed in the second also: the book is relatively free of jargon and acronyms and is written in a simple, straightforward fashion. No footnotes or references to written documents break into the text, although a rather extensive bibliography of source material is given at the end. The report is not meant to be academic but is a practical work drawn on the insights of practitioners.

Like the first edition, this edition also has its limitations. The most important one to keep in mind is that it does not claim to be comprehensive. It tries to cover all the lessons that flow from WASH experience, but there are areas in which WASH does not have enough experience to speak out. If this book is silent on some topics, that does not imply that those topics are not important. Another limitation is that WASH, as a provider of short-term technical assistance, does not have much to say about how long-term technical assistance should be provided. Still another is that we have opted in favor of breadth over depth. Readers who wish to examine some of the lessons in more depth will have to consult appropriate WASH technical or field reports listed in the bibliography.

* * *

WASH will end as a project in November 1993, but that does not mean that A.I.D. will no longer provide technical assistance in water and sanitation. Work will be continued under a new project that will seek to gather together under one roof programs to address the root environmental causes of many serious health problems. The Environmental Health Project will offer technical assistance in water, sanitation, wastewater management, tropical disease control, air pollution, toxic and hazardous wastes, food hygiene, occupational health, and injury control.

On the road ahead, the lessons in this book will be applied in circumstances that in many respects are quite different from what WASH had to deal with in the 1980s and early 1990s. The landscape is changing and those changes will demand equivalent changes in how development work is carried out.

Perhaps the most striking change in the landscape is the breakup of the former Soviet Union and the end of Soviet hegemony in Eastern Europe. Communism, centralized planning, and command economies have been discredited. Free market forces and democratic institutions are now in the ascendancy, but many of the countries have severe environmental health problems brought about by uncontrolled industrialization and neglect of the environment.

The U. S. government is still trying to adjust to this change and to find a new "war" to wage that can be fought with as much vigor as the Cold War was fought. It is likely that the new paradigm will stress the importance of developing business and trading partners, but that aside, this major change in the landscape has a number of implications for WASH's successor organization.

- A.I.D. will continue to increase its activities in the newly independent states and Eastern Europe. These countries are more developed than the countries WASH and other agencies have worked with in the past. Providing technical assistance to these more developed countries will probably involve more work of a collaborative nature with other U.S. agencies, such as the U.S. Environmental Protection Agency, and multilateral agencies, such as the World Bank.
- The promotion of trade and markets for U.S. business is a worthwhile goal, but little is known about how development assistance can help to achieve that goal. WASH's successor project will have to assure, for example, that the achievement of this goal does not result in an over-emphasis on technologies or in neglect of the principles of technology transfer.

On the whole, the direction in which WASH is heading is compatible with this change in landscape. The WASH approach, which stresses community involvement and management, decentralization of water and sanitation agencies, and the role of public participation, supports the growth of democracy. Non-project assistance, especially the type that helps countries improve and strengthen their institutions and develop the capacity to solve their own problems—WASH's stock-in-trade, is also supportive of the development of free-market democracies. Finally, the inauguration of a new project organized around environmental health should make it easier for A.I.D. to address some of the most severe health problems of these new "developing" countries.

The road ahead is post-Rio and post-Decade. These two events have changed the attitudes and practices of development assistance.

The U.N. Conference on the Environment and Development, held in June 1992 in Rio de Janeiro, Brazil, has made it impossible to think about development without taking into account its effect on the environment. The development concept of "sustainability" now implies environmental sustainability. Consciousness about the importance of protecting the environment was raised by UNCED in virtually all regions of the earth.

In the post-Rio world, more development resources will be spent on programs to protect or to clean up the environment. In addition, more aspects of development will be drawn into the environmental circle, be viewed through an environmental optic. For example, wastewater management will be seen as an aspect of integrated water resources management.

In the post-Water Decade world, realism has taken the place of unrealistic goals and simplistic beliefs about how water and sanitation coverage can be extended. Without demeaning the many accomplishments of the U.N. International

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Decade for Drinking Water Supply and Sanitation (1981-1990), it cannot be denied that it was a disappointment. "Water and sanitation for all by 1990" sounds today like an unbelievably naive goal. The experiences of the Decade had a chastening effect as development organizations learned painfully how difficult it was to make lasting improvements in water and sanitation and to change ingrained hygiene-related behaviors.

When those who had labored hard during the Decade took stock, they concluded that the lack of institutional capacity had not been sufficiently addressed, that a wider selection of options should be considered—technical, managerial, policy, and public participation, and that solutions to water and sanitation problems are local. The Decade's international campaign with its emphasis on coverage figures may have encouraged countries to put all their resources into installing facilities and to give minimal attention to behavioral and institutional needs.

While some features of the landscape are new, many are only too familiar. Development work will continue to take place, for example, in an atmosphere of straitened resources. In the 1980s, developing countries saw their resources eaten up with interest payments that came due in the wake of petro-dollar borrowing. Many have had to go through painful economic restructuring to be eligible for international loans. For industrialized countries the 1980s was a period of expansion, but these same countries—even the most prosperous ones—are now in an economic recession. Many national economies seem to be foundering; money is tight; debts are high. Where water and sanitation services are needed, government largesse is a thing of the past, and industrialized countries, feeling pressed themselves, will tend to cut back on funding for overseas development.

The lack of resources will continue to shape development assistance in water and sanitation (and also in other sectors) in many ways:

- Developing countries will place greater emphasis on health impacts, cost recovery, efficiency, and low-cost service options. Public sector water and sanitation institutions, lacking the capacity to meet the public's needs with their tight budgets, will seek to decentralize and to transfer responsibility for water and sanitation to users, the private sector, and nongovernmental organizations. Unfortunately, there is little experience about how this can be done effectively. Because competition for government funds will increase, those agencies which can articulate their needs and the value of the services they provide will have an edge over those which cannot.
- Developed countries will be pressured by their citizens to favor aid that "comes back" in the form of increased trade and business opportunities and to be able to show results and impact.

Population growth and urbanization appear unstoppable in the short term, at least. They will continue to multiply the problems of the sector.

Population growth has slowed in some countries, but the effects of the slowdown will not be felt for some time. Unless resources devoted to water and sani-

tation are substantially increased or used much more effectively, progress in extending coverage will continue to be very slow, many environmental health problems will worsen and push up the price of providing services, and water scarcity will become a hotter issue.

Urbanization, as it is currently taking place, has turned the traditional concept on its head. In standard urbanization, suitable land was obtained by a private individual or by a municipality and provided with infrastructure—roads, sewers, water mains, electricity—and then sold as lots for houses. Today urbanization takes place in reverse. Land near big cities—often the worst land, land that is not suitable for traditional urbanization—is settled by new residents from the countryside. They buy or occupy this land and build shanties on it. No infrastructure exists; it has to be supplied later—a far more difficult proposition once the houses are there. The question facing the sector is how can services be supplied to such communities? This topic merits a lot more attention than it has received.

It is not possible to discuss the road ahead without mentioning the changes that A.I.D. will doubtless undergo in the 1993-94 fiscal year and onwards. The new administrator, J. Brian Atwood, in his budget request statement before the Senate Subcommittee on International Economic Policy, Trade, Oceans and Environment of the Committee on Foreign Relations, July 14, 1993, pointed out that in the post-Cold War environment, global development programs that pose a strategic threat are overpopulation, environmental degradation, endemic poverty, and mass migration. These threaten the political and economic interests of the United States and its allies; therefore it is in our national interest to use development assistance to address these issues through sustainable programs. He goes on to discuss how the four areas he has chosen to emphasize—environment, population and health, economic growth, and democracy—are central to our national interest.

As I stated at the beginning of this preface, the WASH Project will soon be a thing of the past, but that does not mean that the lessons in this book are to be shelved like an ancient history. The lessons are based on past experience, but they are meant to be used to guide development work on the road ahead. They may have to be adjusted and they will be continually refined as the sector faces new problems and tries to grasp new opportunities. My hope is that they will help those of us who work in water and sanitation to come a bit closer to the day when the lack of clean water and sanitation will not loom so large in the catalogue of development problems.

*J. Ellis Turner
WASH Project Director
August 1993*

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J. Ellis Turner
WASH Project Director



Mother and daughter washing dishes in the street outside their Cairo home.

Chapter 1: BASIC PRINCIPLES

The Concept of Development

More than 100 countries have advanced to independent nationhood over the past half-century, and the economic, social, and political development of these countries has become a major goal of the entire international community. In the past half-decade, these developing countries have been joined by Eastern European nations and the newly independent states of the former Soviet Union as recipients of international aid. European countries and many of the newly independent states have passed through the process of industrialization, but for them, many basic development problems remain unsolved. Other problems, with

Although there is no precise definition of development, it is widely understood to be a process resulting at least in improved health and longevity, higher productivity and living standards, enhanced local problem-solving capability, and increased access to essential goods and services.

more far-reaching health impacts, have resulted from centralized and badly managed institutions and controlled and artificial economies.

Although there is no precise definition of development, it is widely understood to be a process resulting at least in improved health and longevity, higher productivity and living standards, enhanced local problem-solving capability, and increased access to essential goods and services. "Developed" countries are those that have already gone through the process; "developing" nations are those still in transition.

A country's development process, to be successful, must be total, eventually covering all areas of national life. However, in order to set priorities and allocate scarce resources, governments commonly pursue development goals within specialized areas, each with its own problems and its own set of relevant policies and technologies. Traditionally, these specialized areas of development—agriculture, education, and health, for example—are called "sectors." The sector provides the organizing focus for the planning, implementation, and management of development activities.

One of the most important sectors for development has been the provision of potable water supplies, sanitation, and hygiene education to urban, peri-urban, and rural communities. Improvements in these areas are essential to promoting health for the general population and for child survival in particular, and are fundamental for the development of many industries and businesses and overall urban expansion. Major water supply and sanitation facilities, especially those serving urban areas and economic centers, form part of the national infrastructure like roads and electric power grids do. In rural areas, improving water supplies, providing adequate sanitation, and encouraging safe hygiene practices are intrinsic to community development. Accordingly, the international development community has made a substantial investment in water supply and sanitation.

The Importance of Water and Sanitation

Water supply and sanitation are fundamental building blocks in the development process, influencing economic development, employment, agriculture, housing, health, and numerous other sectors. These benefits are spread broadly across societal concerns. However, support and financing for water supply and sanitation projects are usually most effectively justified on health grounds. As Dr. Halfdan Mahler, former director-general of the World Health Organization, has said, "The number of water taps per 1,000 persons is a better indicator of health than the number of hospital beds."

Health benefits result from improved quality and increased quantities of water, adequate sanitation facilities, and changes in hygiene behavior. For a number of waterborne diseases (e.g., dracunculiasis and cholera), transmission occurs as a direct result of drinking contaminated water. In other cases, the transmission cycle is through contact (e.g., schistosomiasis). Water also provides a breeding site for disease carrying vectors (e.g., malaria-bearing mosquitoes). Inadequate water for washing hands and cooking utensils and poor sanitation practices often result in diarrheal diseases. Disease and poor health exact a heavy burden on the economy, the community, the family, and the individual. Improvements in water supply and sanitation can reduce the incidence of many of these diseases or eliminate them entirely.

Study after study indicates that children benefit greatly from improvements in water supply and sanitation. Improved water supplies and sanitation practices are instrumental in reducing infant mortality, preventing diarrhea, and improving child nutrition and overall health, and this fact can and should be used as a powerful lever in garnering support for water supply and sanitation improvements.

In addition, unlike many other types of health interventions, water supply and sanitation improvements result in a whole range of secondary, nonhealth benefits. They provide economic benefits for the population as a whole and for women in particular by reducing the time spent in getting water. Unfortunately, it can be difficult to demonstrate the

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Unlike many other types of health interventions, water supply and sanitation improvements result in a whole range of secondary, nonhealth benefits.

Evidence suggests that negative health effects multiply upon the decline of adequate water and sanitation. For example, the return of cholera to Latin America in 1991 may be seen as an indication that water and sanitation conditions are worsening.

many benefits of improved water and sanitation conclusively through conventional cost-effectiveness techniques.

Water supply and sanitation facilities are necessary but not always sufficient by themselves to achieve substantial disease reduction. Rather than showing an immediate and direct impact on disease reduction, water supply and sanitation facilities appear to have a long-run "multiplier" effect that reduces mortality as a result of environmental improvement. One of the few sets of data available corroborate this effect. It indicates that in urban France in the nineteenth century, sharp drops in mortality patterns coincided with the introduction of piped water and sewer systems. Evidence also suggests that negative health effects multiply upon the decline of adequate water and sanitation. For example, the return of cholera to Latin America in 1991 may be seen as an indication that water and sanitation conditions are worsening as increased population and urbanization stretch the resources of already poor countries to the breaking point.

Diarrheal disease control. In terms of the health benefits of improved water and sanitation, reduction of diarrheal disease heads the list. Diarrheal diseases that result from contaminated water kill approximately 2 million children annually. Diarrhea also affects childhood nutrition. The primary cause of growth failure in developing-country children is poor nutrition, resulting in part from frequent bouts of diarrhea. Also, repeated bouts of diarrhea inhibit the ability of the body to absorb food. Thus children already at risk of dying because of the effects of diarrhea are also at risk nutritionally. Diarrhea, along with shortages of food, keeps growth rates below standard for most poor children despite medical and nutritional interventions.

Although it is difficult to establish the precise relationship between improved water supply and sanitation and the incidence of diarrheal disease, the linkage is well supported. Quantity of water, as well as quality, has been shown to be a key factor in reducing diarrheal diseases because of the more frequent bathing, more careful washing of food, and greater general cleanliness that result from increased availability of water. Similarly, improved sanitation has

been demonstrated to impart significant positive effects. A WASH study analyzing data on more than 2,000 children in Guatemala showed that stunting, as a measure of child health and nutritional status, is more than twice as likely to occur among children living in communities with poor sanitation than among those who live in communities with high levels of sanitation.

A WASH report surveying 142 studies on the impact of improved water and sanitation facilities on six water-related diseases concluded that broad health impacts can be expected from improvements in water and sanitation: people are less likely to contract the diseases, and when they do, their case is usually less severe. Tables 1 and 2, taken from the study, show the heavy toll of water-related diseases (using mid-1980's data) and the range of expected reductions in morbidity that various water and sanitation and hygiene education interventions can bring about. More studies on the health impact of various water and sanitation interventions are needed so that development strategies can be perfected.

Quantity of water, as well as quality, has been shown to be a key factor in reducing diarrheal diseases because of the more frequent bathing, more careful washing of food, and greater general cleanliness that result from increased availability of water.

Preventative and curative strategies. In recent years, more immediate and less costly interventions to improve child health have received a great deal of at-

TABLE 1
Incidence and Effects of Selected Diseases
in Developing Countries
(excluding China)

Disease	Incidence	Estimated Deaths/Year
Diarrhea	875 million*	4,600,000
Ascariasis	900 million	20,000
Guinea worm	4 million	**
Schistosomiasis	200 million	**
Hookworm	800 million	**
Trachoma	500 million	***

* Estimated cases per year

** Effect is usually debilitation rather than death

*** Major disability is blindness

Source: Steven A. Esrey *et al.*, "Health Benefits from Improvements in Water Supply and Sanitation: Survey and Analysis of the Literature on Selected Diseases," WASH Technical Report No. 66, April 1990.

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TABLE 2
Expected Reduction in Morbidity from Improved Water Supply and Sanitation

	All Studies			Better Studies		
	No.	Median	Range	No.	Median	Range
Diarrheal diseases	55	26%	9%-100%	20	29%	0%-68%
Ascariasis	11	28%	0%-70%	4	29%	15%-70%
Guinea worm	7	76%	37%-98%	2	78%	75%-81%
Hookworm	9	4%	0%-100%	—	—	—
Schistosomiasis	4	73%	59%-87%	3	77%	59%-87%
Trachoma	13	50%	0%-91%	7	27%	0%-79%

Source: Esrey *et al.*

tention from donor organizations. The two most popular have been oral rehydration therapy (ORT) and immunizations. ORT is a technique for treating dehydration, the major health effect of diarrhea. It is a simple treatment that involves mixing and administering a solution of salts, sugar, and water. With training, a mother can administer ORT in the home. While ORT does not prevent diarrheal disease, it is extremely effective in treating it.

In addition to ORT, donors have put increasing emphasis on widespread immunization of children against six major childhood diseases. Along with ORT, immunization has become a central focus of the international effort to improve the survival prospects and health of children. As donors have faced shrinking budgets and have sought ways to make the most effective use of limited funds, they have placed increasing emphasis on such disease-specific interventions, sometimes to the exclusion of long-term preventive programs such as water supply and sanitation.

It should not be a matter of either-or; both long-term preventive and specific disease-related interventions are valid, and therefore a combination of the two is the best strategy. In addition, water supply and sanitation development can play a key complementary role in maximizing the effectiveness of many specific interventions.

There is no more vivid reminder of the importance of prevention than the return of cholera to Latin America in 1991. In many countries the governments

It should not be a matter of either-or; both long-term preventive and specific disease-related interventions are valid, and therefore a combination of the two is the best strategy.

have not kept up with the pace of population growth in providing water and sanitation services. Untreated wastewater and unreliable water disinfection systems, in particular, have created a situation ripe for the spread of cholera. Cholera is also endemic in Africa and Asia. This frightening disease will remain a threat as long as drinking water supplies are at risk of contamination from human feces.

Guinea worm disease, or dracunculiasis, is another water-related disease that has attracted a lot of attention in recent years. The World Health Organization set 1995 as the year to eradicate guinea worm disease, a disease that responds dramatically to water supply improvements. Guinea worm is a disfiguring, debilitating disease caused by larvae that enter the body through drinking water, mature, and pierce the skin and emerge as adult worms. (Guinea worm annual incidence is just under one million in about 20 countries.) When safe water supplies are provided, the incidence of the disease drops significantly. In fact, in areas where the disease is prevalent, reductions in morbidity caused by guinea worm disease can be used as a direct measure of improvements in water supplies.

"Modern" Water-Related Health Problems

Of the thirty-seven major diseases in developing countries, twenty-one are water and sanitation related. For ten of these twenty-one, water and sanitation are considered primary interventions for prevention: diarrhea, typhoid, schistosomiasis, amebiasis, hookworm, hepatitis A, ascariasis, giardiasis, trichuriasis, and dracunculiasis. These ten diseases cause a tremendous amount of illness every year. One source, using 1986 figures, states that the ten diseases are responsible for over 28 billion disease episodes a year in developing countries.¹ According to the 1993 World Bank *World Development Report*, in 1990 mortality from the ten diseases was approximately 3,000,000, but the big killer among them was diarrheal disease with a total of 2,866,000 deaths.

Of the thirty-seven major diseases in developing countries, twenty-one are water and sanitation related. To this list of diseases must be added the more "modern" health problems caused by ingestion of water contaminated with organic or inorganic compounds.

¹ Julia A. Walsh, "Estimating the Burden of Illness in the Tropics" (Chapter 25) in Kenneth S. Warren and Adel A.F. Mahoud, *Tropical and Geographic Medicine* (McGraw Hill, 1990), p. 190.

To this list of diseases must be added the more "modern" health problems caused by ingestion of water contaminated with organic or inorganic compounds. Little data exist on the magnitude of such health problems in developing countries, but it is clear that increased industrialization, advances in agriculture, and growth in population and urbanization are increasing their severity.

These problems are apparently quite pronounced in the newly independent states of the former Soviet Union and in Eastern and Central Europe, although reliable data are scanty. WASH participated in a World Bank environmental project identification and preparation mission in Russia. The WASH consultant found that huge stocks of sludge from wastewater treatment plants are building up and leaching contaminants into groundwater and streams.

Later WASH organized a regional workshop in Tashkent, Uzbekistan, for four Central Asian republics of the former Soviet Union on assessing and managing environment-related health problems. These republics face serious public health problems caused or aggravated by severely degraded environmental conditions. Agricultural practices have caused extensive water contamination with pesticides and salinization of soils and groundwater. Mining and industry have caused localized water contamination with industrial chemicals and metals. There are widespread chronic problems with unsafe drinking water and discharge of untreated sewage. Because of their exposure to these environmental conditions, people living in these republics experience serious health effects ranging from acute diarrheas to pesticide poisoning.

Most developing countries lack technically qualified personnel, but in the "advanced" developing countries of Eastern and Central Europe and the former Soviet Union, there are plenty of trained persons but a lack of information on which to base plans and know-how about planning in a democratic mode.

Although it is important to know as much as possible about the etiology of water-related diseases, the work of providing water and sanitation to all should be focused on health, not on disease. Water and sanitation and hygiene education interventions aim to maintain people in a state of health. They ultimately enable children, not just to survive one illness after an-

Water and sanitation interventions ultimately enable children, not just to survive one illness after another, but to go to school and get the full benefit of an education by not having worms, by not losing days because of dracunculiasis or malaria, and by not suffering from chronic diarrheal episodes.

other, but to go to school and get the full benefit of an education by not having worms, by not losing days because of dracunculiasis or malaria, and by not suffering from chronic diarrheal episodes.

Development Context

Water supply and sanitation development takes place in a real-world setting of scarce funds, competing priorities, human-resource and other institutional limitations, and social and political systems that both shape it and determine its eventual success. Both fiscal and human/institutional resources are in short supply in most third world settings. These limitations seriously affect the extent to which a country can realistically attempt to address its needs in the sector.

As important as resources are the social, economic, and political contexts within which water supply and sanitation development takes place. Population growth, for example, can so far outstrip facilities development that even after many years of investment in water supply and sanitation, the absolute number of people unserved may be about the same. Table 3 shows the number of persons unserved by water and sanitation at the beginning and end of the International Drinking Water Supply and Sanitation Decade (1981-90). Table 4 compares the gains with growth in population during the same period. Note that the gains in sanitation are particularly low.

Traditions of governmental responsibility and policy formulation and implementation also play a key role. If the political system is such that the government cannot rationally and objectively develop and

Population growth can so far outstrip facilities development that even after many years of investment in water supply and sanitation, the absolute number of people unserved may be about the same or even greater than when the effort began.

TABLE 3
Unserved Populations
(in millions)

Water Supply				Sanitation			
Urban		Rural		Urban		Rural	
1980	1990	1980	1990	1980	1990	1980	1990
235	204	1,511	1,089	374	345	1,591	1,603

Source: End of Decade Review, 1990

TABLE 4
Growth in Population Compared with Coverage Gains,
1980-1990
(in millions)

	<u>Water Coverage</u>	<u>Population Growth</u>	<u>Net Gain</u>
Urban	427	396	+31
Rural	778	356	+422
Overall	1,205	752	+453

	<u>Sanitation Coverage</u>	<u>Population Growth</u>	<u>Net Gain</u>
Urban	427	396	+29
Rural	344	356	-12
Overall	769	752	+17

Source: End of Decade Review, 1990.

Assigning water supply and sanitation a high priority can help give the effort the access it needs to human and financial resources in other departments and ministries.

carry out policies, plans, programs, and projects, water supply and sanitation development efforts will obviously be hurt. Similarly, if no infrastructure exists to support water supply and sanitation improvements—electric power to run pumps, roads and vehicles to transport people and materials—development efforts will be seriously restricted.

In developing nations, it is important that water supply and sanitation be given reasonably high priority to aid in ensuring that the necessary linkages with other governmental activities and other development efforts take place. In most third world contexts, several ministries may be involved in different aspects of water supply and sanitation development. Even if most of the responsibility rests with one ministry, more than one department will almost certainly be involved. Assigning water supply and sanitation a high priority can help give the effort the access it needs to human and financial resources in other departments and ministries, can foster better coordination of efforts and more effective use of resources, and can help assure that the necessary policy support develops.

The Role of the WASH Project

The United States has been a leader in the worldwide development effort, having provided since the

1940s hundreds of millions of dollars a year in direct development assistance, economic support, and loan guarantees for a broad range of development activities. The chief implementing agency for bilateral U.S. assistance is the Agency for International Development (A.I.D.), which works through headquarters and missions around the world. The United States is also a major contributor to multilateral development agencies, such as UNICEF and the U.N. Development Program, and the World Bank, and regional development banks.

A.I.D. has always used technical assistance in water supply and sanitation development to support and complement its project financing, but with the launching of the International Drinking Water Supply and Sanitation Decade, A.I.D. decided to augment and streamline its technical assistance capability. In July 1980, it funded the Water and Sanitation for Health (WASH) Project.

The funding mechanism was a multi-year, multi-million-dollar contract, secured through competitive bidding by a consortium of organizations headed by Camp Dresser & McKee International Inc. (CDM), a Cambridge, Massachusetts-based firm specializing in environmental engineering services. Since 1980 the CDM consortium has continued as prime contractor of the WASH Project through three successive bid proceedings. The project ends in November 1993; however, its activities will continue and be incorporated by A.I.D. under a comprehensive Environmental Health Project.

The WASH Project was conceived as an innovative way to marshal and deploy resources in the water supply and sanitation field. At first, its program focus was primarily on rural areas, but in recent years more work has been done in urban areas and more attention directed to the special water and sanitation problems of poor urban areas. In the early years, WASH's mandate was water and sanitation only. Later this was enlarged to include solid waste disposal and the management of wastewater and industrial and hazardous wastes.

All along WASH has served as an in-place network providing information, technology transfer, technical assistance, and training resources to support A.I.D. efforts to help client countries throughout the

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world. The contractor has worked under the technical direction of A.I.D.'s Office of Health.

During its history, WASH has worked on some 800 activities in eighty-five countries in Africa, Asia, Latin America, Eastern Europe, and the newly independent states of the former Soviet Union. Most activities were in response to requests from A.I.D. overseas missions for direct assistance to countries. In addition, the project has assisted other U.S. government agencies (such as the Peace Corps) and numerous nongovernmental organizations (such as CARE, Catholic Relief Services, and World Vision). All the activities have been aimed at transferring to developing countries the know-how and tools they need to attain the water supply and sanitation goals they have set. WASH also has helped A.I.D. develop regional and country policies and strategies for its water supply and sanitation programs.

Lessons and Principles: How This Report Is Organized

In 1990, the WASH Project produced a booklet entitled, *Lessons Learned from the WASH Project: Ten Years of Water and Sanitation Experience in Developing Countries*. It was based on the significant body of knowledge WASH had built up on what makes for success both in the provision of technical assistance and in the development of rural water supply and sanitation projects. Early in 1993, with the end of WASH in sight, the project decided to produce a revised, updated version of *Lessons Learned*, one that covers the entire span of WASH experience. This report is the result.

About half the report is virtually identical to the first version, but the other half has been changed significantly and many lessons are new or have been restated more precisely. Most of the new material is to be found in the chapter on program strategies, reflecting recent WASH experiences in urban wastewater management and in basic sanitation—in particular, peri-urban sanitation, community participation, risk assessment, behavioral change, and so on. The sections on private-sector participation and financial management in the chapter on sustainability have been greatly expanded.

Drawing upon the reflections of many of the people who have operated the WASH Project and upon the published record, this report distills the WASH experience into twenty lessons learned in water supply and sanitation development.

Like its predecessor, this report draws upon the reflections of many of the people who have operated the WASH Project and upon the published record. It distills the WASH experience into twenty lessons learned in water supply and sanitation development. Many lessons are not unique to WASH; nor do they reflect the totality of the useful insights into development that the project has gleaned. They do, however, represent the essence of the WASH experience.

All the lessons in this book are based on WASH field work and for the most part are documented in the field and technical reports of the project. However, when the idea of producing a lessons learned report first surfaced, it was decided not to break up the flow of the text with footnotes or bibliographic references. Also, the report is sparing in its use of specific examples. The reader should rely on the list of selected WASH reports at the end of the report for case studies and documentation.

The lessons fall into two general categories. The first category (Chapter 2) deals with establishing and operating a technical assistance program. These lessons describe the central features of the WASH Project as it has evolved. They may be of greatest interest to donor organizations carrying out international technical assistance, but many also apply to central governments undertaking local technical assistance. The second category (Chapters 3–5) contains lessons from the field that should be of special concern to any group of people charged with the responsibility for planning, implementing, financing, or evaluating water supply and sanitation programs and projects.

Chapters 2 through 5 begin with a basic principle from which the lessons discussed in the chapter flow. Each lesson covers a major topic such as “the design of technical assistance” or “operating and maintaining systems,” and the discussion of that topic provides support or a context for the lessons themselves. “Sub-lessons” are highlighted in the marginal gloss. This format—years of development experience translated into twenty specific lessons—has the advantage of adding sharpness and practicality to the presentation of this report. However, real-world development is not nearly so simple or clear-cut as twenty lessons would imply. The priority issues and concerns of the water supply and sanitation sector are considerably

The lessons fall into two general categories. The first deals with establishing and operating a technical assistance program. The second contains lessons about planning, implementing, financing, or evaluating water supply and sanitation programs and projects.

Real-world development is an extraordinarily complex undertaking involving a maze of inconsistent and sometimes contradictory needs and actions. It is not nearly so simple or clear-cut as twenty lessons would imply.

interwoven. Therefore, there is some overlap from chapter to chapter; ideas introduced in one context are revisited in another with a different slant to them.

The four principles and twenty lessons collectively constitute an outline of a WASH methodology for water and sanitation development. The central feature of this methodology is but a specific application of a broad democratic premise: that whatever the level of decision-making, ordinary people can solve their own problems if they are given the chance, and no policy or program is likely to succeed unless they are. The four major principles related to this premise and confirmed by WASH experience pertain to participatory technical assistance that results in the transfer of skills, shared responsibility for development outcomes, effective strategies for ensuring that water and sanitation development yields the expected benefits, and system sustainability as the measure of success.

The role of technical consultants is not to make decisions for host-country personnel but to facilitate a process by which they can make decisions for themselves.

Technical assistance. The first principle is that technical assistance is most successful when it helps people learn to do things for themselves in the long run. Technical assistance is an interactive process between the persons offering help and the persons receiving it. The role of technical consultants is not to make decisions for host-country personnel but to facilitate a process by which they can make decisions for themselves. Since they are the ones who must live with the decisions, it is more important that the adopted solutions have their support than that they be endorsed by technical experts, except in exclusively technical areas. This rule applies at both planning and implementation stages of development.

This style of technical assistance also tends to involve large numbers of people in decision-making. The lone expert dispensing wisdom from on high is always eschewed in favor of inclusive processes and group decisions.

Five lessons flow from this general principle about how to ensure the effectiveness of technical assistance:

- Lesson One: Effective technical assistance focuses on building local institutions and transferring sustainable skills.

- **Lesson Two:** Technical assistance in water supply and sanitation requires an **interdisciplinary approach**, not a narrow, specialized one.
- **Lesson Three:** A **participatory approach**—facilitation, not dictation—maximizes the chance that programs and projects will be sustained.
- **Lesson Four:** Technical assistance provided through the **collaboration** of multilateral and bilateral agencies and A.I.D.-funded projects makes maximum use of scarce resources.
- **Lesson Five:** An **active information service** can expand the reach, as well as the visibility and credibility, of technical assistance.

Shared responsibility. The second principle is that **sustainable development is more likely to occur if each of the key participants recognizes and assumes its appropriate role and shoulders its share of the responsibility.** A developing nation typically has at least five types of participants: the government (which may include regional as well as central governments), donor agencies (bilateral and multilateral), nongovernmental organizations, local communities and beneficiaries, and the private sector.

Very broadly speaking, the basic division of labor is that the government should assume control of the development process, establishing policies and priorities. Users must be involved, but the nature of their involvement depends upon the situation; in rural areas, for example, communities should assume major responsibility for operation and maintenance. Donors can provide capital financing and technical assistance in accordance with government priorities, with nongovernmental organizations working in special areas not covered by major donors. Finally, the private sector provides investment capital or services on contract with high potential for improving efficiency. Hence, five additional lessons:

- **Lesson Six:** The **role of the government** is to assume primary responsibility for sector management, including planning, donor coordination, policy reform, regulation, and institutional and financial aspects of development.

A developing nation typically has at least five types of participants in the development process: the government, donor agencies, nongovernmental organizations, local communities and beneficiaries, and the private sector.

- **Lesson Seven:** The donor's role is to provide coordinated support to governments in designing or carrying out their national plans.
- **Lesson Eight:** NGOs are able to operate effectively just where donors may find it difficult to do so—on the local community level and in highly politicized situations.
- **Lesson Nine:** The participation of users in water supply and sanitation systems, whether in rural or urban and peri-urban communities, is critical to long-term sustainability.
- **Lesson Ten:** The private sector's role in providing water supply and sanitation services can be expanded if governments can create a supportive institutional, financial, and legal environment for private sector participation.

Lack of appropriate technologies is not usually what blocks progress in improving health through water and sanitation.

Program strategies. The third principle is that the most effective water and sanitation strategies are those that concentrate on eliminating the constraints that prevent facilities from yielding their expected health benefits. In the early years of the Water and Sanitation Decade, great reliance was placed on technological solutions, but, as the development community gained experience and began to analyze what was blocking progress in improving health through water and sanitation, it became apparent that lack of appropriate technologies was not usually the constraint. Rather, the constraint was more likely to be "software" rather than "hardware" connected. For example, the benefit of access to safe water can be negated by poor sanitation practices: therefore, to obtain health benefits, the installation of water supply and sanitation facilities (hardware) must be accompanied by improved hygiene practices (software).

Another commonly encountered constraint is a weak water and sanitation sector, one that is incapable of putting the resources it possesses to good use, one that fails to serve the public it is charged with serving. Working to improve the effectiveness of sector organizations, therefore, is another effective program strategy.

Other strategies that WASH has identified as key include focusing on behavioral change, emphasizing the legitimate role of users, ensuring wide participation in planning, and creating a beneficial regulatory policy climate.

The lessons on effective program strategies are as follows:

- Lesson Eleven: The success of individual water supply and sanitation projects depends on strong sectoral policies and institutional practices.
- Lesson Twelve: Sanitation should be accorded the same priority as water supply.
- Lesson Thirteen: Improvements in hygiene-related behavior are an indispensable measure of success for water and sanitation activities.
- Lesson Fourteen: National governments must take specific policy steps to ensure that communities have the capacity, and are empowered, to manage water and sanitation activities.
- Lesson Fifteen: A participatory approach to planning helps to forge necessary linkages in and outside the sector and to ensure cooperation in implementation.
- Lesson Sixteen: The command and control model that usually governs water and sanitation regulation in developed countries is not generally appropriate for developing countries.

Long-term sustainability. The final principle is that the basic measure for success of both the national system for development and the community management systems it creates is sustainability—the ability to perform effectively and indefinitely after donor assistance has been terminated. It is still not unusual to see progress in water supply and sanitation development described in terms of the number of wells installed or the number of latrines constructed. However, most practitioners today, due in part to efforts by WASH and others, recognize the fallacy in such assessments. True development occurs only when facilities continue to operate after the assisting

True development occurs only when facilities continue to operate after the assisting agencies depart, when the communities are in control of their own affairs, and when adequate government support services are in place.

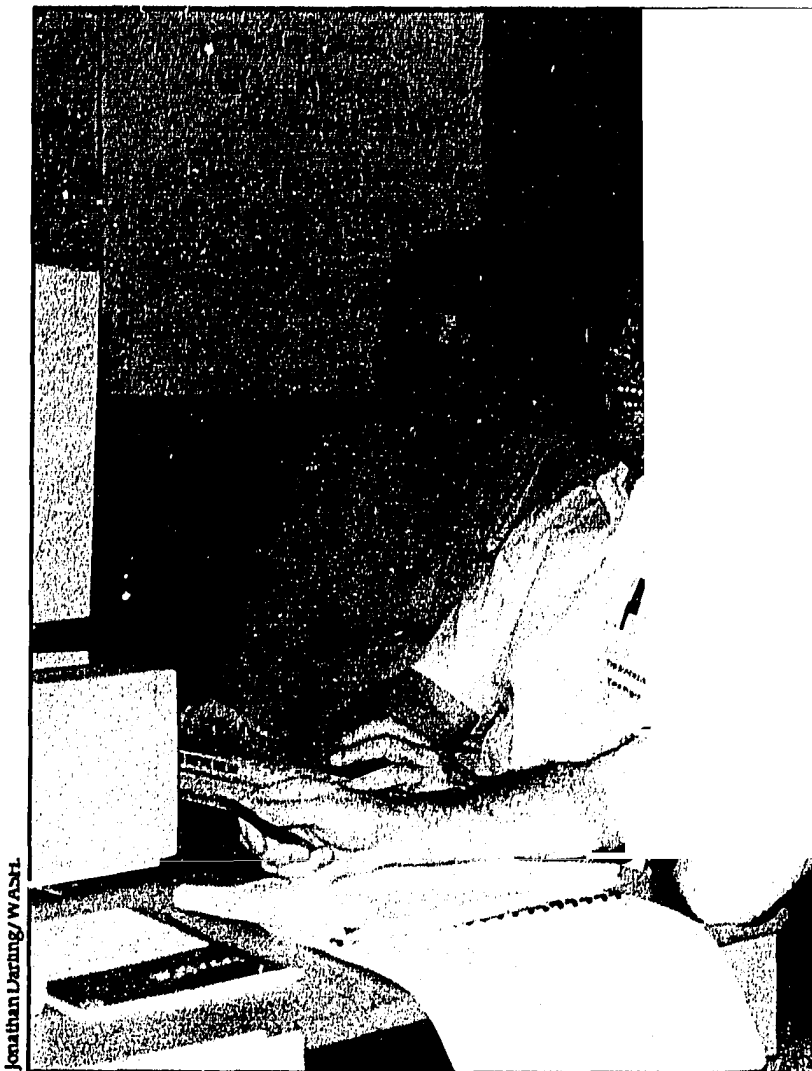
agencies depart, when the communities are in control of their own affairs, and when adequate government services are in place to provide appropriate levels of assistance.

Obviously, sustainability must begin at the planning stage, when the proper linkages are established and a technology appropriate to the situation is prescribed. A sustainable system should have a financial plan that assures that all costs are covered—whether from revenues collected from users, subsidies, or donor assistance. There must also be sustainable supporting institutions, nationally and locally, and trained personnel to staff the institutions.

The lessons on system sustainability emphasize the importance of strong institutions and management, trained personnel, appropriate choice of technology, well-organized operation and maintenance systems, and adequate financing for the long term:

- **Lesson Seventeen: Successful institutional and human resources development projects are comprehensive, systematic, participatory, and based on long-term planning.**
- **Lesson Eighteen: Full consideration of appropriate engineering design and application is essential to system sustainability.**
- **Lesson Nineteen: Making operation and maintenance plans before facilities are constructed and in place helps ensure that sustainable technologies are selected.**
- **Lesson Twenty: To be sustainable, the water supply and sanitation sector must rely on an appropriate mix of donor, national government, and community financial resources.**

The principles and lessons in water and sanitation development described here are mutually supportive. Thus, if technical assistance builds capability and if effective strategies are followed and responsibilities are appropriately shared, systems are more likely to be sustainable. Sustainable systems, in turn, encourage the further expansion of capability and support for the right strategies.



Jonathan Dearing/WASHI.

WASHI consultant and Belgian officials share a light moment during training in data-base management.

Chapter 2: TECHNICAL ASSISTANCE

Government-to-government development assistance is essentially a post-World War II innovation. The idea that it might be in the interest of one country to help another develop its economy and society first gained acceptability in the reconstruction of Europe and Asia and then became prevailing doctrine as part of the revolution against colonialism that swept the world in subsequent decades. In the 1990s, with the demise of the Cold War, which itself had provided a framework for development assistance, the rationale for assistance has shifted to emphasize the promotion of market-based democracies and trading partners.

At first, most assistance took the form of loans and grants for building or rebuilding physical infrastructure—"capital investment." The American Marshall

There has been increasing recognition that, no matter how well-intentioned, doing things for other people does not lead to development.

Technical assistance today is not simply to solve a short-term problem but to build local capacity for solving future problems.

Plan for Europe was the prototype for such assistance. As new nations began to emerge throughout Asia and Africa, however, it was clear they faced a far costlier and longer-lasting development challenge. Yet no nation was willing to underwrite all of the tremendous cash outlay that would be required for development in this "third world." Thus, beginning with the famous Point Four program in 1948, developed nations began to commit *people*, in addition to capital, as a type of development assistance. This cost money but was easier to sell at home than cash outlays. Such help was called "technical assistance" to distinguish it from direct financial transfers.

Early technical assistance took the form of "expert advice." The expatriate engineer designing bridges or even holding down a government post in a developing nation was the quintessential technical assistant. This type of assistance can still be found in developing countries today. However, there has been increasing recognition that, no matter how well-intentioned, doing things for other people does not lead to development.

Both bilateral and multilateral aid programs have become prominent features of international relations, and they consist of infusions of both capital and technical assistance. Technical assistance today still means people offering help, but the intent of the help generally is not simply to solve a short-term problem but to build local capacity for solving future problems; not simply to apply a technology but to transfer the technology; not simply to provide skills but to build skills. WASH regards this as a fundamental principle: **Technical assistance is most successful when it helps people learn to do things for themselves.**

The lessons related to technical assistance fall into five general areas: function, design, delivery, coordination and networking, and information exchange.

Lesson One

The Function of Technical Assistance

Effective technical assistance focuses on building local institutions and transferring sustainable skills.

The WASH Project defines the water supply and sanitation sector broadly to include not just the provision of facilities but the promotion of behaviors and policies that affect the use and sustainability of facilities. Thus, the goals of the technical assistance WASH provides are to assist in designing and building water and sanitation systems, to protect against environmental pollution, to promote health-enhancing behavior, and to help local and national authorities assume management, financial, and operational responsibility for the systems.

In this context, the *process* of technical assistance is as important as the substance. Whatever the content of the particular technical assistance activity, the correct role for the provider is to carry out the assistance requested in a way that builds capability. This approach helps ensure that skills—not just information—are transferred.

Unless the receiving country develops the technical, financial, and managerial skills to assume responsibility for meeting its water supply and sanitation needs over the long term, capital investments by donors will not achieve maximum impact. It is estimated, in fact, that external financing agencies are able to meet only a small percentage (perhaps less than 15-20 percent) of the long-term financing needs of the water and sanitation sector. Yet projected rates of population growth and urbanization alone indicate that demand will exceed donor and government ability to supply. Filling the funding gap puts pressure on developing countries to use the resources they have most effectively, to find and integrate new sources of finance, and to take advantage of every opportunity to coordinate efforts.

Factors external to the technical assistance may determine the eventual success or failure of capacity-building efforts. National policies and economic considerations, for example, may facilitate capacity building or make it nearly impossible to achieve. As in other areas of technical assistance, the national frame-

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Filling the funding gap puts pressure on developing countries to use the resources they have most effectively, to find and integrate new sources of finance, and to take advantage of every opportunity to coordinate efforts.

LESSONS LEARNED

National policies and economic considerations may facilitate capacity building or make it nearly impossible to achieve.

Consultants with an "I am the expert" mentality are not suited to the capacity-building role, nor are expatriate advisors retaining vestiges of paternalism.

Capacity building and skill transfer can be accomplished by structuring the technical assistance in such a way that a series of activities build on one another to systematically increase capacity.

work for absorbing assistance has as much to do with its impact as the quality of the assistance itself.

The way technical assistance is provided, the duration of the assistance, and the timing of capital infusions all influence the extent to which technical assistance contributes to long-term capacity building and sustainability.

Characteristics of effective assistance. Donors must recognize the importance of capacity building and intentionally structure the assistance so that it takes place. Few donors would deny the importance of capacity building; however, most projects have other goals as well and in the attempt to achieve them donors may pay too little attention to capacity building or unintentionally create a situation that subverts it.

All technical assistance providers involved in a project must be committed to capacity building. Consultants with an "I am the expert" mentality are not suited to the capacity-building role, nor are expatriate advisors retaining vestiges of paternalism, a major barrier to capacity building. If long-term advisors are assigned to work in the water and sanitation sector in the host country government—as is currently the case in many countries, a permanent local employee of the agency should be learning how to do what the long-term advisor is doing. In addition, the host country should contribute at least a part of the support for the advisor.

Short-term consultants, such as those provided by the WASH Project, also must focus on capacity building and skill transfer. This can be accomplished by structuring the technical assistance in such a way that a series of activities build on one another to systematically increase capacity. For example, in 1992-93 WASH provided technical assistance to four riparian countries to carry out a water pollution inventory of the Danube River, one of the most polluted in Europe. A computerized water-quality information management tool called DEMDESS (Danube Emissions Management Decision Support System) was developed for decision makers to assemble data on river pollution and use it to evaluate the effects of various pollution abatement strategies. To assure that the skills needed to use DEMDESS were really transferred to techni-

clans in the four countries, A.I.D.'s Bureau for Eastern Europe, the sponsor of the Danube project, set up a series of activities, including a hands-on training workshop, consultant assistance in the individual countries, and interaction with high-level government officials. The same short-term consultants were used throughout the series of activities. These consultants were highly motivated to assist in adapting the DEMDESS system to each country and to leave behind, not just the users' manual, but trained users capable of modifying and expanding the system to meet their specific needs.

In cases where consultants or advisors have conceived of their mission as local capacity building, such as in Zaire and Sri Lanka, they have provided needed leadership and assistance but have also served as a catalyst for creating sustainable programs.

Duration of technical assistance. Institution building and skill transfer are difficult and time-consuming activities that must be carefully planned. If a technical assistance provider expects to have a real impact on the water supply and sanitation sector and on the institutions that support the sector, however, it should be prepared to participate over the long term. Similarly, governments receiving the technical assistance should also be committed to long-term efforts.

One way to provide long-term assistance is through a series of individual tasks two or three weeks in duration spaced out over a year or two, as mentioned above. Ideally, the same consultants are used over the period. In Ecuador, for example, WASH provided technical assistance to strengthen a water and sanitation institution in this manner. Expatriate consultants would spend a few weeks at the institution providing training or other assistance and then would leave an "assignment" for the local consultants and institution staff to complete in a two- or three-month-long interim before moving on to the next task in the series. The assignments called on local staff to put into practice what they learned in training or to integrate specific management policies or procedures. Using the same consultants throughout the process had the obvious advantages of creating continuity and inspiring confidence. WASH and the Vector Biology and Control Project, another A.I.D. centrally funded project, used a similar approach in Belize in a comprehensive program to institutionalize

If a technical assistance provider expects to have a real impact on the water supply and sanitation sector and on the institutions that support the sector, it should be prepared to participate over the long term.

The technical assistance provider should be seen as a consistent, reliable, and available partner, working with the host government in an ongoing process of identifying problems and devising solutions.

No amount of capital invested will bring about development unless the recipient is capable of using the capital effectively.

a community-based strategy for water and sanitation and vector control.

Sustainable programs evolve; they are not created and put in place. Much of the success of this evolutionary process depends on institutional and human relationships. The technical assistance provider should be seen as a consistent, reliable, and available partner, working with the host government in an ongoing process of identifying problems and devising solutions, a process that may take years before a sustainable program is in place. A Sri Lankan official, commenting on a successful institutional development project for the National Water Supply and Drainage Board (NWSDB), stated that even a six-year time frame for the project was "barely sufficient."

Unfortunately, reasonable timetables often do not fit in with the needs of donors, whose top priority may be to get capital out into the field where it is needed for projects. All too often, this takes place without a realistic consideration of whether the receiving country has the institutional structure and the capability to absorb and use the money successfully for its designated purpose.

Timing of capital infusions. No amount of capital invested will bring about development unless the recipient is capable of using the capital effectively. This fact is frequently ignored until problems become visible and threaten to overwhelm a program. WASH has seen numerous occasions when a country realized the need to develop the institutional capacity only after constructing a facility. On other occasions, institutional problems are recognized in time. For example, the Sri Lankan institutional development project mentioned above was instituted at the behest of the World Bank. Realizing that the NWSDB had major problems, the bank held up a major loan at the last minute until the Sri Lankan government brought in an A.I.D. technical assistance team and agreed to an institution-strengthening project. In Belize, eight years of facilities construction under the A.I.D.-sponsored Improved Productivity Through Better Health Project, preceded any attempt to deal with institutional issues. Finally, A.I.D. amended the project specifically to address community capacity building when it became apparent that the Belize government needed assis-

tance in dealing with these issues. A.I.D. concluded that it would not be a good investment to continue building facilities unless community-lead institutions were built also.

Lesson Two The Design of Technical Assistance

Technical assistance in water supply and sanitation requires an interdisciplinary approach, not a narrow, specialized one.

From a design standpoint, probably the most demanding aspect of providing technical assistance concerns the multifaceted, complex natures of technical assistance and water supply and sanitation development. Unquestionably, the belief that technical assistance means institution building results in a need for far more diverse and specialized skills than would be required if technical assistance were defined only as giving advice or solving problems. Similarly, the commitment to sustainability as a basic principle introduces the need for assistance in management, finance, policy planning, and training, among other disciplines.

An interdisciplinary orientation has been a key feature of WASH from the time of its conception, but the number of disciplines involved has increased over time as WASH and other providers of water and sanitation technical assistance have come to understand the multiple ways in which development problems manifest themselves.

The need for strong multidisciplinary and interdisciplinary capabilities virtually dictated the consortium structure under which WASH operates. The consortium is made up of a number of subcontracting organizations, each with particular disciplinary strengths and resources. They are professional equals but administratively answerable to CDM, the prime contractor. Most of the subcontractors have at least one senior person on the WASH staff, while CDM provides the top management and support staff. All consortium members provide consultants and staff in their areas of expertise.

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Institutional specialties in the consortium include, among others, engineering (CDM); public health (University Research Corporation); communications and health information management, technology transfer, and evaluation (International Science and Technology Institute); institutional and human resources development (Training Resources Group); community participation, hygiene education, environmental risk assessment, and finance (Research Triangle Institute); sustainable natural resource development and appropriate technology (Associates in Rural Development); and applied research (the University of North Carolina).

Core staff. The WASH core staff represents most of the key disciplines important in water supply and sanitation development: engineering, institutional and human resources development, finance and economics, anthropology, public health, law, public administration, water resources, environmental management, and information management. Staff members are encouraged to interact frequently in all aspects of their professional lives. Active debate among staff is encouraged; management decisions are made in a participatory manner; a yearly planning retreat keeps the project focused; and constant communication and information exchange are required.

When requests for technical assistance are received from A.I.D. missions, a WASH senior staff member is designated as task manager. While this decision is sometimes based on substantive expertise, it is just as often determined by past experience, interest, or work load. All senior staff are expected to be willing and able to manage activities outside their own disciplines, to remain conversant in all WASH activities, and to provide backup assistance when required. Major decisions on activities are based more often on vigorous discussion among senior staff than on the solitary judgment of the task manager or the project director.

Consultant teams. WASH also uses an interdisciplinary approach in assembling and fielding consultant teams to carry out technical assistance activities. It is up to the task manager, working with the mission requesting assistance, to determine and put together

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the right mix of skills, expertise, and experience. The increasing range of problems WASH is asked to address requires more diversified consultant teams. For example, one team investigating opportunities for private sector involvement in the water sector in Indonesia had representatives from five disciplines: engineering, financial management, public policy and administration, law, and organizational development. Assembling and fielding such teams is as much art as science.

In some assignments, technicians representing multiple disciplines are called upon to integrate their work. An example of such a process was an assessment of environmental risks in Quito, Ecuador, conducted jointly by WASH and another A.I.D.-funded project, PRITECH (Technology for Primary Health Care). Experts in health, urban planning and policy, economics, and anthropology developed an experimental method that combined the collection of quantitative and qualitative data. The method integrated concepts not normally considered in risk assessments.

To put together good consultant teams, a technical assistance organization needs an extensive consultant roster that is easy to access. WASH's roster is organized according to more than twenty skill categories important in water supply and sanitation development.

In choosing consultants, a high premium should be placed on multicountry experience generally, and on water-and-sanitation-related experience specifically. The consultant with a varied background and/or with training in two or more specialties is especially prized—for example, an engineer with a policy or social work background. Many assignments require consultants with a specialty plus experience in other areas, such as an epidemiologist with some knowledge of human resources development, finance, and regulatory issues.

WASH deliberately avoids using as consultants highly qualified domestic experts who have no overseas experience and no fluency in foreign languages; despite their technical expertise, they too often turn out to be unable to relate well to situations in other countries and cultures, unfamiliar with the WASH technical assistance methodology and philosophy, and unaware of the importance of local participation and capacity-building objectives. WASH continually looks

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for foreign nationals to add to its consultant pool, particularly experts in such emerging areas as legal and regulatory issues, toxic and hazardous wastes, and privatization.

Management practices. There are many factors involved in designing a worldwide technical assistance effort. Clearly, it is important to establish and maintain a close working relationship with the sponsoring government agency. The complexities of the undertaking demand flexibility, streamlined procedures, shared understanding of goals and responsibilities, and mutual confidence between contractor and funding agency. Lack of a close working relationship between the two introduces delay and inefficiency at best, and inertia and wasted resources at worst. The WASH approach has been to keep A.I.D. fully informed at all times of relevant activities and to foster a collegial relationship between the staffs so that communication occurs on a daily basis. This has enabled both contractor and agency to anticipate problems, clarify issues and procedures as they arise, and learn from mistakes.

Effective central management by the technical assistance contractor or agency is also required since a wide-ranging technical assistance project is potentially a management nightmare. The variety of human resources to be assembled and coordinated, the logistical and administrative support to be arranged, the geographically far-flung activities to be implemented simultaneously, and the sometimes politically sensitive nature of the projects to be undertaken call for a highly organized project design and structure.

In addition, systematic procedures are needed for responding to requests for technical assistance. Were such procedures lacking, a technical assistance program could be overwhelmed by requests for help and the attendant details and paperwork. To minimize this burden, standardized procedures should be established for most operations, including fielding teams, sending cables, writing letters, reviewing reports, and distributing publications.

Lesson Three The Delivery of Technical Assistance

A participatory approach—facilitation not dictation—maximizes the chance that programs and projects will be sustained.

The WASH approach to technical assistance stresses meaningful participation of all persons and entities involved in a water and sanitation project. Who participates and how, depends upon the type of program or project involved. In rural water supply and sanitation projects, for example, it is essential that community members be involved in all stages of a project, from planning through ongoing maintenance. Involvement leads to a sense of ownership and responsibility. When this sense is lacking, projects fail once donor support is withdrawn.

Similarly, if a water utility plans to reorganize, it is vital that the managers on all levels and regular employees are given a voice and a chance to participate in decisions that affect them. Decisions from on high made without the participation of those who must carry them out are decisions made without sufficient data. Also, such decisions may be blocked by those left out of the decision-making process.

Technical assistance providers must honor their own commitment to participation by functioning in partnership with the client. Active participation in the process of identifying problems and developing solutions, which is the crux of most technical assistance efforts, is itself a learning experience. When clients are equal participants, they learn from the process and capacity building occurs. Dictating solutions may solve short-term problems but does not increase the likelihood of long-term development.

A participatory approach results in greater support for the solutions arrived at and a greater likelihood that the flow of benefits from the project will continue after the technical assistance team has departed. When people participate in making a decision, selecting among alternatives, or developing a plan, they are much more likely to support it and to work to see it succeed.

It must be said, however, that fostering participation takes time and costs money. But from a long-

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range point of view, the money spent will be repaid in increased project effectiveness.

In most technical assistance activities in the water supply and sanitation area, there are no single "right" or even "best" answers. Generally, the right answer is the one that is implementable—something that depends more on the psychological investment of those who will implement it than on the elegance of the solution. Psychological investment correlates directly with level of involvement in framing the solution. Thus, for example, the "best" country plan for the International Drinking Water Supply and Sanitation Decade for Swaziland is the one developed by the government of Swaziland, because that is the plan the government will believe in, support with money and other resources, and work to make succeed, just as the best plan for a particular community is the one it helped to design.

Above all, the process of participation helps to strengthen the institutions and processes essential to building more pluralistic and democratic societies—an important objective of U.S. development assistance.

The role of the technical assistance provider, then, is to facilitate the decision-making process, making intellectual contributions to that process, to be sure, but giving priority to ensuring that all parties are heard and involved in making decisions. This is by no means an easy task, particularly for those unaccustomed to the role. Consequently, WASH has developed several techniques to keep its technical assistance activities focused on facilitating decision-making by the client rather than dictating to the client. These include preparing technical assistance teams via pre-project meetings, defining client needs, maintaining continuity of personnel, and conducting debriefings and follow-up activities. WASH also attempts to recruit experienced consultants who are comfortable working in a collaborative mode and who share WASH's philosophy of development.

Preparing technical assistance teams. The team planning meeting is the key element in the WASH technical assistance process. The TPM, as it is referred to, was developed within WASH in the early years of the project as a two-day meeting. A WASH report outlining the process was published in 1985, and, by 1986,

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the TPM was institutionalized within WASH. Many other organizations are now using the methodology as part of their own operations.

The TPM is a two-day facilitated meeting attended by all members of all consultant teams. The primary objectives of the TPM are to brief the consultants on the background of the assignment, clarify goals and purposes of the activity, and develop an outline of the end product and a work plan. This work plan is the central tool for defining and implementing the assignment. It serves as the basis for developing a consensus on the scope and nature of the assignment among the team members and between the team and the client.

Another objective of the meeting is to build an effective team and pass on relevant WASH experience. Individuals vary in the degree to which they are comfortable as members of interdisciplinary, participatory teams that include the client as a key player. It is important for team members to compromise with the client on issues that do not damage the integrity of the project while holding firm on those that do. There are many more of the former than the latter, but the more common problem in consultant teams is resisting compromise. The TPM gives the task manager and the team leader the opportunity to spot such potential problems and take steps to solve them.

In 1993 WASH developed a new guide to supplement the TPM guide. Whereas the TPM concentrates on preparing technical assistance teams, this new guide provides advice on how team leaders can increase the effectiveness of teams at work in the field. The guide describes the challenge of enabling team members from widely differing disciplines to work together harmoniously. It explains how a "multidisciplinary" team (one made up of representatives from numerous disciplines) can be fashioned into an "interdisciplinary" team (one in which the work of the disciplines is integrated). The guide distills the experience of twenty-four team leaders and managers who were interviewed as the guide was prepared.

Defining client needs. While most clients expect and want the intelligent contributions of the technical assistance team, they do not want to be dictated to or patronized. The most important rule in successfully

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delivering technical assistance then is to provide the assistance the client wants, not the assistance the provider thinks the client needs. In order to obey this rule, it is first necessary to identify the client clearly, as this identity is not always immediately apparent. The most useful question to ask in this regard is, "Who really wants to know the answers to the questions this activity is addressing?" For the WASH Project, the client is normally the A.I.D. mission or bureau for whom the technical assistance is being carried out. But, there are often secondary clients as well, such as the Ministry of Health in the country or an NGO which may be involved in the activity.

Identifying the client is a prominent topic of discussion at team planning meetings because WASH has learned that a successful activity is contingent on a shared understanding, among team members and between team and client, of the purpose of the activity. Once identified, the client becomes a member of the team and the process of clarifying the client's objectives can begin. This process is an iterative, ongoing one that begins with initial discussions on receipt of the request for assistance and only concludes when the project draft report is submitted on departure.

A participatory approach to determining client needs and objectives is especially important because clients do not always articulate exactly what they want. In a large, complex activity, therefore, a reconnaissance visit to clarify client needs may be required before the scope of work is even prepared. The process of clarifying needs and objectives is sometimes lengthy, but it is always worthwhile because all clients know what they do *not* want when they see it. The ultimate failure in technical assistance is to complete the assignment and submit the report only to be told that this was not really what the client wanted or needed.

Maintaining continuity of personnel. In projects requiring a series of technical assistance visits over a multiyear period or over the life of the project, involving the same personnel greatly increases the efficiency and effectiveness of the technical assistance efforts. The institutional memory tapped in this way reduces the burden on mission staff, permits more rapid start-up of activities, and alleviates the anxiety of clients

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who have learned to trust and value a particular consultant's work.

WASH's work in Sri Lanka over the past several years exemplifies the benefits of multiple visits. In early 1985, a WASH consultant planned and conducted a project start-up workshop for a large A.I.D. institution-strengthening project. Since then, the same consultant has teamed with others and returned to implement a series of management training workshops for senior staff of the national domestic water supply authority. This continuity has been a major factor in the success of the technical assistance.

Debriefing clients and consultant teams. The debriefing process is important both to the client and to the technical assistance provider as an indicator of an activity's effectiveness. If clients are fully involved in the assignment throughout—as they should be—they will be aware of how the work is progressing and much more likely to accept the results. When the assignment is nearing completion, it is important to convey to the client rapidly, succinctly, and unambiguously what has been done or found. Before leaving the country, WASH consultant teams normally present a draft report in as full a form as possible in order to put their work quickly and clearly in the context of the client's desires. Time is reserved to sit down and review the results with the client face to face so that misunderstandings can be clarified or additional viewpoints incorporated.

From the technical assistance provider's viewpoint, the consultant team is the most accessible source of information about the assignment and can provide a wealth of useful feedback on both the substance and process of the activity. To capture this, WASH uses both informal and formal debriefings along with written reports.

Timing can be everything where debriefings are concerned. Memories and perceptions are clearest immediately after the assignment has been completed, and since much of the informal "institutional memory" of an organization making heavy use of consultants is vested in them, the more that can be done to capture their experience the less the risk that something of potential importance will slip through the cracks. Additionally, task managers need a quick

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Some activities inevitably go badly and leave the client less than fully satisfied. If this is known right away and the situation followed up correctly, the negative impact can be minimized.

In many technical assistance projects, follow-up receives low priority. The urgency of other business—new activities to plan and manage or paperwork to be completed—frequently has more immediacy and receives greater attention.

sense of whether the assignment went well or not. Some activities inevitably go badly and leave the client less than fully satisfied. If this is known right away and the situation followed up correctly, the negative impact can be minimized. The technical assistance provider can offer to redo the assignment or take other steps to rectify and salvage the situation. Obviously, a bad situation becomes less salvageable as time passes, so initial debriefings should occur within a few days after the team has returned. Formal debriefings also provide an opportunity to discuss lessons learned that can be applied in future assignments.

Follow-up activities. When a technical assistance activity ends, the primary responsibility for implementation shifts to the client. The consultants have done their work and prepared their report; the client has accepted the results and is prepared to go forward with the effort. The ultimate success of the activity will not be known, however, unless follow-up is done to find out to what extent the client is continuing the effort.

In many technical assistance projects, follow-up receives low priority. Although all parties are aware intellectually of the need for it, the urgency of other business—new activities to plan and manage or paperwork to be completed—frequently has more immediacy and receives greater attention. Little time may be left to seek information on past activities, to see if the objectives really were met, to reflect on experience, and to apply lessons learned. Because of the way WASH operates—responding to A.I.D. mission requests for assistance—it often does not have the opportunity to follow up vigorously on all assignments, but where it is able to do so, the results are rewarding. In the case of WASH institutional development assistance to Sri Lanka, for example, WASH was able to trace progress toward goals in yearly assessment workshops. It was gratifying to see an inefficient, unresponsive, overly bureaucratic institution gradually turn around and become more like a well-run commercial firm.

More funding for follow-up technical assistance would be highly advantageous for the sector. Individual projects would benefit but, more important, overall programming for the sector would improve as the

lessons of follow-up activities were followed in new project designs.

Lesson Four Coordination and Networking

Technical assistance provided through the collaboration of multilateral and bilateral agencies and A.I.D.-funded projects makes maximum use of scarce resources.

Coordinating and networking have several significant benefits for technical assistance projects. In addition to permitting more effective use of resources and leveraging of resources, coordination of activities with other multilateral and bilateral agencies and other A.I.D.-funded projects helps to prevent duplication of effort and permits the project to play a more influential role. Networking—the process of building and maintaining mutually beneficial professional relationships with colleagues in other organizations—brings greater visibility to the project and its work, enhances its credibility, provides access to expertise and information beyond the project's internal resources, suggests opportunities for coordinated and collaborative efforts, and expands awareness of the importance and impact of water supply and sanitation development.

Today, the trend seems to be toward greater coordination and collaboration, and a favorable climate exists for achieving these both at management and field levels. Part of the impetus for this trend is declining resources for development projects and a greater emphasis on affecting third world government policies. Technical assistance organizations should be ready and able to take advantage of this opportunity and initiate and participate in joint efforts.

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Collaborative mechanisms. A collaborative network established in 1991 for Central America may provide a model for effective donor and government collaboration in the sector. The Regional Water and Sanitation Network (RWSN) for Central America, as it is called, consists of close to twenty members representing government and external support agencies involved in water and sanitation in the region. The U.N.

Development Program/World Bank Water and Sanitation Program coordinates the RWSN, and the Inter-American Development Bank, UNICEF, the Pan-American Health Organization, the World Health Organization, and the development assistance agencies of many countries are among the members. The RWSN has a small secretariat and depends on other organizations and resources to carry out its work. A staff person from the WASH Project served as a member of the secretariat to assist the RWSN in its start-up phase by focusing on institutional and human resources issues.

Rather than following the traditional model of technical assistance, in which individual water and sanitation projects are undertaken, the RWSN aims to focus government attention on the too often neglected sector issues that must be solved before any substantial progress in increasing water and sanitation coverage can be made. These include sector organization, water tariffs, institutional development, policies, and planning. The strength of this collaborative network is its ability to address such sectoral-level issues, all of which are very difficult for individual development agencies to tackle. Also, the network can attract the attention of high-level officials whose support is indispensable.

Another regional effort, sponsored by the Pan American Health Organization, is set to tackle not just water and sanitation problems but all environmental health issues. The Regional Plan for Investment in the Environment and Health aims to bring about significant improvements in environmental health in Latin America and the Caribbean. The plan, which was launched in 1993, seeks to establish a Multilateral Fund with the goal of attracting \$216 billion over a twelve-year period (70 percent from national and 30 percent from external sources) to overcome the enormous deficit in health services infrastructure, drinking water, and basic sanitation. Under the plan each country will design a multiyear national plan providing guidelines for the activities of all the public and private institutions engaged in the areas of health and the environment within the country and for the mobilization of multilateral and bilateral technical and financial resources. WASH, through the support of

A.I.D.'s Bureau of Latin America and the Caribbean, is collaborating with PAHO in this effort.

A similar collaborative mechanism, though wider in scope, was organized at the end of the U.N. International Drinking Water Supply and Sanitation Decade (1981-90). As the decade neared its conclusion and the goals of safe water and sanitation for all remained unmet, external support agencies searched for a way to keep up the momentum of the decade. In 1988, a collaborative council of external support agencies was formed, and in 1990 it was expanded to include water sector professionals from developing countries. The council provides a forum for sector professionals to discuss issues, promote collaboration and efficient use of resources, and encourage adoption of favorable policies. It works through existing institutions and focuses on broad sector-level issues.

Collaboration on this level has the capacity to raise water and sanitation issues to a higher priority on the development agenda. It may also offer a model for developing countries on the benefits of collaboration, since developing country government structures often divide responsibility for water and sanitation among several ministries.

Management coordination. In addition to the collaborative networks described above, WASH has been involved in joint activities with a number of international and bilateral agencies in the areas of operation and maintenance, information, applied research, cost recovery and financial management, community management, training, community participation, urbanization, and the role of women. These activities have taken the form of joint conferences, jointly prepared and presented papers, and joint technical assistance teams. While these efforts have generally proceeded smoothly and advantageously, there are some potential problems in collaborative efforts that should be recognized and addressed to the extent possible.

Perhaps the most important problem is that collaboration and coordination are time-consuming, substantially more so than doing everything oneself. There are many meetings that must be held, telephone calls to be made, and memoranda to be written. An already hectic and stressful operation becomes even more complex as pressures are felt from institutions

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LESSONS LEARNED

Institutional jealousies or legitimate competition get in the way of collaboration.

other than one's funding agency. Competing priorities for time and other resources intervene. At times institutional jealousies or legitimate competition get in the way. Even with these potential problems, the potential payoffs are great so long as the primary purpose and priority of the organizations are kept firmly in mind and the necessary time and resources are accounted for in planning and budgeting.

WASH has adopted a number of practices to ensure that collaborative activities run as smoothly as possible. For example, WASH makes every effort to persuade collaborators to use planning techniques that have met the test of time at WASH: comprehensive team planning meetings using a facilitator, consultation with the client in developing scopes of work, and producing a well-edited final report. Some organizations with which WASH has worked are not used to allocating so much time to planning. Also, WASH recognizes that different organizations espouse different problem-solving paradigms that may not be compatible but should at least be made explicit.

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Field coordination. Just as an institutional policy supporting coordination does not necessarily lead to cooperative efforts, so coordination at the management level may or may not lead to coordination in the field. Not all field technical assistance efforts, of course, require coordination, but many do. It is not unusual for water supply and sanitation technical assistance teams from different agencies within the same country or counterpart agencies in other countries to meet by accident in the same hotel. Even if the headquarters offices back home are aware of the fact and have agreed to coordinate efforts and have so informed their respective teams, whether this occurs in any useful way depends almost entirely on the willingness of team leaders and members to make it happen.

Management can encourage coordination by creating an atmosphere and approach in which coordination is expected.

Management can encourage coordination by creating an atmosphere and approach in which coordination is expected, and by evaluating the success of such efforts based on the results achieved. Ultimately, however, since managers are likely to be physically far away and unaware of much of the detail of what is occurring until after it has happened, their ability to influence field situations is very limited.

The best way to foster coordination in field situations is to look for consultants to act as team leaders who believe in the value of coordination and collaboration and will set norms for achieving them from the outset, at the team planning stage. This belief can then be impressed upon others by encouraging networking and communications and by demonstrating coordination at management levels.

Lesson Five Information Exchange

An active information service can expand the reach, as well as the visibility and credibility, of technical assistance.

The most effective transfer of technologies, skills, and information occurs through technical assistance activities in the field. But the need for such transfer far outstrips the resources available to accomplish it. One important way to narrow this gap is through the development and dissemination of written materials. The WASH information service enables a much wider group of people than those who receive direct technical assistance to benefit from WASH's field experience and management analyses. It is effective in large part because it is an integral part of WASH's operation and has the same status and priority as its field activities.

Developing and distributing materials drawn from WASH's work also plays an important role in increasing the project's visibility and credibility. In other words, disseminating materials makes a marketing impact at substantially less cost and with a much wider audience than other techniques such as conference participation or reconnaissance visits. WASH gives high priority to producing and distributing publications that capture as much of its knowledge and methodology as possible. WASH issues both technical reports and field reports, many in French and Spanish as well as English.

Technical reports examine issues, synthesize experience, and set out guidelines. A great amount of attention is paid to review, revision, and presentation of technical reports. Field reports are the result of technical assistance activities; in these documents, higher

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priority is given to capturing and disseminating the results quickly than to producing a perfect document. WASH makes both types of documents available to interested parties and routinely distributes them to key audiences. By the end of fiscal year 1992, WASH had published 80 technical reports and 380 field reports.

In deciding what kinds of publications to develop, the guiding precept should be that form follows function. A technical assistance provider should have a clear picture of who its audience or audiences are and what kind of information they need. Only then can a decision be made on the type of publication (or other form of communication) that is appropriate.

For example, WASH publishes "Fact Sheets" and "Technical Notes," two- to four-page leaflets that synthesize the contents of technical and field reports or other publications for people who may not need the full detail of the longer reports. These are chosen to fill information gaps for policy audiences wishing to become familiar with broad water supply and sanitation issues. In addition, several publications promote a broader awareness of WASH activities. A "Progress Report" issued every twelve to eighteen months briefly describes all WASH technical assistance activities and lists all WASH publications. Three or four "WASH Update" bulletins issued between progress reports keep A.I.D. missions and bureaus and other interested parties aware of current activities.

An active information service experiments with new ways of communicating ideas. Therefore, WASH has used a number of computer software programs for special presentations. A computerized slide show on cholera, for example, has functioned as a stimulus to discussion and supplemented published reports, technical notes, and fact sheets on the same topic.

Through its information service, WASH benefits from the work of others. Efforts in information exchange have resulted in a collection of more than 7,000 water, sanitation, and health-related documents, one of the most comprehensive collections of information on water supply and sanitation available. An important function of this collection is to provide ready access for WASH staff and consultants to a broad range of documents addressing common problems from a variety of technical, cultural, and political viewpoints.

This is extremely useful in preparing consultant teams, responding to technical assistance requests, and keeping staff and consultants aware of what is happening elsewhere in water supply and sanitation development.

In addition to carrying out marketing, dissemination, and library functions, the WASH information service also provides technical assistance, institutional memory, documentation of lessons learned, and specialized collections and networks.

Technical assistance backup. As the need for and benefits of organized technical information systems have become more widely appreciated in developing countries, many requests have been received for technical assistance in planning, designing, and implementing such systems.

For example, the A.I.D. mission in Zaire requested that WASH determine the information requirements of A.I.D.'s rural water supply and sanitation project and the supporting ministries and agencies of the government of Zaire. Once the requirements were identified, WASH helped in designing appropriate information systems and training programs for the respective organizations. Also, a technical assistance activity in database management was carried out in Thailand in conjunction with a water resources center, which may become a library.

Institutional memory. The collection, organization, and maintenance of information about the experiences and accomplishments of an organization permit it to build on its past successes and avoid repeating past mistakes. The WASH information service is the institutional memory both of WASH and of A.I.D.'s water supply and sanitation staff. In addition to maintaining the collection of WASH field and technical reports, the WASH library also has a large collection of internal field reports, interim reports, conference presentations, and other materials not suitable for formal publication. These materials are invaluable in training and orienting new WASH staff as well as in providing backup to technical assistance teams.

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Lessons learned activities. An ongoing process for capturing lessons learned should be a function of technical assistance. WASH has adopted a number of practices by which experience is fed back to planning. When technical assistance teams complete their assignments, they participate in a debriefing meeting in which they describe the assignment and its results to interested persons from WASH, A.I.D., and other development assistance organizations. Lessons learned is an important agenda item of these debriefings.

In early 1992, WASH instituted quarterly staff seminars especially devoted to discussing lessons learned. Topics discussed in these meetings are developed further and disseminated through the "Lessons Learned Forum," a new publication in which WASH staff members discuss what WASH has learned about such specific topics as private sector participation and sanitation. The "Lessons Learned Forum" is distributed to key technical and policy audiences.

Information exchange activities lead to the development of communications networks—interactive arrangements among organizations or individuals for the purpose of sharing information.

Specialized collections and networks. Information exchange activities lead to the development of communications networks—interactive arrangements among organizations or individuals for the purpose of sharing information. When the information collected is organized around one or more specialized topics, specialized networks tend to develop as well. WASH has used these techniques to target its information exchange efforts to high-priority topics and organizations concerned with them and has become an international focal point for information in the areas of guinea worm disease, rainwater harvesting, and peri-urban issues.

The networks associated with these three topics are extensive and include interested individuals and organizations worldwide. Informal and relatively inexpensive, the networks are particularly important in providing information to researchers and practitioners in developing countries. A special bulletin is published for each network to facilitate information exchange among members. For example, "RAINDROP," the newsletter of the rainwater harvesting network is published and distributed twice a year to 820 network members in 103 countries. All network newsletters consist of articles and letters from network members and serve as the networks' communication vehicle.

Cooperation with other organizations is a critical component in maintaining effective networks. In the case of guinea worm disease, for example, WASH cooperates with the Centers for Disease Control in translating and distributing the bulletin.

The existence of these specialized collections and networks has had several positive results, including an increased flow of information from WASH to influential actors in water supply and sanitation development and increased contact between staff and development practitioners.

* * *

Over the years WASH has built an effective technical assistance project and some of its procedures and practices have been picked up and used by other organizations. The particular procedures and practices are far less important, however, than the axioms on which they are founded: responsiveness to the client, collaborative decision-making, an interdisciplinary approach, flexibility, and a willingness to learn from experience and to change when old approaches are no longer effective.



Bolivian woman enjoys the fruits of her participation in a community-based CARE rural sanitation program.

Chapter 3: SHARED RESPONSIBILITY

The term “shared responsibility” is not commonly used in development literature, but it captures a notion that is favored by most development practitioners. The essence of this notion is that key participants in water and sanitation development should not act independently or competitively but should share responsibility, each assuming an appropriate part of the burden. If they do, the development process is more likely to be successful; if they do not, time and money will be wasted and the need for sustainable water supply and sanitation facilities will be unmet. The principle can be stated as follows: **Sustainable development is more likely to occur if each of the key participating entities recognizes and assumes its appropriate role and shoulders its share of the responsibility.**

Those with the responsibility for water supply and sanitation development are host country governments—national as well as local or municipal, governmental donor agencies, nongovernmental organizations (NGOs), local communities and users, and the private sector. Each of these groups is discussed below.

Lesson Six National Institutions

The role of the government is to assume primary responsibility for sector management, including planning, donor coordination, policy reform, regulation, and institutional and financial aspects of development.

Developing-country governments must take the lead in developing their own water supply and sanitation sectors. Otherwise, donors may make decisions based on their own organizational perspectives, and the results may or may not be in the best interests of the country as a whole. Or donors may decide to move their operations elsewhere, to a country that shows more signs of being able to carry out sustainable programs. Similarly, governments should ensure that conditions are in place to attract private sector resources.

In almost all cases, only the national government has sufficient authority and credibility to take on the role of sector manager. Local governments, private sector organizations, and internal support agencies can provide varying degrees of assistance, but none of them can be the focal point for sector management, which includes setting standards, overall coordination of planning, donor involvement, financing, and implementation. WASH has found that strong central government institutions are essential for water supply and sanitation development to be managed effectively.

Indicators of effective sector management include establishing clear national goals, plans, policies, and institutions with the mandate and trained personnel to carry them out; providing regulatory guidance and program approval to ensure that development ef-

Strong central government institutions are essential for water supply and sanitation development to be managed effectively.

forts are environmentally sound and that all of the elements necessary for sustainability are included; and approving and monitoring donor, nongovernmental organization, and other involvement to ensure that programs meet country needs.

Policy. To be successful, water supply and sanitation development efforts must take place in the context of explicitly stated support and responsibility from the highest levels of national government. This should be in the form of a document containing the government's official policy on water supply and sanitation. This document need not be elaborate, nor must it necessarily contain detailed plans for implementation; it must, however, at a minimum, delineate who is responsible for the operation and maintenance of public systems and where funds for these activities will come from. Benin, for example, has developed such a document which is clear and concise and which provides direction for all concerned parties, including donors, communities, NGOs, and the private sector.

It is not uncommon for individual programs to founder for lack of support at the top. One of the reasons for the success in Tunisia of instituting nationwide water-user associations to handle operation and maintenance of rural water systems was that the government was squarely behind the idea and, in fact, had articulated it as a national policy.

Formal policy statements indicate the government's seriousness of purpose in addressing water supply and sanitation issues, give visibility to development efforts, and indicate the priority the sector is being given. They help to create and shape the environment in which development is to occur. Such statements alone, however, do not convince donors and other potential contributors to the country's water supply and sanitation program of the government's resolve. Governments must also commit a share of the available national resources. When governments truly believe an issue is important, they spend money on it, even when relatively little is available.

Planning. Sector planning at the national level is important because it establishes priority areas for investment and ensures that water and sanitation programs address what the government considers to be

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Planning is difficult because it often involves institutions that must be brought together despite their natural tendency to compete and guard their prerogatives.

the sector's most pressing needs. Planning can also identify areas where institution strengthening is needed to increase the capability to implement programs and help to ensure that funding is provided to meet those needs. Finally, planning helps governments identify activities and projects for which assistance can be sought from supplemental sources such as private voluntary organizations and the private sector. From the donor's standpoint, sector planning inspires confidence that funds will be used appropriately and will go to support sustainable programs and projects.

WASH has found that governments often lack the ability to develop realistic plans. In a number of instances, therefore, WASH has assisted governments in the planning process. For example, when cholera reemerged in Latin America in 1991, WASH helped a number of countries assess their vulnerability to the disease and make plans for forestalling or coping with the epidemic. In another task, one of the most ambitious WASH has undertaken, WASH assisted four Eastern European countries in developing rational plans for cleaning up the Danube River by first assessing the sources of pollution in the river from those countries.

Planning is difficult because it often involves institutions that must be brought together despite their natural tendency to compete and guard their prerogatives. As water and sanitation come to be viewed as aspects of a broader environmental health agenda, the number of institutions involved will increase, complicating planning even further. In recent years, tools such as environmental and health risk assessments have been developed to help countries set priorities and make plans.

In its limited experience with risk assessment, WASH has attempted to adapt the risk assessment methods used by the U.S. Environmental Protection Agency to the developing country context and to use qualitative as well as quantitative data. WASH collaborated with PRITECH, an A.I.D. centrally funded public health project, to conduct an assessment of the relative health risks of a number of environmental conditions in Quito, Ecuador, in 1992. Risk assessment is a tool for estimating to what degree specific environmental hazards pose a health risk. It provides in-

formation for policymakers to set priorities. Normally the information sought in a risk assessment is purely quantitative. To give the Quito risk assessment a human face, WASH gathered qualitative data as well from in-depth and focus group interviews and structured observations of household behavior to help define the risks as they are experienced and perceived by ordinary people. Qualitative and quantitative data were compared.

Risk assessment can be an important planning tool for governments, but, for it to be effective, government agencies must have the capacity to collect the quantitative data on which assessments must be based. In addition, governments need institutions and participatory processes that can be mobilized to make public policy decisions. Only then will the decisions attract wide support and be sustainable.

Regulation. National governments should continue to take the lead in identifying and bringing about policy and regulatory reforms needed to permit greater efficiency and effectiveness in water supply and sanitation development. Although a great deal of progress has been made in dealing with this difficult issue, in some countries government regulations still impede efficient operation and maintenance by discouraging the involvement of the private sector.

For example, in Tunisia the Ministry of Finance was not willing to relinquish tight control of the funds for maintenance collected by the Water Users Associations despite the near-unanimous sentiment of governorate officials that the system was not working well. The Water Users Associations were being established to institutionalize a nationwide program of community management of rural water supplies. Changing the system and giving the Associations greater autonomy over their financial resources is fundamental if they are to achieve self-sufficiency. Some governments, to cite another example, have set unreasonably stringent regulations governing water quality or infrastructure construction which impede the development of alternative systems, and because they are widely ignored, may encourage a disregard for the law. Others place unreasonably high tariffs on imports that the private sector might need to participate in water and sanitation programs.

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In many countries, government regulations on financial institutions effectively block local capital markets from participating in water supply and sanitation investment by prohibiting or severely restricting their ability to make loans. Making these local markets available would help to solve external debt problems, which are worsened by requirements to repay loans in the original currency, since this takes an ever-increasing percentage of the gross domestic product when domestic currencies are devalued.

Donor-financed and -managed programs, private voluntary organizations, and the private sector all have abilities and experiences that can be valuable resources to the development effort if tapped by the government.

Management. Strong government sector management can increase the institutional and financial resources available to the water and sanitation sector. Many agencies with primary responsibility for implementation are principally technology driven and do not have the multidisciplinary skills required for effective development. These skills are often available in other government ministries and can be brought to bear on water supply and sanitation efforts by effective interministerial coordination.

Similarly, donor-financed and -managed programs, private voluntary organizations, and the private sector all have abilities and experiences that can be valuable resources to the development effort if tapped by the government. The private sector can be particularly useful in project implementation—carrying out feasibility studies, drawing up engineering plans, and constructing systems under government direction—and in providing operation and maintenance services. If external resources are to be used effectively, the sector plan must be well formulated and enforced, and the overall effort strongly coordinated.

Successful water supply and sanitation sectors have monitoring and evaluation mechanisms for keeping tabs on everything going on in the sector.

Evaluating performance. Insofar as it can, the government should take the lead in identifying and correcting problems in water supply and sanitation programs quickly, before they cause major weaknesses. If donors perceive the national program as weak, ineffective, inefficient, or corrupt, the government will rapidly lose control of the process. The best way to avoid this is for the government to evaluate the program's performance constantly, making any needed adjustments to strengthen and improve it.

Successful water supply and sanitation sectors have monitoring and evaluation mechanisms for

keeping tabs on everything going on in the sector. In Swaziland, for example, the technical support group primarily responsible for sector planning under the National Action Group continually monitors and evaluates the sector, recommending areas needing further attention or adjustments in program plans.

Reviewing and revising institutional arrangements. As a national water supply and sanitation program grows and evolves, institutional arrangements should be periodically assessed by the concerned government agencies to determine whether changes are needed. New government ministries may have been created, for example, to respond with greater vigor to other national needs; their efforts should be coordinated with the water supply and sanitation work being done. Similarly, the shape of the water and sanitation program may have changed to the extent that a different coordinating structure would be more effective. If, for example, the private sector has grown significantly or if new private voluntary organizations have formed, new relationships may need institutionalizing. The responsibility for water supply and sanitation may need to be moved to a different ministry—from infrastructure development to health or rural development, for example—to permit the sector to continue to grow in the proper direction. Initially, rural and urban affairs may have been handled by the same department but now require separating, or a whole new component addressing hygiene education may need to be developed.

In Ecuador, for example, after a reassessment of the water supply and sanitation sector, the national water agency decided to move toward a more decentralized approach to meet the needs of rural communities better. In Sri Lanka, the responsibility for rural water supply was moved from the Ministry of Agriculture to the Urban Water Authority because it was considered cheaper and better to combine rural and urban services. In some countries, the responsibility for water and sanitation is now being assumed by newly created ministries of the environment.

The focus of responsibility for carrying out the work of the sector varies considerably among countries. A WASH study of five countries found management responsibilities shared among the national

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government agencies, decentralized regional agencies, communities, and the private sector. Each arrangement was developed in accordance with local needs and concerns.

The possibilities are virtually endless. The important thing is for someone to sit back periodically and reflect on the progress the sector is making and how that affects and is affected by existing institutional arrangements. If this is not done, the tendency to make no changes and continue doing things in outmoded or inefficient ways is perpetuated.

Lesson Seven Donors

The donor's role is to provide coordinated support to governments in designing or carrying out their national plans.

Under the impetus of the International Drinking Water Supply and Sanitation Decade, many countries developed sectoral plans. Many plans were done by outside consultants and reflect an imbalance between proposed activities and national resources, capacity, and government commitment. Some countries, however, have treated sector planning as a serious matter, giving it high priority, and have come up with reasonable, well-thought-out, long-term plans for the sector that deserve serious consideration by donors for long-term funding commitments. Benin is such a country; the strength of its water and sanitation program probably stems from its effective planning.

This is not to say that donors should provide funds and technical assistance only to countries that have such pragmatic plans. Countries that do not have the institutional capability to undertake sector planning seriously also need technical assistance. Their populations are likely to be as much, or more, in need of capital assistance for improved facilities as populations in countries possessing greater planning abilities. However, donors should be especially responsive to and supportive of those countries that treat the water and sanitation sector as sufficiently important to devote resources to manage and develop it. On the one hand, this is positive reinforcement to the country

to take charge of its own affairs; on the other, it is also a good indicator that donor investments will be made in sustainable programs and systems.

Too often donors nod approvingly or even provide active encouragement to the idea of national governments taking the lead in water supply and sanitation development, only to insist at the implementation stage that everything using the donor's money be done the donor's way. In too many cases, donor support is provided only if all of the donor's rules are followed and the equipment and materials it specifies are used. Some donors even insist that a separate operational department be established to handle all projects the donor is underwriting and that this department function independently from all others.

An extreme example of this occurred in Honduras, where three donors insisted that separate units be established within SANAA (the country's rural and urban water supply agency) to handle their individual programs. This resulted in three units of the agency each dealing with a different geographic area, using different criteria for community eligibility, and emphasizing different technologies. Not surprisingly, this caused significant internal problems, including institutional jealousies, conflicting policies, and inhibited career development.

Donors should instead permit as much national autonomy as possible. If there is a clash between the objectives of the plan and the donor's program priorities, the donor should either modify its own priorities or show the national government why its priorities should be the same as the donor's, given the country's needs.

In some situations it is unwise for donors to continue to pour resources into a country. For example, if a country is unwilling to come to grips with the need to strengthen its weak institutions, a donor may be justified in withdrawing support for facilities construction on the grounds that the money could be used more effectively elsewhere.

Donors must be willing to be flexible, supportive, and understanding and to make some short-term sacrifices in the interests of long-term institutional development and sustainability. This role carries with it several specific obligations that demonstrate donor support for national government management of the

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development process as discussed in further detail below.

If programs are to be sustainable, they must reflect the government's priorities and directions, not those of the donor. The planning process should be collaborative, with the donor assisting and facilitating but not deciding.

Participation in planning. Donors should actively participate in developing national strategies and plans but should be careful not to dictate to the government what its plans should be. If programs are to be sustainable, they must reflect the government's priorities and directions, not those of the donor. The planning process should be collaborative, with the donor assisting and facilitating but not deciding.

Donors should not, however, take a hands-off attitude about national planning on the grounds that collaboration is somehow inappropriate or implies a financial commitment. If the latter is a problem, the donor can simply make it clear at the outset of the project that its participation in the planning process should not be interpreted to indicate any funding commitment. Most donors recognize that they have a responsibility to help governments build their institutional capability through information and skills transfer even if no capital funding is provided.

Long-term commitments. One of the most common and most damaging mistakes donors make is refusing to make long-term financial commitments to countries in support of their water supply and sanitation activities. Donors should not feel compelled to sign a blank check good for ten years on the strength of clearly unrealistic ten-year plans. However, it is reasonable to expect them to commit themselves informally to an estimated level of funding for a multiyear period. This kind of commitment permits the country to develop its plans on the understanding that money will be provided pending the donor's approval of the specific activities for which its funds will be used. At the same time, the country must also be committed to capacity building and a gradual diminution in reliance on donor assistance.

Some donors tend to change directions, priorities, and emphases so rapidly that no government can follow.

Some donors have a tendency to change directions, priorities, and emphases so rapidly that no government can follow. To some degree, this is the result of democratic political pressures in donor nations, but not all democratic donors are equally guilty. Switching development "themes" every few years makes it impossible for developing countries to make the best use of their own or the donors' resources. Countries

that take seriously donor admonitions to manage their own development and come up with realistic plans can find their work impeded by sudden changes in direction. Rational development policies and efficient use of resources require consistent, logical themes and approaches; otherwise they simply waste taxpayers' money.

Coordination of programs. In the interest of developing rapidly, many governments allow programs to begin that are beyond their capacity to coordinate effectively. Generally it is unrealistic to expect a national government to coordinate the programs of various donors. Donor participation in the national planning process helps, but ultimately the donors themselves must take positive steps to coordinate their work. In many developing countries, formal or informal donor committees meet periodically to discuss their activities and planned projects and to share their assessments of sector progress. This permits all donors to make better use of their resources and to ensure that projects are not overlapping or working at cross purposes. Donor competitiveness and unwillingness to share information or coordinate activities lead to wasted money and failed programs.

Collaboration and coordination among bilateral and international donor agencies can increase the impact and visibility of sector activities and offer opportunities to increase efficiency and to lower costs (for example, through agreeing on the use of standard equipment). At the same time, true collaboration presents numerous logistical difficulties, and the substantial investment of time required can slow progress and raise costs—at least in the short term. Also, collaborating entails some loss of control, and many organizations may be uncomfortable with that.

Flexibility in implementation. It is not unusual for projects to start off in one direction and then to correct their course because new opportunities present themselves or greater-than-anticipated difficulties arise. Those directing a schistosomiasis control project, for example, might discover part way through that some funds should be diverted to developing drinking water supplies in affected communities. Likewise, a project designed to address only drinking

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water might uncover considerable community support for and willingness to pay part of the cost of sanitation facilities if the two could be developed simultaneously. In another instance, officials implementing a program designed to use only hand-pumps might find that communities are willing to pay more for sophisticated and convenient technologies and little to nothing for the lower level of service.

In cases such as these, donors must be flexible enough to permit needs to be addressed and opportunities to be seized midstream without insisting on the original approach or technology. Such flexibility can lead to more effective use of resources than was initially thought.

Lesson Eight Nongovernmental Organizations

**NGOs are able to operate effectively just where donors may find it difficult to do so—
on the local community level and
in highly politicized situations.**

NGOs have traditionally played a major role at the community level in many developing countries. Thousands of local and national NGOs operate throughout the world, although in any given country there are only a few with enough experience and sustainable funding.

In addition to the many local NGOs around the world, there are a number of large international NGOs whose role in development efforts has been growing significantly as they focus less on their traditional disaster relief activities and more on a long-term commitment to development. CARE, for example, is carrying out water and sanitation development projects in a wide range of countries, including among others Indonesia, Guatemala, and Sierra Leone. World Vision conducted a large-scale water and sanitation program for five African countries. It is these large international NGOs, the type that WASH has worked with, that are discussed here.

Because NGOs involved in primary health care and water and sanitation tend to be nonpolitical, they often are more acceptable than donor agencies to both

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local communities and national governments, and can work in countries regardless of official governmental relations between the developing-country government and the NGO's home government. In Ethiopia, for example, political problems prevented A.I.D. from working directly in the famine relief camps. More than a dozen U.S.-based NGOs, however, were able to develop water supply and sanitation systems in that country. In South Africa a coalition of NGOs was formed to coordinate emergency relief in the 1992 drought because the complex relationships among the South African government and the governments of the homelands hampered relief efforts.

Clearly, NGOs have a positive role to play in development efforts. They frequently have substantial amounts of money and other resources available, coupled with the ability to move quickly and flexibly to address development needs. They generally have excellent community-level ties and high credibility and are active in technical assistance as well as construction. These characteristics are needed in, and can be used to support, national development programs and projects. NGOs thus are a potentially significant resource in water supply and sanitation development.

On the other hand, many NGOs have resisted any outside guidance—even from the governments of the countries in which they are working. Historically, many NGOs were relief organizations that prided themselves on their independence and whose financial supporters demanded quick and visible results. While these characteristics are not problematic in disaster relief, they can be damaging in long-term programs aimed at sustainable development.

As NGOs shift their focus more toward long-term development, they are increasingly willing to work, along with other donors, in the context of a national government in charge of its own development process. This willingness can be further enhanced by treating NGOs as important players on the country's development team and involving them in planning and coordination. In general, where strong working relationships exist between NGOs and governments, effective project implementation results.

In Sierra Leone, for example, CARE, with support from Canada, implemented a rural water supply project in the Moyambo District for a number of years.

NGOs generally have excellent community-level ties and high credibility and are active in technical assistance as well as construction.

LESSONS LEARNED

Because CARE worked closely with Sierra Leone's Ministry of Energy and Power, technical staff of the two organizations were effectively integrated in project implementation. The ministry provided overall direction and some staff and established policies, while CARE provided project funds, innovative community participation approach, staff, and logistical support. Overall, CARE developed a strong working partnership with the Sierra Leone government, which allowed joint efforts to be directed toward urgent water and sanitation problems.

In peri-urban, or informal, areas, which may be cut off from access to governmental resources and institutions, NGOs can serve as useful bridges to formal institutions.

In peri-urban, or informal, areas, which may lack legal status and consequently may be cut off from access to governmental resources and institutions, NGOs can serve as useful bridges to formal institutions. For example, an NGO may organize a community and then reach out to formal institutions from that base. Also, in working with communities, NGOs can function as commercial enterprises, providing services for building infrastructure at a low cost. With NGO assistance and community labor and pressure, the cost and red tape involved in infrastructure can generally be reduced and government support and recognition can be fostered.

Like all organizations, NGOs have both strengths and weaknesses.

Strengths. NGOs have a number of advantages over governmental organizations in implementing water supply and sanitation projects, particularly small-scale projects using innovative technologies and approaches. NGOs tend to have leaner administrative structures than government organizations and can mobilize and adopt new ideas more quickly. They also can usually implement water supply and sanitation projects at a lower unit cost because their overhead and administrative costs are lower.

NGOs use indigenous staff very effectively and give them proportionately greater responsibilities than do international development agencies.

NGOs use indigenous staff very effectively and give them proportionately greater responsibilities than do international development agencies. They are particularly effective in countries with weak or nonexistent governmental infrastructures. In Zaire and Haiti, for example, NGOs carry out the majority of water supply and sanitation efforts in rural areas. Because they have a long-term presence and are thus well accepted by local governments, NGOs are often

excellent at introducing pilot projects using innovative ideas, technologies, and development methods.

In Cameroon, for example, CARE began working with A.I.D. in 1979 on an integrated program of water supply, health education, and latrine construction. In a country in which few organizations have successfully implemented programs involving community participation, CARE has been able to work with the government's Community Development Department to develop integrated projects in more than 100 villages. The self-help philosophy promoted by CARE has helped the villages develop a strong sense of ownership and concern for the continued operation of their facilities.

Weaknesses. Not all NGO-implemented projects are fully successful, due largely to inherent but correctable weaknesses in some of the organizations. NGOs sometimes lack sufficient technical expertise to carry out more complex water supply and sanitation programs. Since NGO salaries are usually quite low, there frequently is a shortage of engineers and hydrogeologists on staff. This deficiency can adversely affect field performance on projects requiring high levels of technical expertise. Because of limited staff and administrative resources, NGOs are not always able to monitor their field operations closely and, as a result, often cannot conduct detailed evaluations of completed projects. They also may be unable to provide sufficient backup resources if problems arise. Conversely, some NGO projects are not replicable due to the hidden costs of intensive management and technical attention from NGO staff applied to rather small efforts. Often tallies of NGO cost effectiveness fail to count this cost even though the success of the project may be very dependent on this attention. These problems are compounded by the preference of many NGOs for carrying out their projects in isolation rather than in conjunction with other NGOs or other institutions that could provide supportive resources.

Surprisingly, NGOs working in water and sanitation are sometimes quite inattentive to the need to strengthen institutions and promote community participation, even though one of their strong points is their excellent link with communities. This may be a result of the "doing for" mentality of disaster relief or-

ganizations rather than the "doing with" approach that sustainable development requires.

WASH evaluated work in four countries involving two of the largest international NGOs working in water supply and sanitation and found major problems in community participation. In Ghana and Senegal, for example, WASH found that the communities had been inadequately prepared before drilling rigs arrived, even though good community development work by the same NGO was going on in villages not involved in the water project. Similarly, in Sierra Leone and Belize, WASH found that another NGO's projects were dominated by technology and that the local communities had little role in influencing project development. In its work with NGOs, WASH has concentrated on strengthening their capabilities in community participation.

Lesson Nine Community Participation

The participation of users in water supply and sanitation systems, whether in rural or urban and peri-urban communities, is critical to long-term sustainability.

For a water supply and sanitation system to be sustainable, users must accept their responsibilities or offer their participation. The kinds of responsibilities and the nature of participation depend on the type of user community.

In well-established urban areas, where off-site facilities are the norm (piped water and sewers), participation may consist solely of paying for services rendered and using the system in a way that does not jeopardize its integrity.

In well-established urban areas, where off-site facilities are the norm (piped water and sewers), participation may consist solely of paying for services rendered and using the system in a way that does not jeopardize its integrity. This may seem self-evident but in many countries the principle of paying for services is still not well established. There may be no metering system, tariffs may not be collected regularly or may be set artificially low, or illegal hookups may be common. These conditions result in a loss of revenue to the sector and compromise the ability of the water and sanitation agency to maintain and extend services. Many governments could find needed revenue by assessing and improving their tariff structures and collection practices.

In rural and peri-urban communities users normally are expected to accept a more active type of participation. They should participate as community members in the planning, construction, and operation of new or improved facilities. In most such communities, on-site facilities are the norm, and these lend themselves to community or household efforts.

In rural and peri-urban communities users normally are expected to participate in the planning, construction, and operation of new or improved facilities.

Ideally, the role of the community in both rural and peri-urban areas is to participate actively in all phases of decision-making and project development. While much has been learned about how to foster this level of involvement in rural areas, it is only beginning to be understood in peri-urban areas, where there is an urgent and growing need for water and sanitation services.

The early work in water and sanitation was carried out largely in rural areas, where few if any services were available and where any increase represented major progress. Today, however, a growing proportion of the world's poor live in marginal urban areas with questionable legal status, poor-quality shelters, little or no infrastructure, and few if any water and sanitation services. These rapidly growing peri-urban areas have a great need for water and particularly for sanitation, and meeting their needs is forcing significant changes in development focus and strategy. Community participation is as important in these areas as in rural areas. Yet, it is becoming increasingly clear that achieving such participation is substantially more difficult in urban than in rural areas, in part because of the tenuous societal status of peri-urban communities.

While much has been learned about how to foster community participation in rural areas, it is only beginning to be understood in peri-urban areas.

The ultimate beneficiaries of water supply and sanitation improvements are the communities in which the systems are constructed. For many years, donors regarded communities as passive beneficiaries to which new systems were given; the communities then were expected to operate and maintain their new systems as best they could. With hindsight, it is not surprising that this approach led to many abandoned systems and wasted resources.

Experience has shown that water and sanitation projects have much greater prospects of success when communities are involved in project decision-making. In rural areas, this involves planning, designing, constructing, and operating and maintaining facilities.

The capacity to become effectively involved must be built over time in a community. It doesn't happen overnight.

Community participation is not simply a matter of keeping the local people informed, seeking their ratification of decisions already made elsewhere, or letting them build parts of the system. True involvement means decision-making and hands-on management; anything less will not be sustainable over the long term. Also, the capacity to become effectively involved must be built over time in a community. It doesn't happen overnight.

Bringing about this level of community involvement requires a great deal of work—in peri-urban even more than in rural areas—and has substantial costs associated with it. However, when appropriate ways can be found to ensure community participation, particularly the participation of women, the benefits are great and extend beyond the project.

The wealthy members of a community and those accustomed to leadership roles will participate eagerly given the opportunity, while the poor, ethnic minorities, and those not accustomed to leadership roles (women, for example) often need special encouragement and training.

Full community involvement. Experience in water and sanitation work in rural areas has demonstrated that all members of the community, not just elites and formal leaders, must participate actively in the development process in order for projects to succeed. WASH has found that the wealthy members of a community and those accustomed to leadership roles will participate eagerly given the opportunity, while the poor, ethnic minorities, and those not accustomed to leadership roles (women, for example) often need special encouragement and probably special training in participation. In general, building on whatever community management structure already exists is better than attempting to create a new one.

The community's informal leadership should be identified early in the development process, since it may differ significantly from the formal leadership and will be valuable in organizing the whole community. Special steps should be taken to involve the very poor and other noninfluential members of the community who may be ignored by extension agents because they are difficult to reach. Even these groups, however, have their own informal leaders who can be identified and drawn into the process.

Involving associations and networks in peri-urban communities is considerably more difficult than in rural areas, where societies are more homogeneous. In peri-urban areas, even people living in close proximity to one another, come to the community from

widely different backgrounds and do not share a history or mutual trust. Nevertheless, informal organizations based on village or ethnic origin, religious affiliation, or neighborhood frequently do form, although the level and intensity of participation is generally less than in rural areas, because the majority of people—both men and women—work outside the community and have little time that is not dedicated to income-generating activities.

The role of women. In rural areas, women are the primary users of water supply and sanitation project facilities, and often provide most of the construction labor for them as well. Nevertheless, they all too frequently are inadequately involved in project development and are viewed as passive beneficiaries of improvements in infrastructure rather than active participants in project planning and utilization.

WASH has found that the well-thought-out involvement of women in project planning and implementation is essential both to sustainability and to realizing long-term health benefits. In Tunisia, where water users associations were being established, WASH sent a consultant to interview women and find out whether or not they wished to participate in the associations. The consensus among the women was that they wished to be involved in the hygiene education committees, not the associations per se. That type of participation was more culturally appropriate. In Rwanda, a WASH evaluation found that a CARE water project had developed and implemented strategies to achieve women's participation in community management. An electoral process ensured that at least one woman served on each user association committee and at higher levels of the water authority. Consequently, women participate in water system management to an unprecedented degree.

Systems are more sustainable when women have significant ongoing responsibility for them. In many rural areas, men go to the cities in search of paid employment, while women are more likely to live in the community year-round, making them more reliable caretakers and repair technicians. In Malawi, women are being trained by the government to be village pump caretakers, and consideration is being given to including them in village pipe repair teams.

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In peri-urban areas, where the purpose of participation may be more to change behavior (how people acquire and store drinking water; how they dispose of human and solid wastes, and so on) than to construct facilities, the participation of women is equally critical. In their role as caretakers of children and activists in improving the community, women generally want to participate when they understand the expected health benefits; because of their role as breadwinners, often in single-parent households, however, it may be almost impossible for them to do so.

Community participation involves costs to both the community and the implementing agency. For a number of reasons, these costs are higher in peri-urban than in rural communities.

Costs of community participation. Community participation involves costs to both the community and the implementing agency. For a number of reasons, these costs are higher in peri-urban than in rural communities. In rural areas, most of the community's costs are "in-kind" (labor, materials, participation time) and do not involve cash transfers. Peri-urban areas, however, operate almost exclusively in the cash economy. Generally, all the members of the household, including the youngest, spend all available time earning badly needed cash. In these circumstances, it does not make sense for community members to contribute labor to building a latrine, for example, when they can hire a laborer and pay him less than they can earn in their regular work. This "paid participation" may be economical for the community members but it changes both the nature and effectiveness of the concept of community participation.

Promoting community participation also costs a considerable amount for implementing agencies, which must pay the salaries and expenses of personnel who assist in community organization, training, supervision, and backup technical support. Depending on the particular community involved, training needs may include participation skills, literacy, management, bookkeeping and other administrative skills, and operation and management.

Most water and sanitation projects underestimate the costs of community participation.

Most water and sanitation projects underestimate the costs of community participation. Data on direct and indirect costs unfortunately are difficult to obtain. The November 1987 global consultative meeting on the Water Decade held at Interlaken, Switzerland, concluded on the basis of "scarce data" that community participation activities could add "from 3 percent to

17 percent to project costs," adding that "estimated gains from improved reliability are higher, particularly if wider benefits are taken into account."

WASH evaluations support the idea that community participation should be funded at a somewhat higher level than the above figures if all the benefits of increased sustainability are to accrue. The amount of money spent for promoting community participation and project success are correlated in terms of long-term sustainability. A highly successful rural project in Togo, for example, had spent about 25 percent of project resources on community participation activities, including health education and training. While no firm percentage can be recommended, it is clear that expenditures for community participation should be substantially more than the frequently cited 1 to 5 percent.

Benefits of community participation. In both rural and urban areas, involving the community in developing water supply and sanitation projects improves the chances that the users will accept their responsibilities and that the project will be sustainable over the long term. In addition, community participation has potential benefits that go beyond the projects themselves. The skills and capabilities developed increase the community's ability to take on other projects and other issues that affect its well-being.

Field experience strongly suggests that active community participation in water supply and sanitation projects has a positive impact on other activities introduced to the community, particularly in the area of primary health care. Field investigations in Malawi, for example, have shown that community response to immunization projects, when conducted in a participatory manner, was 50 percent higher than in non-participatory projects. Spin-off development benefits have also been observed, as in Swaziland, where water committee members moved on to work towards building a school after their success in improving water and sanitation services for the community.

The best evidence to date on the positive effect of community involvement in water supply projects resulted from a WASH study of sixty villages in Togo and Indonesia. Using DPT (diphtheria, pertussis, tetanus) series completion rates as the indicator, the study

Field experience strongly suggests that active community participation in water supply and sanitation projects has a positive impact on other activities introduced to the community, particularly in the area of primary health care.

compared immunization rates among communities with participatory water supply projects, communities with nonparticipatory water supply projects, and communities without any type of water project.

In both Indonesia and Togo, DPT series completion rates in the communities where participatory water supply projects had been carried out were consistently higher (55 to 60 percent) than in the communities where only nonparticipatory projects (with facilities constructed by external agencies) had been conducted. Moreover, additional data for Indonesia showed that DPT series completion rates in the communities where nonparticipatory water supply projects had been carried out were similar to series completion rates in the control villages where there had been no water supply project. The indication is, then, that participation in a water supply project—not just the existence of a project—is the key to the stimulus effect on other health care activities.

Community participation in environmental management. The importance of community, or public, participation cannot be over emphasized in the area of environmental protection and pollution control. Often community members are aware of environmental problems that political leaders and public officials know nothing about. In addition, many environmental problems can be solved only through active public participation and advocacy. WASH is interested in learning more about how to stimulate community participation in pollution control, and has developed a model for promoting public participation in urban environmental management.

Community participation should be adopted as a core environmental management strategy because participative approaches have been shown repeatedly to be effective, efficient, and ethical. They are effective because improving urban environmental conditions requires extensive changes in institutional and individual behavior, and behavioral change is more likely to occur when the persons whose behavior needs to change are involved in all stages of planning and implementing the change. They are efficient because community members possess important information about the problems that affect them and create a demand for change. They are ethical because all people

Community participation should be adopted as a core environmental management strategy because participative approaches have been shown repeatedly to be effective, efficient, and ethical.

have a right to participate in decisions that may fundamentally affect their lives.

Community participation in environmental management gives community members a central role in all three phases of the management process: assessment, planning, and implementation. Community members or their representatives identify environmental health concerns—unsafe water, broken sewer pipes, no garbage collection, unregulated water vendors, and so on—and participate in investigating them. Community members identify the institutions that may be causing environmental health problems and create organizations to address these problems. Finally, community members create channels with government agencies so that they may participate in or even help create laws and regulations for environmental health.

The WASH model for promoting community participation in environmental management involves two processes that unfold in parallel: (1) the technical process of evaluating environmental health problems and developing interventions to mitigate their effects and (2) a systematic effort to provide community members with the skills they need to participate fully.

Risk assessment is intrinsic to the first of these processes. This tool has been criticized for vesting the power to make subjective value judgements and public policy decisions in scientific experts whose perceptions of risk may differ from those of community members. Indeed, risk assessment is not an exact science, and the opinions of people exposed to risk should be regarded with respect, recognizing that the opinions may be based on criteria that differ from those of the experts.

To respond to these criticisms, the WASH model for promoting community participation in environmental management involves communities directly in conducting the risk assessment and using the results as an input to democratic process for setting priorities and taking action. As mentioned earlier, a limited form of public participation was integrated into a WASH co-sponsored risk assessment in Quito, Ecuador.

The WASH model for promoting community participation in environmental management involves two processes that unfold in parallel: (1) the technical process of evaluating environmental health problems and (2) a systematic effort to provide community members with the skills they need to participate fully.

Lesson Ten The Private Sector

The private sector's role in providing water supply and sanitation services can be expanded if governments can create a supportive institutional, financial, and legal environment for private sector participation.

In many developing countries, the public sector is unlikely to be able to meet the growing demand for water and sanitation services. The continuing growth in urban populations, in particular, creates a constantly increasing demand for safe drinking water and an ever more urgent need for sanitation services. For example, the population in Indonesia's urban areas is multiplying at twice the national rate. At present, over 75 percent of Latin Americans live in urban areas. In 25 years, even Africa, a region that is still predominantly rural, will be over 50 percent urban, according to current estimates. Private sector funds can help meet increased needs in two ways—by introducing efficiency gains and by creating new capital financing.

Although some definitions of the term "private sector" include any entity that is not public or government (e.g., nongovernmental organizations, community groups, cooperatives), in this discussion, "private sector" refers specifically to commercial, profit-oriented interests. (However, NGOs do play a large role in many developing countries, often carving out a niche in marginal areas where the government does not operate.)

Private sector participation is much more relevant in more developed countries—including many Asian and Latin American countries—than in the poorest developing countries, where few private resources exist.

There are five basic ways that the private sector can work as a partner with the government in providing water and sanitation: service contracts, management contracts, lease contracts, concession agreements, and divestiture. *Service contracts* are the most common: the private sector is awarded contracts to provide services such as well drilling, meter reading, engineering design, or billing and collection, while the government retains overall management and control. Under *management contracts*, the private

sector assumes overall responsibility for the operation and maintenance of the water system, with the authority to make all day-to-day operating decisions. In lease contracts, the private firm in essence rents the existing facilities and assumes total responsibility for operation and maintenance, service delivery, and collecting the tariff from users, retaining an agreed-upon share and paying the remainder to the government as rent.

Private sector *concession agreements* require the private sector partners to provide investment capital in addition to working capital. The most common concession agreement is known as the BOT—build, operate, and transfer—model. The private firm builds a system, operates it for a given number of years, and then transfers it back to the government. *Outright divestiture*, the fifth type of private sector participation, is rare, even in developing countries. Great Britain is one of the few countries that has gone through the complicated procedure of selling off water utilities.

Efficiency gains. Most private sector participation in the water and sanitation sector in developing countries is in the form of contracts with the government to provide specific services. Contracting has repeatedly been shown to introduce greater efficiency and cost savings. In particular, it reduces labor costs by introducing more flexibility in the use of labor, offering a more versatile reward package, and focusing more on individual results and accountability. In addition, contracting out public services also results in better management practices and the use of superior technology. Similar levels of service quality often can be maintained at less cost.

Private sector contractors covering a number of cities can achieve economies of scale from specialized equipment and by holding larger inventories of spare parts than individual municipalities are able to hold. This benefits smaller cities, which would have no hope of achieving such efficiencies on their own.

Finally, the private sector tends to increase its own efficiency by investing in research and development that leads to cost-efficient performance. Public agencies, conversely, generally have very limited resources to experiment with innovative and new technologies and practices.

Most private sector participation in the water and sanitation sector in developing countries is in the form of contracts with the government to provide specific services.

Contracting with the private sector to provide specific services has repeatedly been shown to introduce greater efficiency and cost savings.

When the public sector cannot generate sufficient investment resources to build the infrastructure needed to keep up with growing water and sanitation needs, private participation achieved through concessions or divestiture offers the best option for increasing capital assets.

Governments must be willing to take a number of steps to make participation attractive to the private sector.

Capital formation. The second major reason for encouraging private sector participation in the water and sanitation sector is to attract increased capital resources and create new capital assets. When the public sector cannot generate sufficient investment resources to build the infrastructure needed to keep up with growing water and sanitation needs, private participation achieved through concessions or divestiture offers the best option for increasing capital assets. However, there is more potential in water supply than in sanitation and wastewater, which are thought of as public services. Willingness to pay for these are low unless people are highly aware of the health and social costs of lack of sanitation. Although few developing countries to date are pursuing aggressive strategies to increase private sector participation, it is, at least in some countries, a potentially significant new source of investment income.

The BOT model is the most likely route to increasing private investment capital in the water and sanitation sector. This approach enables more facilities to be built than the government has resources or borrowing capacity for; it allows the private sector to get an adequate return; and it actually increases the government's capital stock when it takes over the facility at the end of the concession period. (A similar, less used approach is called BOO—"build, operate, and own," in which the private sector owns the facilities in perpetuity.)

If the BOT approach is to work, governments must be willing to take steps to make participation attractive to the private sector. They must modify laws and regulations to create a hospitable, predictable environment; provide price guarantees; find a way to ensure that other institutions and jurisdictions (particularly local governments) do not take measures that jeopardize the concession or lease; specify how rates are to be changed and guarantee the private sector access to the rate review process; and establish an effective regulatory authority to clarify ambiguous and contradictory laws and procedures, to mediate conflicts, and to protect the public interest.

In other words, the private sector will only participate if the risks and potential benefits are clearly defined, the overall political and economic environment is stable, and the institutional structure to address problems effectively is in place. If these

conditions prevail, the potential for involving the private sector—in some countries—is considerable.

Private sector participation is no panacea, however. Many problems must be worked out to assure that the legitimate needs of the community are being met and that health and safety are assured. On the legal and regulatory side, the question of who is responsible and who is permitted to carry out various services needs to be very clear. Many problems concern water tariffs. Who sets them? Who can raise them? How high can they go? In many countries officials fear that private sector participation in large water systems will raise tariffs so high that the poor will not be able to pay. It is clear also that the private sector is attracted to providing services where there is no question about the ability to pay and is not interested in poor urban areas. In other words, the government could be left with precisely those areas where the chance to recover costs is lowest while the private sector skims off the cream. Finally, in many of the poorest countries—those likely to have large unmet needs for water and sanitation—the private sector is not very well developed and what parses for the private sector are firms with strong ties to government that obtain contracts based on family, ethnic or political relationships, or outright bribes.

Promising prospects. The best opportunities for private sector participation lie in on-site water supply (such as the construction and maintenance of systems), on-site sanitation (such as the construction and emptying of latrines), and solid waste collection, management, and recycling. These lend themselves well to lease, management, and service contracts and, because of their size, can involve medium-sized, small, or even micro-entrepreneurs. The fewest opportunities for private sector participation lie in off-site sanitation (wastewater collection and treatment) and municipal water supply, although service contracts can take over some responsibilities such as bill collection and meter reading.

For example, in Haiti, WASH has assisted the government to examine the role that private entrepreneurs might play in the collection and disposal of garbage in Port-au-Prince. According to the plan that was developed, private entrepreneurs with trucks would collect garbage and deliver it to a disposal site. The en-

The best opportunities for private sector participation lie in on-site water supply, on-site sanitation (such as the construction and emptying of latrines), and solid waste collection, management, and recycling.

trepreneurs would be franchised to operate in specified zones and would be paid on the volume delivered to the disposal site. Even in a poor country, it is possible for the private sector to provide a service and make a profit.

There is often a fair amount of private sector activities in peri-urban areas, particularly in water vending but also in latrine emptying. Some of the arrangements are quite complicated and involve collaboration between the public and private sectors. In some instances, a city water utility leases taps to wholesalers who market water to distributors who go house-to-house with donkey carts. In others, private enterprises buy water from private truckers, who in turn purchase it from public utilities. In still others, private entrepreneurs may sell water from their own wells. Not all of this activity is beneficial. Normally users pay a high price for vended water, a price considerably higher than what they would pay if they were connected to the municipal system, and often the water does not meet high enough quality standards.

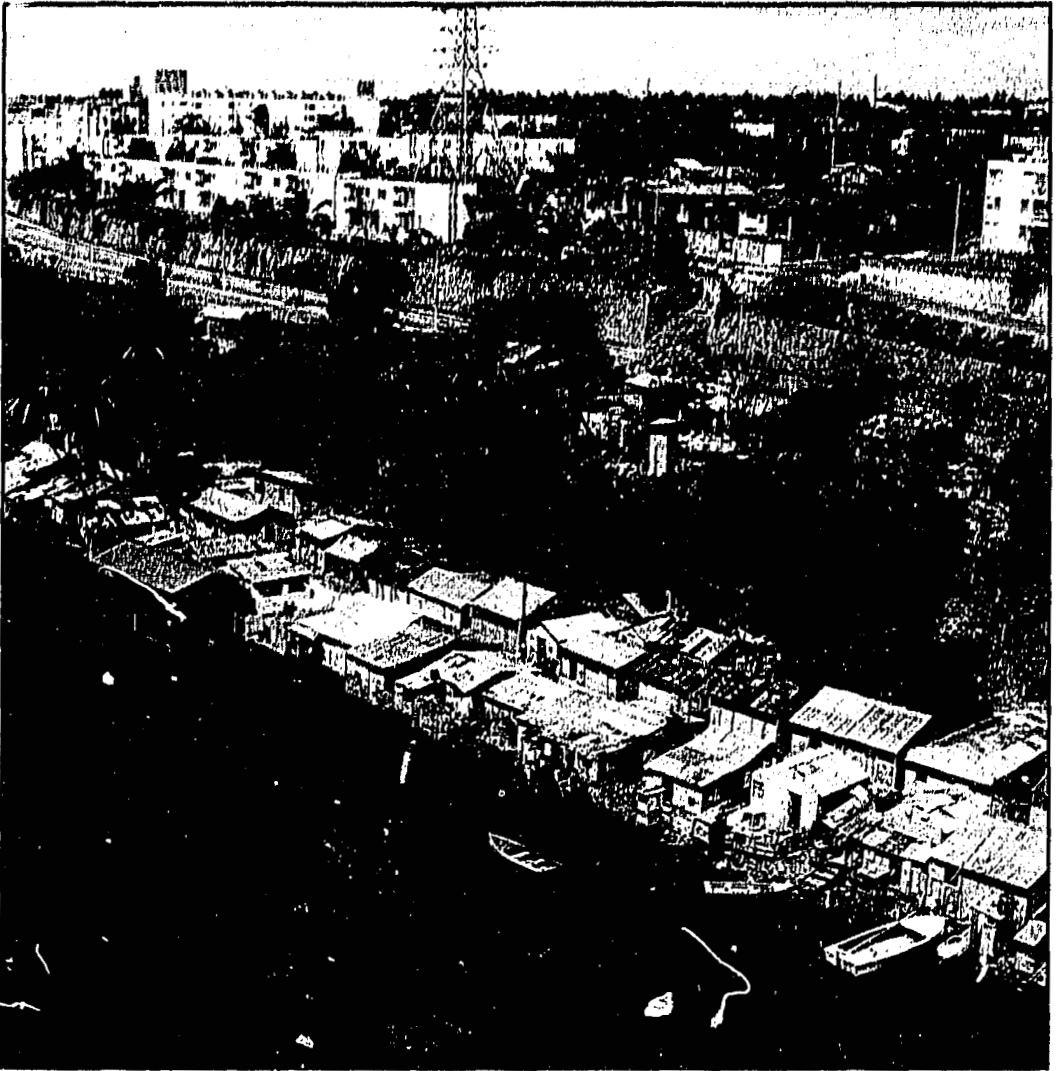
In sum, private sector participation cannot substitute for strong national water and sanitation agencies, which must retain regulatory control and oversight responsibilities for the water and sanitation sector. But it can provide important additional resources and expertise, particularly in some subsectors.

The role the private sector plays in water and sanitation ultimately will be determined by the private sector itself. Obviously it does not have to participate. But governments, with the help and encouragement of donors, can go a long way toward creating an environment that assures equity and that encourages private sector participation.

* * *

The challenges ahead in water supply and sanitation are daunting given the number of people still unserved, the rapid population growth rate in many regions, and the deterioration of many freshwater resources. It will be easier to meet the challenge if the two minor players—users and the private sector—can assume a larger share of the responsibilities that have fallen mainly on the two major players—governments and donors.

Private sector participation cannot substitute for strong national water and sanitation agencies, which must retain regulatory control and oversight responsibilities for the water and sanitation sector. But it can provide important additional resources and expertise, particularly in some subsectors.



Peri-urban areas like this one outside Santo Domingo require new water and sanitation strategies.

Chapter 4: PROGRAM STRATEGIES

It is currently acknowledged that facilities construction alone does not necessarily lead to improvements in health. The experience of the Water Decade gave sector professionals a clearer understanding of why this is so and how programs could be improved. The guiding principle is that the most effective water and sanitation strategies are those that concentrate on eliminating the constraints that prevent facilities from yielding their expected health benefits. Comprehensive strategies are needed to a) strengthen the water and sanitation sector overall; b) recognize the importance of sanitation, which was neglected in earlier efforts; c) focus on behavioral change; d) emphasize the role of the community, particularly women, in successful water and sanitation activities; e) ensure wide-

spread participation in the planning process; and f) contribute to creating a policy and regulatory climate that will foster water and sanitation improvements.

Lesson Eleven The Larger Context

The success of individual water supply and sanitation projects depends on strong sectoral policies and institutional practices.

Water and sanitation projects do not take place in a vacuum. Whether they are projects with a significant construction component or are institution-building projects, how well they actually work depends on the strength and efficiency of the water and sanitation sector as a whole. The "sector" refers to the institutions, agencies, or governmental committees in charge of policy-making and interinstitutional practices affecting the way water and sanitation projects and programs are actualized. These institutions may include the ministries of health or public works, water utilities, and governmental policy-making entities, among others.

How well water and sanitation projects work depends on the strength and efficiency of the water and sanitation sector as a whole.

Key factors influencing the sector. The way the water and sanitation sector is organized is fundamentally important to the success of the individual institutions and projects operating within it. The sector's organization in any particular country is heavily influenced by the country's history and current political system, the level of economic development, the size of the country and its population, and the availability of water resources. In addition, pressures to extend coverage, involve the private sector, recover costs, protect the environment, and increase efficiency also affect sector organization.

In any sector, the performance of institutions is influenced by the political environment. Weaknesses and corruption in the government as a whole will almost certainly be reflected in the water supply and sanitation sector in particular.

The political system also often determines the degree of governmental control exercised over sector services. This, in turn, may influence the degree of

community involvement, the strength of the local government, the extent of centralization, and social policy. The government should be supportive of the kinds of changes needed to strengthen various institutions and be willing to make needed reforms. If, for example, a municipality is responsible for managing a system but has no authority to set tax rates or tariffs, it will be unable to carry out its responsibilities in the event of a revenue shortfall.

The level of economic development is another important factor determining the way the water and sanitation sector is organized in a given country. The general health of the economy influences availability of income, willingness to pay for services, level of public investment, and the ability of the government to sustain increased costs for improved services. A strong economy is also likely to have a strong private sector, which will extend the impact of government resources and contribute to decentralization. (A WASH study comparing GNP and water coverage suggests that it is unrealistic to expect countries with very low GNPs to increase coverage to any great extent; sector plans should recognize that economic development and increases in water—and perhaps sanitation—coverage must progress in tandem.)

Country size and population also affect how the water and sanitation sector is organized. Small countries such as Jamaica, Paraguay, Singapore, or Sri Lanka are likely to manage services through one or two national-level agencies. Larger, more populous countries such as Brazil or Malaysia, on the other hand, are more likely to be decentralized or regionalized in their management.

Finally, the organization of the water and sanitation sector is influenced by the availability of water and the land's topography. The relative scarcity or abundance of water determines how tightly water use is controlled, how important it is to economize, and how centralized the sector is.

Basic tasks. Sectoral-level functions include setting national standards and priorities for water and sanitation, developing regulations, establishing tariff policy, providing financing, promoting research and development, and addressing such issues as cost recovery, community management, hygiene education

The sector's organization is heavily influenced by the country's history and current political system, the level of economic development, the size of the country and its population, and the availability of water resources.

and public health, and human resource development. In addition—because it generally has a large number of institutions and individuals with overlapping roles and responsibilities—the water and sanitation sector must address the issue of coordination with the national ministries involved, as well as with regional and local governments. Unless these functions are accounted for and are made the clear responsibility of specific institutions, inefficiency, overlap, and poor service will result.

A 1992 WASH study of the water and sanitation sectors of five countries came to the following conclusions:

- A decentralized sector is often more effective than a centralized one. However, a decentralized sector must still account for functions which can usually only be carried out effectively at the central level. These functions include policy setting, sector planning, financing, monitoring and enforcing environmental regulations, research and development, and specialized training.
- The ministry of health is generally not the most effective agency to assume full responsibility for rural water supply, although it can play an important role in providing hygiene education and in the construction of simple systems such as improved springs.
- When responsibility for implementation of rural water and sanitation is spread among a number of government agencies, the result may be confusing or inconsistent strategies at the community level, excessive time devoted to coordination, and an inability to respond to emerging issues.
- It is important to have a body that addresses sector-wide concerns such as water pollution.
- Strong regulatory control is needed at the central level.
- Rural water and sanitation should not be the responsibility of an urban utility.

In the water and sanitation sector, planning, priority setting, and resource allocation decisions frequently are best handled by a specially created institution such as a task force, council, or work group. This group should include high-level representatives from all ministries concerned—e.g., agriculture, health, natural resources, and education—so that its decisions reflect the broadest possible consensus and have wide support. Generally, an interministerial group charged with planning will also be responsible for policy coordination and fund allocation. To be effective, it needs at least a small professional staff, including people responsible for disseminating information, arranging logistics, and carrying out the decisions of the policy group on a daily basis.

In recent years, WASH has moved from focusing solely on project issues to addressing sectoral issues. One example of such a sectoral perspective is a 1992 WASH study of point-source pollution and institutions in the Danube Basin carried out in four Eastern European countries. The institutional study identified several areas for further improvement. All are on the sectoral level: a) the development of appropriate laws, sanctions, and enforcement policies; b) the creation of economic incentives and more realistic tariffs to ensure financial self-sufficiency; c) clarification of roles and responsibilities and improved coordination among various agencies; and d) enhanced laboratory and monitoring capacities. Such sectorwide analyses are essential to achieving improved service delivery and environmental management.

Many countries have recently undertaken major efforts to decentralize their water and sanitation sectors. Some have sought assistance from WASH in designing and implementing these efforts, which have come about partly in response to economic reform and increased democratization. Successful decentralization requires redefining central government functions and strengthening local or provincial structures. It usually spells significant sectoral reform—including the reassignment of staff, the redefinition of functions, and the emergence of new institutional structures—that results in great change. However, in most situations these changes are highly desirable because they make it possible for the sector to gain access to new

In the water and sanitation sector, planning, priority setting, and resource allocation decisions frequently are best handled by a specially created institution such as a task force, council, or work group.

private or semi-private resources for the delivery of services.

Unfortunately, the "sector" does not usually cover peri-urban water supply and sanitation. By definition, most peri-urban settlements are not legally sanctioned and therefore do not fall under the jurisdiction of any sectoral institution. The people living in these settlements literally fall between the cracks in terms of services, although their numbers are considerable. In many countries, the need for water and sanitation is greatest in these areas. One of the unsolved problems of the water and sanitation sector is how to build institutional bridges between "formal" sector entities and "informal" peri-urban settlements. WASH experience suggests that authorities must recognize that the peri-urbanization process in which settlement precedes installation of basic services is a reality in most cities in developing countries. In fact, most developing country cities are 50 to 80 percent peri-urban. Authorities must institute reforms in service provision that recognize the actual situation.

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Lesson Twelve The Importance of Sanitation

Sanitation should be accorded the same priority as water supply.

The connection between water supply and sanitation is implied by the name of the sector, but the sanitation half of the equation has too often been ignored. Water supply and sanitation development are inextricably related from a health standpoint and, although improvements in either have the potential for positive health effects, their combined impact is greater than the sum of the two parts.

Sanitation refers principally to the safe handling, treatment, and disposal of excreta, although the handling, treatment, disposal, and recycling of wastewater, solid waste, and industrial waste are related and equally serious functions. Hygiene practices, such as the safe storage and handling of drinking water, also are a part of sanitation.

The plan of action for the Water Supply and Sanitation Decade called for accelerated programs in both

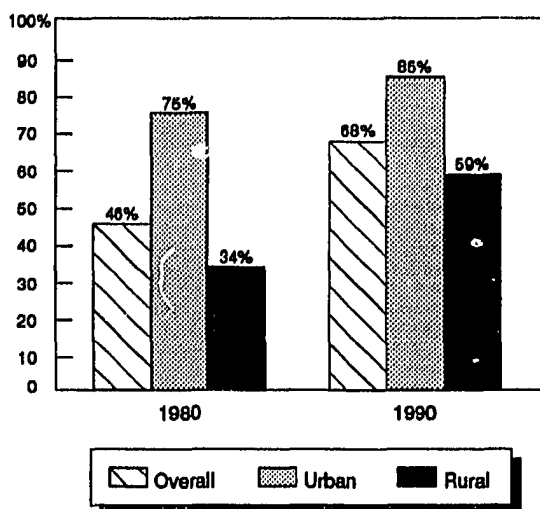
The combined impact of water and sanitation is greater than the sum of the two parts.

areas. However, water supply received far more emphasis than sanitation, and population growth, especially in peri-urban areas, made the imbalance even more pronounced. As a result, today there is a great need for sanitation which will be met only if sanitation is accorded much greater priority than it was during the Decade. While nearly 1.2 billion people were provided with water during the 1980s, barely 770 million people received sanitation. Figures 1 and 2 show that sanitation lags behind water in every category. The situation regarding sanitation is probably worse than these figures indicate. Many urban areas have sewage systems that take wastewater away from dwellings, but the wastewater is normally not treated. It is simply dumped in raw form in some nearby watercourse, often creating a health hazard for another community. (In addition, coverage statistics do not often take account of the many malfunctioning or dysfunctional systems.)

The sanitation problem is made more acute by the explosion of urban growth. Between 50 and 80 percent of this growth is occurring in the informal sector, in outlying squatter areas. People settle in these peri-urban areas before any infrastructure is in place. Because squatters often settle on the least desirable land—steep hillsides, low-lying flood plains, contami-

Today the great need for sanitation will be met only if sanitation is accorded much greater priority than it was during the Water Decade.

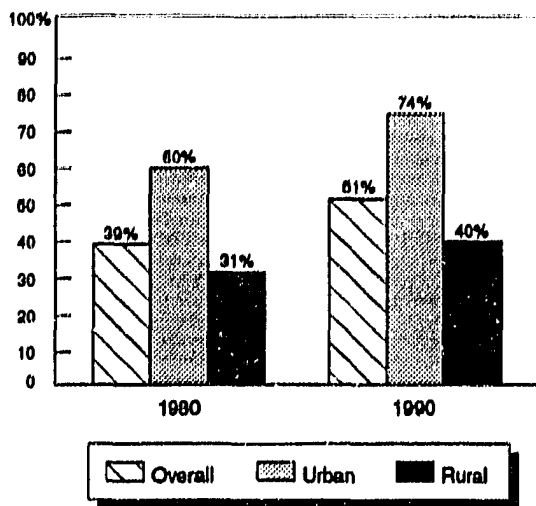
FIGURE 1
Water Supply Coverage



Source: End of Decade Review, 1990

FIGURE 2

Sanitation Coverage



Source: End of Decade Review, 1990.

nated sites, etc.—neither municipalities nor individual landowners find it cost-effective to provide infrastructure of any kind (roads, electricity, water, or sanitation). Once poor people begin to settle on these sites—because they are the only places they can afford—it becomes even more difficult and more expensive to install water mains or sanitation systems. While the people living in these settlements eventually find ways to obtain water, roads, electricity, and schools, their demand for sanitation is likely to rank well below these other priorities. Yet the sheer volume of waste and wastewater produced in these densely settled areas is staggering, and poses serious health and environmental risks.

Hygiene education is generally included in water supply projects, but improving sanitation facilities still receives far less emphasis in project development. To some extent, poor sanitation practices can be compensated for by increased quantities of available water for cleaning and hygiene; nevertheless, unsanitary waste disposal is one of the leading causes of water contamination and of many waterborne and water-related diseases. Sanitation can be addressed more effectively by facilities improvements than by increases in the water supply alone.

A 1990 WASH review of studies on the health effects of water and sanitation found that safe excreta disposal is the most effective intervention for reducing the incidence and severity of the six diseases studied. Using data from that review and another similar survey, the World Bank has estimated that two million diarrhea-induced deaths among children under five could be prevented annually through the provision of water and sanitation. The importance of sanitation to health has been confirmed by other studies as well. A 1991 WASH study using Demographic and Health Survey data from Guatemala was designed to test hypotheses about the relative benefits of water and sanitation, rural/urban differences in such benefits, and the significance of community-level compared with family-level sanitation efforts. The study found that children who live in urban communities with poor sanitation were twice as likely to suffer from stunted growth from bouts of chronic diarrhea as those who live in communities with high levels of sanitation. Even when they had no individual access to a toilet, children in communities with high levels of sanitation (where at least 75 percent of the households had toilets) were less likely to be stunted than those living in communities with low levels (less than 75 percent). How everyone else in the community disposes of feces is a significant factor in an individual's chances of being infected with disease.

The reappearance of cholera in numerous Latin American countries in the early 1990s after an absence of nearly one hundred years is directly attributable to a lack of sanitation. Approximately 20 percent of urban, including peri-urban, and more than 60 percent of rural residents in Latin America did not have sanitation as of 1990. Forty percent of Lima's residents do not have access to potable, piped water. A WASH study estimated that in 1991 the cholera epidemic cost Peru \$177 million, including the cost of hospital treatment, lost fish production, lost sales by food street vendors, and lost tourism. If a portion of that amount had been invested annually in water and sanitation, the epidemic might have been prevented or at least been less severe.

The environmental problems resulting from the lack of sanitation, particularly in urban areas, are enormous. In peri-urban settlements, most fecal matter ends

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Sanitation is often assumed to be a prohibitively expensive intervention—beyond the reach of most communities and impossible to achieve for all. But there is growing recognition that the costs of inaction are also high.

Today engineers are inclined to examine where the waste is coming from, why it is being generated, and how the volume and toxicity can be reduced.

up on the ground and then either washes down to the nearest river or gets diluted by rain. Thus, these settlements, producing tons of fecal matter, become the largest nonpoint source of pollution in the city, polluting the river, the ground, and the water table.

Sanitation is often assumed to be a prohibitively expensive intervention—beyond the reach of most communities and impossible to achieve for all. But there is growing recognition that the costs of inaction are also high, that a range of technology choices is available, and that success depends at least as much (maybe more) on behavioral change and land ownership and politics as on specific technologies.

Relative costs. At the beginning of the Water Supply and Sanitation Decade, a study¹ of alternative primary health care strategies led many to conclude that water and sanitation interventions were unaffordable. The study estimated the cost of providing water and sanitation compared to other health interventions, such as oral rehydration therapy. The broad social and economic benefits of water and sanitation were not considered, nor was the fundamental difference between a long-term preventive approach and a short-term curative one recognized. Comparing the costs of two such different approaches is questionable. While oral rehydration therapy and other treatment interventions have had major successes in treating problems after they occur, there is growing acknowledgment that, over the long term, it is cheaper to prevent problems from occurring in the first place. Providing basic water and sanitation cannot be postponed indefinitely.

Low-cost technologies. In the past, sanitary engineers simply assumed that a certain number of people would generate a certain volume of waste and it was the engineer's job to design and build a system large enough to handle that volume. Today engineers are more inclined to examine where the waste is coming from, why it is being generated, and how the volume and toxicity can be reduced. Whereas waterborne col-

1 J.A. Walsh and K.S. Warren, "Selective Primary Health Care: An Interim Strategy for Disease Control in Developing Countries," *New England Journal of Medicine* 301 (18) (November 1, 1979): 967-974.

lection systems were once taken for granted as the norm, people now look for means of disposal that use less water.

Clearly a range of technical solutions is possible, and donors and governments must learn to consider a wider range of options. From the early 1980s onward, the U.N. Development Program/World Bank Water and Sanitation Program has emphasized low-cost water and sanitation technologies. For its part, WASH is trying to educate decision-makers and the engineering profession about the importance of developing a variety of appropriate low-cost waste disposal options among which communities can choose. Tunisia, for example, with WASH assistance, developed and institutionalized a half dozen sanitation alternatives. Brazil has cut costs of urban sewers by 30 to 50 percent by changing design norms for its sewer systems. Other countries have pushed development of appropriate technologies for wastewater treatments.

Finding low-cost technologies is by no means a simple matter. Even the lowest of low-cost options may be unaffordable in some situations unless supported with viable financing plans. In addition, at times no technology is feasible. Such "impossible situations" are more than likely to be found in peri-urban communities, which are almost always built on cheap land with unattractive physical attributes, such as a steep slope or swampy conditions. Design and construction costs can double for sanitation improvements in such areas. Finally, low-cost technologies often require a high level of user maintenance—much higher than people in developed countries are accustomed to. This implies a high level of community organization and participation.

Finding low-cost technologies is by no means a simple matter. Even the lowest of low-cost options may be unaffordable in some situations unless supported with viable financing plans.

Lesson Thirteen Behavioral Change

Improvements in hygiene-related behavior are an indispensable measure of success for water and sanitation activities.

Despite the provision of safe water to thousands of communities worldwide during the 1980s, resulting health benefits did not fully live up to expectations.

In sanitation projects in particular, goals have tended to focus on the number of latrines constructed, without considering the effect of the many behaviors that determine whether new facilities bring health benefits.

Successful behavioral change projects must be designed around a thorough and correct understanding of existing knowledge and hygiene practices in the community.

One reason, as noted above, is that sanitation efforts did not keep up with water provision. Another reason is that neither water nor sanitation projects took adequate account of individual and community behavior that affect people's use of the facilities provided.

In sanitation projects in particular, goals have tended to focus on the number of latrines constructed or the number of people given access to latrines, without considering the effect of the many behaviors—hand washing, safe excreta disposal, personal and household hygiene, food handling, the avoidance of unsafe water sources, protection of pumps and wells, and so on—that determine whether new facilities bring health benefits.

Today, the need to change behavior is recognized as being at least as important as the construction of new facilities. WASH's new latrine construction training guide reflects the importance of behavioral change. The original manual, written at the beginning of the Water Supply and Sanitation Decade, concentrated primarily on the steps of organizing a latrine-building project (planning, estimating costs, ordering materials, mixing cement, etc.). Revised in 1992, the new document focuses not on construction skills but on the process of understanding fecal-oral contamination routes and community behaviors in order to design effective interventions, which may or may not include construction of new latrines.

In order for efforts to change behavior to succeed, projects must be designed around a thorough and correct understanding of existing knowledge and hygiene practices in the community. Moreover, efforts to change behavior must be institutionalized and have strong support from donors, governments, and other key actors. Effecting changes in behavior is a difficult process that takes time—maybe a generation.

Behavior as the basis for project design. Before designing any sanitation project, planners must have a baseline of data on community knowledge, attitudes, and practices regarding hygiene and a thorough understanding of the social, cultural, and religious context within which sanitation-related behavior takes place. This involves going into communities to observe and record behaviors that cause contamination. Only then can project planners determine what

changes in sanitation can reasonably be introduced or choose the technologies and supporting programming that can work.

In this approach, the field worker is key. He or she is a partner who serves as a facilitator of community change, rather than as a functionary who imposes predetermined solutions. The field worker must provide constant feedback and project documentation so that the project can adapt to changes in community knowledge, norms, and needs.

Some development efforts fail to bring about intended results because behavioral change is not made an integral goal. For example, the existing global strategy for eradicating guinea worm disease emphasizes water improvements, chemical application, and use of water filters. It has set 1995 as the year when all twenty-one countries with guinea worm should be eligible for certification attesting that the disease has been eradicated. Setting such targets is important, but any strategy must recognize that guinea worm will not be eradicated until people change their behaviors toward handling and filtering drinking water and protecting water sources.

Some development efforts fail to bring about intended results because behavioral change is not made an integral goal.

Measuring outcomes through behavioral indicators. Project outcomes can be measured at three levels: the physical or efficiency level defining project operation, the behavioral or effectiveness level defining project performance, and the impact level defining ultimate project consequences.

The *efficiency level*, which consists of the immediate or direct consequences of the project, defined quantitatively in terms of numbers of dollars invested or activities carried out, does not indicate the extent to which a project meets its objectives. The *impact level* refers to the long-run benefits that water and sanitation projects are intended to achieve, but it may take many years before these benefits show up as measurable indicators. The *effectiveness level*, therefore, which involves usage of the project facilities and the effect of the project on behavior, provides an appropriate intermediate indicator of project outcome. How do people use and care for the water facility? How have their former habits of water use and sanitation changed as a result of the project? What kinds of committees, rules, or other social mechanisms have the communities es-

Project outcomes can be measured at three levels: the physical or efficiency level defining project operation, the behavioral or effectiveness level defining project performance, and the impact level defining ultimate project consequences.

established to maintain the facilities and encourage their proper use? Project officials cannot directly control these consequences, but they can try to influence favorably behavioral patterns in the communities.

These intermediate indicators can serve as surrogate measures of impact until more feasible means of measuring ultimate impact are devised. For example, if a project results in a marked increase in the percentage of women in a given community who wash their hands with soap before handling food or changing their babies or an increase in the quantity of water used, then, based on the results of studies that have been carried out, WASH assumes that the project will have a positive impact on health. WASH began using such indicators to measure health impact in 1981 and has since incorporated them into its procedures for evaluating water supply and sanitation projects.

In February 1992, WASH collaborated with A.I.D.'s Quality Assurance Project to develop a ground-breaking technical approach to measuring impact. This approach involves monitoring the behavioral changes that are the link between new services and improved health. Monitoring is ongoing in order to permit problem identification during the life of the project when adjustments still can be made. Developed for CARE-Guatemala, this method is now being replicated in other settings.

Hygiene education is the key to bringing about behavioral changes and achieving health benefits from water supply and sanitation improvements.

Role of hygiene education in bringing about behavioral change. Hygiene education is the key to bringing about behavioral changes and thus in realizing system sustainability and achieving health benefits from water supply and sanitation improvements. If people know how to use the new facility and do use it, they are more likely to maintain it and to be healthier in the long run.

Hygiene education helps people understand both why and how to use new facilities properly. The germ theory of disease, so taken for granted in much of the industrialized world, is unknown to the poor and uneducated in many developing countries. Old ways of doing things may be ingrained. Or, having had only limited amounts of water in their lifetimes, people may not know of its many beneficial uses.

Hygiene education involves changing the way people do some very private, personal things—defe-

cating, washing, cooking, and getting and carrying water. Changing hygiene behavior depends in large part on how appropriate the educators and materials are for a particular audience.

Studies conducted by WASH and reinforced by experience with projects in Africa and Asia show that locally produced hygiene education materials can be at least as effective as high-cost, externally produced materials. It is more important for materials to reflect an understanding of the crucial role of hygiene education and community participation in changing behavior than for them to be costly or sophisticated. The materials need to demonstrate potential health improvements, encourage changes in user behaviors, and promote full participation of the affected group. They should be simple, direct, and designed to support a limited number of teaching points.

WASH experience also suggests that hygiene education materials should be based on careful studies of the target audience's attitudes, beliefs, practices, and past experiences with water supply and sanitation. Materials, in other words, should be tailored to the context in which they will be used. The choice of medium should be based on audience and available funds, production materials, and equipment; possibilities include flash cards, games, posters, pamphlets, puppets, and radio and television messages.

The educators involved in developing, making, and using the materials, as well as those in direct contact with the community, are more acceptable and more credible if they come from the local community or surrounding areas. If this is not possible, the educators should at least deliver their message through or with the assistance of local people. A hygiene education program in Sri Lanka, for example, was successful in part because the hygiene educators came from the communities being served. In Yemen, a recent hygiene education campaign relied on local assistance from every village.

The participation of local people is also important for project sustainability. By leaving behind a cadre of persons who can continue to educate fellow villagers in improved water-use habits, an external development institution strengthens the community's capability to continue operating the system long after the development project has ended so that the flow of

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In most societies, women are the most important people to educate in hygiene; they control the household activities, are most concerned with the health of the family, and are the primary source of information on domestic matters for the family.

health benefits continues. The ideal situation is for the educators to train the community's water committee members so that they can train the rest of the community. This is difficult because the effort must then focus both on substantive content and on training of trainers. However, the opportunity to use hygiene education as a vehicle for capacity building makes the extra effort worthwhile.

In most societies, women are the most important people to educate in hygiene; they control the household activities, are most concerned with the health of the family, and are the primary source of information on domestic matters for the family. Also, since it may not be acceptable for men to talk with women about matters of personal hygiene, it is best for women to serve as hygiene educators. A man cannot enter a woman's home as freely as another woman can in many societies. In conservative cultures, recognition of this rule is essential. In the Yemeni example mentioned above, it would have been impossible for a man to gain the same access to women in the community that the female hygiene educator had. On the other hand, in some cultures it is not acceptable for women to travel alone from village to village as hygiene educators may have to do.

Lesson Fourteen Community Management

National governments must take specific policy steps to ensure that communities have the capacity, and are empowered, to manage water and sanitation activities.

There is wide agreement that decentralization of responsibility for water and sanitation is an effective strategy, and many developing countries have transferred responsibility for operation and maintenance from provincial or regional entities to local villages. But too often decentralization has failed to create the human and institutional capacity and networks that make progress in water and sanitation sustainable. Because national and local governments do not have an implementation role and local governments do not have the capacity under a decentralized approach,

communities have not had the support they need to become effective long-term managers of water supply and sanitation systems.

Today it is recognized that for decentralization to work and community management to be effective, some governmental entity must provide support on a continuing basis. Donor agencies cannot plan to have this role in perpetuity; nongovernmental organizations, which can be outstandingly successful at working with a limited number of communities, do not have the breadth or scope to provide such support on a national level. National governments must, therefore, remain important actors in sustaining community management. This requires helping communities gain the skills they need to participate more actively in governmental decisions regarding their lives.

WASH has identified a number of operational steps that public sector organizations must take to ensure effective community management. These include developing a shared understanding among all donors and the government of what community management is and what it is meant to accomplish; clarifying the roles of donors, various levels of government, and nongovernmental organizations and developing strong collaborative relationships among them; developing a legal and policy framework and a financial management system that promote community management and control; determining staff, training, and logistical needs; creating ongoing awareness of and demand for community management; and developing a management information system that collects the kind of data communities will find helpful.

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National governments must remain important actors in sustaining community management.

Lesson Fifteen Planning

A participatory approach to planning helps to forge necessary linkages in and outside the sector and to ensure cooperation in implementation.

Developing successful water supply and sanitation programs and projects requires establishing both public and private linkages within the sector and with other sectors whose activities impact on water and

sanitation. Forging these linkages should begin during the planning process.

In most cases, achieving health goals will require linkages between water supply and sanitation, which likely will be handled by different ministries, and with the overall community health effort in areas like hygiene education, nutrition, oral rehydration therapy, tropical disease control, and immunization.

Other ministries will be undertaking activities that affect and/or support the water supply and sanitation effort. If the agriculture ministry, for example, is carrying out irrigation projects in rural areas, these may be linked with the water supply and sanitation work. The involvement of the transportation ministry may be needed to assist in coordinating delivery of materials and transport of people to the project sites. If there are active economic or business development programs targeting rural communities, these should be taken into account in the water supply and sanitation effort. Linkages with agencies outside of government—private voluntary organizations and private businesses—may increase the resources available to water supply and sanitation development and lead to improved standards of design and maintenance.

Consideration should be given at the beginning of the planning process to all of the linkages it is necessary to establish. These linkages are then most likely to occur with a participatory approach to planning.

For example, from 1985 to 1989 WASH assisted the government of Swaziland to develop a national plan of action for water supply and sanitation. WASH worked directly with the National Action Group, an interministerial body composed of seven ministries and two departments. The methodology honed in on building the capacity to produce plans, not on the plans themselves. Accordingly, the main outcome was an effective planning mechanism integrated into the national capital planning process. Other outcomes were a plan of action, improved coordination within the sector, and improved implementation of projects by both the government of Swaziland and other organizations.

Wide-ranging consultation. In the water and sanitation sectors, all agencies that have a stake should be heard from during project planning—health, natural

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resources, agriculture, housing, land use, and so on. Participation should not be limited to official government agencies. International donors and nongovernmental organizations should also be consulted. If they decline to participate formally, and they may, they should be consulted informally.

The communities that will benefit from the development work should also be included in the planning process. The consumers of goods and services (the community) often have a different viewpoint than the providers (the government agencies), and this viewpoint should be heard and considered. The community leaders who actually have influence, as opposed to those who have titles suggesting influence, are the most important figures to involve.

This approach to planning is important not so much to ensure that all water and sanitation factors are taken into account—presumably central planners could do that—but to permit all of the interests, some of them competing, to offer input into the project plan. If the critical interests of all parties are not heard at the planning stage, the parties probably will not cooperate at the implementation stage, and project activities may founder as a result. Everyone with a stake in the outcome, therefore, should have the opportunity to have some say in the plan at the outset.

People at different levels should also be involved in the planning process. Many times planning is coordinated at the highest conceptual levels, through a task force of senior officials, for example. However, if coordination among agencies is to benefit the development process at all, it must occur not only at the policy level but at the working level as well.

The timing of planning—both in terms of chronology and duration—should also receive careful consideration to maximize the effectiveness of the process.

“Rolling” work plans. There is an understandable, and correct, tendency on the part of people involved in a major undertaking to say, “First, let’s make a plan.” However, if sweeping master plans are developed without any prior water and sanitation experience and without attending to the institution-strengthening needs of the country, they are doomed to fail. Planning at a certain level is, of course, always

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LESSONS LEARNED

Planning should be understood as a process, not an event.

required to ensure that needs are identified and resources used efficiently. At the very beginning of an effort, however, plans should consist only of a goal concept and "rolling" work plans, i.e., plans subject to continuous review and revision. Planning should be understood as a process, not an event.

WASH has used this approach effectively in Swaziland and Thailand. In Swaziland, formal master planning was not begun until four years of experience in developing and strengthening institutions and building facilities had been acquired. The result has been a much better and more realistic national master plan than would otherwise have been possible.

If planning is to be effective, it should provide guidance both for short-term actions and targets and long-term strategies and goals.

Short-term targets, long-term strategies. If planning is to be effective, it should provide guidance both for short-term actions and targets and long-term strategies and goals. The best way to do this is to divide the overall sector plan into two parts. The action plan should include definite targets that can be achieved, clear steps to take for achieving them, and short time frames for completion. A master plan should be no less realistic, but it can be more general, giving time ranges for the goals it supports. For example, an action plan might promise x number of boreholes to be drilled in one year in a number of communities, identify the source of funds, and set forth the steps to be taken to make this happen. The master plan, on the other hand, might promise water coverage to all communities above a certain population or geographic area, with possible funding sources noted.

Plans are not ends in themselves; their usefulness lies in helping to guide the rational allocation and expenditure of resources, and that cannot occur unless what is learned through experience flows back into the plan.

Both types of plans should be the result of ongoing processes rather than one-time events. A national seminar or similar affair may kick off the effort, but there should be regular—at least annual—meetings of the key planning participants and frequent one-on-one or small group consultations between meetings. The intent is to continually evaluate the plan of development against the reality of development and revise the plan accordingly. Plans are not ends in themselves; their usefulness lies in helping to guide the rational allocation and expenditure of resources, and that cannot occur unless what is learned through experience flows back into the plan.

WASH has found its team planning concept useful at the project planning level and has adapted it for

general use in development projects. This approach involves bringing together all parties involved in a project to set priorities, define the scope of work, and develop a work plan. This helps to ensure a shared vision of the project and to delineate the roles and responsibilities of all involved. As the project is implemented, periodic monitoring workshops can also be held to see to what extent goals are being achieved and to make adjustments in the strategy.

Lesson Sixteen Legal and Regulatory Framework

The command-and-control model that usually governs water and sanitation regulation in developed countries is not generally appropriate for developing countries.

In recent years, more attention has been given to legal and regulatory issues. This is due in part to the need for preventing or reducing environmental contamination. Water sources are subject to rising levels of contamination. Lack of latrines and inadequate or nonexistent wastewater treatment are the prime causes of water pollution. Tons of garbage are dumped into the environment each day. Solid and liquid wastes produced by industry also play a part. An effective legal and regulatory framework is sorely needed to help turn the tide.

Up until just recently the centralized command-and control-model has dominated water and sanitation regulation. With command and control a central agency lays down regulations governing water quality, wastewater treatment technologies, effluent standards, and the like and mandates that they be applied universally on a given date.

This model, which ensures uniform standards for water quality, wastewater treatment, and the disposal of solid, hazardous, and industrial wastes, is financially and institutionally resource intensive, and probably well outside the limits of what is possible to achieve on a widespread basis in most developing countries. A more flexible model of ensuring required behavioral changes on the part of individuals and institutions is called for. Moreover, even in developed

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countries, the command-and-control approach is not always necessary; it frequently results in over-regulation and makes adversaries out of government and private enterprises. The regulatory framework is already acknowledged in developing countries to be in need of complementary market instruments.

In developing countries regulations modeled after the West are often legally or practically unenforceable and so are rejected. In many cases it is simply technically impossible to monitor and measure pollution standards. There are also political barriers to the imposition of drastic sanctions. Fines are too low to constitute a deterrent or to change behavior and can be avoided through bribes.

Norms and standards are important, but a flexible means of ensuring their enforcement must be found. The role of central governments is to set target standards for various situations and then let local entities find their own ways to meet the targets. The ideal is to bring all concerned parties into the decision-making process and to rely more on a mix of incentives than "punishments" such as fines. It is not practical for a community to go to great expense to treat its wastewater before disposing of it in the adjacent river if a much larger community upstream is still dumping raw untreated sewage. Improvements often have to be phased in over time to allow all parties that affect a system to participate in planning.

Since 1992, WASH has planned and carried out two workshops on wastewater management for Latin American countries to promote this more flexible framework. Participants learned that governmental and private institutions and organizations have many instruments they can use to manage wastewater. Normally technological instruments are the only ones seriously considered: i.e., end-of-the pipe treatment of wastewater. However, regulatory, institutional, economic, and education options are also available, and many groups can be mobilized to improve wastewater management: polluters, policymakers, consumers, land and water managers, educators, and health professionals.

For example, in Chile the proliferation of new industries, fueled by rapid economic growth, is adversely impacting the environment. These 2,400 industries may be part of the problem, but they can be

Normally technological instruments are the only ones seriously considered in wastewater management: i.e., end-of-the pipe treatment. However, regulatory, institutional, economic, and education options are also available.

part of the solution also. They offer a good target for addressing wastewater problems. Control policies, incentives, tax breaks, disincentives, polluter-pays regulations can all help reduce to an acceptable level the amount and toxicity of residuals being discharged. Such "market-based" interventions must be used if public health is to be protected at an affordable cost.

What is needed is a flexible approach that sets up a structure but leaves room for a lot of behavior change and innovation. Only the higher priority problems can be dealt with right away, but improvements can be made as resources become available, eventually leading to full implementation of a system.

Regulatory alternatives. The function of regulatory institutions is to use rules, regulations, and sanctions (insofar as they are able) to influence the behavior of individuals and institutions in ways that work toward meeting clean water goals. In the appropriate context, regulatory institutions can be highly effective in reducing threats from pollution. They can intervene at several different points in the pollution cycle, ranging from the banning of certain pollution-causing practices to requiring the removal of polluting agents from the system.

To find out whether or not such institutions actually are effective in a particular country, however, depends on the answers to a number of questions. Do the regulatory institutions have formal authority to regulate? Is their authority compromised by jurisdictional division among competing or related institutions (e.g., health, planning, agriculture, or energy)? Are the standards being imposed reasonable and designed to target the behavior that needs changing? Is the policy environment supportive? Are the regulations widely known and understood and free of favoritism? Do the government and the community support the regulations? And, finally, do the regulatory institutions have adequate financial resources, information, and skilled personnel in the areas of engineering, financial management, human resources management, law, and economics?

Regulatory functions can be carried out by national, state, or local governments, or in some cases even by nongovernmental entities. NGOs are not regulatory institutions per se, but they can perform regu-

Regulatory institutions can intervene at several different points in the pollution cycle, ranging from the banning of certain pollution-causing practices to requiring the removal of polluting agents from the system.

latory functions by organizing other institutions (for example, manufacturers or large dischargers) or by helping households reduce threats to the environment. What is important is not just which institutions have formal authority to regulate but also which have the capacity to control or foster the desired behavior. Flexibility and the willingness to consider alternatives are key to promoting regulatory functions.

Flexibility should characterize not only which institutions are involved in regulation, but also the choice of what is regulated. It may be possible, for example, to go beyond issues of how to dispose of pollutants to actually regulating the production of pollution—an approach that could help developing countries prevent many problems that plague developed countries.

In any given country, policymakers must carry out an analysis to determine the relative advantages of regulatory versus market instruments.

In any given country, policymakers must carry out an analysis to determine the relative advantages of regulatory versus market instruments. Comparative parameters would include compliance costs to polluters, legal and administrative costs of implementation and monitoring, information requirements, financial affordability, cultural acceptance, and so on. Political will is the sine qua non for success of either approach to environmental management.

Legal constraints. Peri-urban communities with uncertain or clearly illegal status present special legal and regulatory problems. Peri-urban settlements usually occupy land that has not been zoned for housing or is considered dangerous or is environmentally protected. Politicians often take a tough stand against such settlements. Governments are reluctant to provide infrastructure because that would imply recognition of the settlement's legality or it might encourage the growth of such settlements. In such situations, project designers should be sure to obtain the consent of the mayor or other decision-makers before water or sanitation programs are begun. The challenge to project designers and local authorities is to resolve the conflicts inherent in trying to apply codes and laws to communities that the law does not recognize.

Promoting participation. To date, few developing countries have been ready to move toward effective regulation; increasingly, however, the importance

of fostering pollution control through laws and regulations is being recognized. While it is clear that wholesale import of developed-country models is inappropriate, not enough is known yet about the kinds of legal and regulatory frameworks that will work best in developing countries. What is clear, however, is that ensuring broad-based participation in the design of the regulatory process is essential. WASH experience suggests that the greater the political support and the more broadly based the public support, the more likely it is that regulations will be effective. Similarly, regulations will be more effective the less they conflict with accepted norms and the less behavioral change is required.

Laws and regulations imposed from above and implemented by institutions without adequate authority to enforce them will be ignored. Thus it is important to involve other powerful institutions, particularly those, like ministries of the environment or tourism, that may not have direct responsibility for water and sanitation but whose help and cooperation is essential.

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Of the six strategies discussed in this chapter, perhaps the most important is recognizing that sanitation must not be treated as a mere footnote to water supply. The symbiotic relationship between water supply and sanitation is especially pronounced in peri-urban areas where more and more poor people in developing countries are flocking everyday. A WASH report on the water and sanitation sector in Central America published in 1993 points out that if access to water were more strictly defined to include standards of quality, then the already low coverage percentages in many urban and peri-urban areas in the region would have to be revised downward to a point lower than rural areas. The reason for this is that the potential for contamination of the immediate home environment for peri-urban dwellers is enormous. The tons of garbage produced each day remain uncollected, and thousands of people have no sanitation facilities at all. The risk of contamination of water sources is high and rises higher as more people crowd into congested

LESSONS LEARNED

peri-urban areas, as hundreds of thousands use latrines that likely contaminate the groundwater because so many are concentrated in a small area, as cities fail to provide safe disposal systems for industrial and medical wastes, and as sewage is discharged untreated.

Fortunately, interest in sanitation is increasing and sector organizations are beginning to devise ingenious solutions to these knotty problems. The approach taken by the Cooperative Housing Foundation in Honduras, for example, is one WASH would applaud. The Foundation provides loans for peri-urban households to build improved water and sanitation facilities. Each household decides on the level of service it can afford and selects a design from a wide range of options. When the loan is approved, the household can hire a contractor to do the work or may elect to do some of it themselves. Participating households must agree to participate in follow-on hygiene education. A workable combination of incentives, financing, private sector participation, and hygiene education has made this program a success.



Sean Sprague/Panos Pictures.

Installing a well and handpump, Kolokani, Mali.

Chapter 5: LONG-TERM SUSTAINABILITY

The WASH concept of “sustainability” is borrowed from the discipline of systems analysis: it is a measure for judging system performance. It refers to the ability of a system to continue performing its functions at an acceptable level and for an indefinite period of time using only the inputs specified in the system’s design. To be sustainable, the system must include all of the resources, including financial resources, required to keep up the flow of benefits. In the development lexicon, however, the financial resources cannot require continuing dependence on donor agencies.

In the field of water supply and sanitation, sustainability is increasingly considered by the development community to be a guide to wise investment. In par-

The sustainability test is applied at two levels: it measures both the success of the sector itself, i.e., the national system for development; and the success of the institutions that are created to provide water supply and sanitation service to specific residents.

particular, donor agencies are reluctant to continue putting capital funds into development programs and facilities that may soon fail to function. In WASH terms, the principle may be stated like this: **The basic measure for success of both the national system for development and the management systems it creates is sustainability—the ability to perform effectively and indefinitely after donor assistance has been terminated.**

The sustainability test is applied at two levels: it measures both the success of the sector itself, i.e., the national system for development; and the success of the institutions that are created to provide water supply and sanitation service to specific residents. The key variables affecting the sustainability of water and sanitation activities at both these levels are the strength of the responsible institutions and community groups, the skill levels of those who are in charge of implementation, the operation and maintenance plan, financing, and choice of technologies used.

Thus the overall program for developing the sector may fail if the institutions established are inadequate for the task, or staff and financial resources are lacking, or the technology used is inappropriate. Likewise, particular water systems may fail if the community cannot generate sufficient revenue to cover the cost of operation and maintenance.

Since the U.N. Conference on the Environment and Development held in Rio de Janeiro, in June 1992, it is not possible to use the term "sustainability" without bringing to mind the concept of environmental sustainability. According to the definition adopted by the conference, development activities are "environmentally sustainable" if they "meet people's current needs while preserving nature's capacity to meet the needs of future generations." The conference has taught water and sanitation sector professionals a new lesson: the work of the sector must be carried out in the context of environmental sustainability.

Years before the Rio conference A.I.D. required environmental assessments as a precondition of water and sanitation projects. WASH has provided technical assistance for a number of these assessments (in El Salvador and Ecuador, for example). In addition, WASH consultancies have measured the magnitude of specific water-related environmental problems: the

health effects of small irrigation dams in Mali, the extent to which a new wastewater treatment system with an ocean outfall might increase Grenada's vulnerability to cholera, and the polluting effects of water-intensive industries in Mauritius—to give a few examples.

In the future, the challenge will be to continue to support and promote actions that make water and sanitation interventions environmentally sustainable. This requires the following approach.

- Water and sanitation projects should be developed in the context of water resources policies and programs. Often these can be national programs but sometimes, to be effective, water resources must be viewed from a water basin perspective, which sometimes goes beyond national boundaries. How can multiple agencies or governments work together to develop resource plans?
- A fundamental change in national planning processes is called for to integrate economic, social, and environmental factors. This demands greater public participation and improved data-gathering methods.
- The environment—including water—can no longer be considered a “free good.” Now or later, environmental costs must be paid. The price of water should reflect the total value of the resource.

It is clear that development and the environment are inextricably linked, but the details of how these linkages will affect the work of the sector remain to be defined. With that caveat, this chapter reviews the lessons WASH has learned about key elements of sustainability: strong institutions, well-trained personnel, appropriate technologies, well-organized operations and maintenance, and solid financial support.

**Lesson Seventeen
Institutional and Human Resources Development**

Successful institutional and human resources development projects are comprehensive, systematic, participatory, and based on long-term planning.

As already noted, a wide range of institutions is involved in the water and sanitation sector. Included are service-providing, financing, coordinating, and regulatory institutions. Because WASH's experience is primarily with service-providing institutions, the discussion here about institutional development refers primarily to such organizations. Institutions responsible for providing services are generally either government ministries or semi-autonomous urban-oriented utilities. These two types of organizations are quite different. A semi-autonomous utility may resemble a commercially oriented business without ties to government personnel policies or pay scales. On the other hand, a government ministry, as part of a larger system, has less latitude in how it operates. In rural areas institutions are typically a combination of government ministries and community organizations. The role of the community water committee, discussed in a later section, may be quite important. Also, as discussed earlier, the private sector has a role to play.

Projects designed to strengthen service-providing institutions should first examine a given institution's overall performance and effectiveness.

Assessing institutional performance and effectiveness. Projects designed to strengthen service-providing institutions should first examine a given institution's overall performance and effectiveness. How these two factors are assessed depends on the type of institution being studied. In the case of utilities or semi-autonomous institutions, WASH has identified nine performance categories that should be fully investigated and assessed before plans can be made to address the institution's needs. These categories are organizational autonomy, leadership, management and administration, commercial orientation, consumer orientation, technical capability, development and maintenance, organizational culture, and interactions with key external institutions.

In the case of government ministries, such as public works or health, different performance catego-

ries are required. Line ministries inevitably have only limited autonomy, are unlikely to have a commercial orientation, and are subject to government-wide personnel policies. Their performance, therefore, should be evaluated on the basis of their ability to provide training and technical assistance, to coordinate with other ministries, to monitor program effectiveness, to plan, to provide funds, to implement projects, and to involve communities. How these functions are carried out depends in part on the existing degree of decentralization.

Project comprehensiveness. Institution-strengthening projects for both autonomous organizations and government ministries should strive to be comprehensive and participatory. If a project is to be comprehensive, it must address all institutional systems (e.g., operation and maintenance, administrative, commercial, and technical) simultaneously and involve people at all levels of the institution. The A.I.D.-funded Water and Sanitation Sector Project in Sri Lanka is an example of a system wide effort to strengthen all aspects of the country's National Water Supply and Drainage Board, including engineering, stores and supplies, water quality and treatment process control, operation and maintenance, public health and sanitation services, management and commercial orientation, organizational structure and decentralization, and personnel and training. The project has had a major impact on increasing collections (from 31 percent of operation and maintenance costs in 1984 to 99 percent in 1990) and reducing billing lag times (from six months to thirty days). By focusing on the entire institution rather than just a single aspect, the project has also succeeded in increasing the proportion of its costs covered by collections; reducing the amount of unaccounted for water; and increasing the proportion of its capital budget devoted to rehabilitation from nothing in 1984 to 62 percent in 1990.

Institutional Mix. After donor inputs are completed, three types of institutions are necessary for achieving sustainability of a water supply and sanitation system, in either rural or urban settings: a government agency (or perhaps several), the private sector (possibly including a local NGO), and a community

A comprehensive institutional strengthening project must address all institutional systems (e.g., operation and maintenance, administrative, commercial, and technical) simultaneously and involve people at all levels of the institution.

organization responsible for managing the facilities and for organizing hygiene education activities.

The relative authority and responsibilities accorded each institution vary dramatically between countries and even within countries. Urban facilities tend to be centralized within an agency or utility but often draw on the private sector for specialized services. Peri-urban settings usually allow a wider role for the private sector especially when residents must depend on vendors for water supply and construction and repair of homeowner facilities. Rural areas, in contrast, often exhibit a very wide range of institutional models.

A WASH study found a variety of models ranging from countries, such as Botswana where management responsibility is located primarily at the national level and where community inputs are minor, to parts of Indonesia where an informal system is based on strong community control and no government inputs. Most countries have settled on an institutional mix that is in between these extremes by involving all three entities to varying degrees. There is no single institutional mix that can be said to apply to all situations.

Project participation. To succeed, institutional development projects must be participatory. An institutional development project differs from a system construction project in the effect it has on individuals. A reorganization, change in personnel policy, or management improvement affects employees in a very direct way. The project must be seen as beneficial rather than as a threat to anyone's position or career. A project that does not involve the institution's personnel actively in all stages of the effort may ultimately be subverted by forces within the institution itself. As always, people will be more committed to change if they have been included in the change process. Strengthening institutional capability is a complex matter that takes time, skill, and flexibility. It is essentially a human process, and people do not change overnight. Many effective ways exist to involve an institution's people in a water and sanitation project. A core group can be put together at the project design stage to provide advice and information to the designers. A project design workshop can be conducted with

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the key decision-makers to involve them actively in the design. A steering committee or smaller management committee can be established for project implementation to serve as a regular forum for discussing progress and problems. The particular technique chosen should be dictated by the situation; the important thing is that definite action be taken to ensure participation by all concerned.

Communication links and the role of the extension agent. Even in the most isolated rural areas most communities are not able to provide entirely for themselves. They are dependent on outside supplies such as cement, pump parts, and fuel to keep their systems operating. They also require knowledge of such things as changing prices, new government policies, and opportunities to avail themselves of proposed government programs and services. Communication between the communities and the requisite government agency is therefore critical. Mass media messages, such as radio, can be very effective when targeted to a particular audience. But more important is human contact as supplied by a government extension agent.

The agent should visit the community periodically to establish two-way communication and to provide information regarding new developments in the sector, monitor operations and maintenance, and encourage behaviors which lead to acceptable hygienic practices. He or she listens to the expressed developments and needs within the community and transmits this information to agency headquarters. The agency is then placed in a position to modify its services according to real needs. The communication link supplied by a well-qualified and equipped extension agent is perhaps the single most important factor in maintaining the benefits of a sustainable project.

The role of the long-term advisor. Institutional development is more unpredictable than capital construction and requires different skills. Although short-term consultants play a role in these projects, it is the long-term advisor who is pivotal. WASH has worked with many long-term advisors and has determined that the effective ones share certain skills and characteristics.

The communication link supplied by a well-qualified and equipped extension agent is perhaps the single most important factor in maintaining the benefits of a sustainable project.

First, long-term advisors need to be solidly grounded in their technical discipline and able to transfer their knowledge in ways that fit local circumstances. Second, they should be able to transfer skills to counterparts by assessing learning needs; obtaining agreement on the need for change; and setting up, implementing, and evaluating a learning strategy. Third, they should enjoy the opportunity to work in a multicultural situation and be able to make cultural differences a positive factor or a nonfactor in everyday work situations. Fourth, they must be committed to development and the concept that the end goal is community empowerment and the creation of conditions to carry on after the technical assistance is ended. Finally, long-term advisors need to be able and willing to take the time to build and maintain collegial relationships with a range of people.

Institutional change requires a willingness to revise plans and strategies in light of changing circumstances and events.

Ongoing project review and revision. Institutional change requires a willingness to revise plans and strategies in light of changing circumstances and events. Project progress should be monitored constantly so that problems can be detected before they become major obstacles. It is important to step back occasionally, review project goals, and solve emerging problems. WASHI has successfully used the technique of regular project review workshops to ensure that projects stay on track. This technique has worked especially well in Sri Lanka, Ecuador, Zaire, and Tunisia.

HRD is a crucial aspect of institutional development and an essential component of long-term sustainability.

Human Resources Development. HRD is a crucial aspect of institutional development and an essential component of long-term sustainability. It includes education, training, long-range planning for personnel needs at institutional as well as sectorwide levels, recruitment and selection of personnel, personnel management policies in areas such as compensation and incentives, and management development. HRD should be aimed at those who work directly in the water supply and sanitation sector as well as people in related sectors.

Since people almost always work in some type of institutional setting, human resources and institutions are interdependent. Although most development agencies understand the relationship between human resource development and institutional performance,

few have been able to design projects that effectively bring the two together. WASH has stressed the need to have an overall institutional perspective when carrying out HRD efforts. In Bolivia, for example, WASH held a series of workshops on rural water supply operation and maintenance for the country's Department of Environmental Sanitation in the Ministry of Health. The trainers quickly recognized that they could not design the workshops in the absence of clear departmental policies on operation and maintenance. In order to link the workshops to the broader goals of the department, WASH organized a one-day session for key decision-makers to help the department define its operation and maintenance policies, around which the series of training workshops was then designed.

Use of participatory, experiential training methods. Training yields the best results when it employs participatory, experiential methods. Although the importance of training individual workers is fairly widely understood in developing countries, the quality of most training programs is poor. Training techniques such as lectures or rote-oriented learning are considered outmoded in the United States and other Western countries but nevertheless continue to be used in developing countries. In contrast, participatory training, as elaborated by experiential learning models, has much better and longer-lasting results. It works best for several reasons.

First, the participatory approach is consistent with the concept that the essence of development is to empower people to take charge of their own development process and to foster a spirit of self-reliance. It puts the responsibility for learning directly on the shoulders of the trainees, telling them that learning will not occur unless they accept that responsibility.

Second, in much of the developing world, people learn by doing, not by being taught in formal settings. Experiential learning responds directly to this tradition by placing a heavy emphasis on doing.

Third, the experiential approach to learning does not offer prescriptions. The participants generally feel that they have as much to contribute as the trainers and therefore have a greater sense of ownership over what they learn.

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The participatory approach is consistent with the concept that the essence of development is to empower people to take charge of their own development process and to foster a spirit of self-reliance.

Finally, because the pace of change in the developing world has been rapid, there is a real willingness to try new approaches. Despite the fact that participants are accustomed through school to rote learning, they respond extremely well to training requiring active participation.

Training is usually thought of as necessary primarily at professional and technical levels. In fact, training needs are much broader than this.

Defining training needs. Training is usually thought of as necessary primarily at professional (e.g., engineers and public health specialists) and technical (e.g., well drillers, pipe fitters, and pump repair specialists) levels. In fact, training needs are much broader than this. Within most institutions, staff who handle accounting, budgeting, personnel, and procurement also need training. Management and supervisory training also are often needed. At the community level, training needs include not just the local caretaker but also the local committee responsible for financial record keeping and hygiene education.

In Malawi, WASH provided training to all levels of the Ministry of Works and Supplies, which was responsible for water supplies, and the Ministry of Health, which was responsible for sanitation and hygiene education. In-service training programs were held for both ministries for engineers, health inspectors, health assistants, construction supervisors, system operators, and health surveillance and monitoring assistants. Selected overseas training in engineering and management was suggested for senior staff. In addition, an extensive series of orientation courses, leadership workshops, and hygiene education sessions was held for community leaders, village committee members, and community system repair teams.

Effective training must be systematically planned, delivered, and managed.

Designing training programs. Much donor-sponsored training consists of single, ad hoc workshops. Unfortunately, single events have limited impact. Without follow-up and a supportive institutional environment, achievements from one workshop soon evaporate. Effective training must be systematically planned, delivered, and managed.

Training is most successful when it is designed as a series of events building on each other. A comprehensive training plan is even better. WASH has designed comprehensive training plans in several countries. In Zaire, for example, as part of the training

strategy for SANRU II (a rural primary health care program), WASH conducted three training-of-trainer workshops to create a core of well-prepared Zairian trainers.

In Bolivia, WASH designed a training strategy consisting of four workshops to improve the Department of Environmental Sanitation's capability to operate and maintain rural water supply systems. The first workshop focused on training rural supervisors in the general concepts of operation and maintenance, the second on improving the skills of the supervisors in pump maintenance, the third on designing training courses, and the fourth on pilot testing and revising the courses. This sequence of workshops developed a group of technicians skilled in operation and maintenance and put into place the basic elements of an operation and maintenance system.

Developing training materials. Good training is not inexpensive. Effective training materials are not put together overnight; a significant commitment of time and resources is necessary. For example, the cost of developing a training guide includes not only the initial draft but also pilot testing, revisions after each test run, and final editing and production. A good rule of thumb for determining the time required to develop training materials is approximately twenty-five hours' worth of materials preparation for every hour of instruction. Thus, a training guide for a thirty-hour workshop would take almost ninety-five days of effort. In addition, initial needs assessment and field tests can be quite costly.

Training materials should be as concise and succinct as possible. Because the host-country trainers who will use the materials will probably be inexperienced, the materials should be easy to use and contain visuals and handouts.

WASH has prepared training guides on a number of subjects (for example, latrine construction, spring capping, and hygiene education) and has found the best approach to be combining the skills of a training specialist and a technical specialist. Most technical specialists cannot write training manuals. Rather, they end up producing a technical reference manual and have great difficulty enunciating learning objectives, trainer instructions, and specific training

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In order to provide effective training over the long term, the institution itself must develop a training capability.

It is essential to link the training department's activities to the organization as a whole and to make an effort to elicit the commitment and support of top management.

activities. For these reasons, it is best to have the training specialist take the lead in writing the training guide and act as coordinator for the technical inputs.

Building training capability. In order to provide effective training over the long term, the institution itself must develop a training capability. To be effective, training must be based on an accurate needs assessment; designed according to the principles of adult learning; targeted to the right audience; designed to improve performance; conducted by skilled trainers; well managed; and continually monitored and evaluated.

Developing a training capability starts with creating a vision for training within the organization. Key supervisors and top managers should contribute to that vision and participate in decisions on the structure and size of the training department, the cost of training, and recruiting and developing trainers. It is essential to link the training department's activities to the organization as a whole and to make an effort to elicit the commitment and support of top management. Only then will a training program receive the necessary human and financial resources and be able to serve the needs of the organization.

In Ecuador, WASH worked with the Institute of Sanitary Works to conceptualize a training department, define its roles and responsibilities, and determine its organizational structure and conducted a series of training-of-trainer workshops in order to develop a cadre of skilled trainers.

In Oman, WASH assisted the Ministry of Water Resources in defining the role of an internal training department and in determining what was needed to make it effective. The ministry was newly created and, therefore, had a wide range of training needs and only limited internal capabilities. A key issue was how the training department would relate to the ministry as a whole.

The importance of institutional and human resources development to sustainability cannot be over-emphasized. It was one of the primary lessons of the Water Decade. Investments in water supply and sanitation will yield results only if the receiving institutions have the capacity to use them effectively.

Lesson Eighteen Technology and Technical Standards

Full consideration of appropriate engineering design and application is essential to system sustainability.

In general, current technology is up to the task of solving most of the water supply and sanitation problems of developing countries. Some gaps persist, however, particularly in the field of appropriate systems for peri-urban communities and low-tech options for urban wastewater collection. Nevertheless, technology itself is not generally a problem, in that a wide range of technical choices exists. There is always room for improvement, of course, and further technical advances occur regularly. But technology by itself cannot solve developing-country problems, including those in water supply and sanitation. It is the ways in which technologies are applied and how they are chosen that determine whether they will be adequate solutions.

Socioeconomic considerations. Operation and maintenance problems are widely considered to be the biggest issue facing the water supply and sanitation sector. But poor operation and maintenance is only the manifestation of the failure to consider a wide range of social, financial, institutional, and technological factors at the project design and implementation stages. If such an "integrated" decision-making process involving all of these factors is used, it is more likely that the best—i.e., the most appropriate—water pumping system or type of latrine or wastewater collection system will be used and well maintained.

In order for a technology to be suitable for use in a particular location, it should pass several socioeconomic tests. First, use of the technology should be conceptually and physically within the capabilities of the persons responsible for the operation and repair of the system. Handpumps can often be repaired by bicycle mechanics after a relatively short training period. Water treatment plants, on the other hand, generally require a cadre of skilled staff.

Second, spare parts and equipment must be available in order to maintain and repair the chosen technology. Importing spare parts and tools from

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LESSONS LEARNED

Spare parts and equipment must be available in order to maintain and repair the chosen technology.

The cost of operating the technology must be within the financial means of whoever will bear the cost.

Although technology must be affordable, it must also be attractive and desirable.

other countries usually causes logistical and foreign exchange problems. For example, in Botswana, WASH was asked to assist with the repair of two broken American well-drilling rigs. The WASH consultant put together a list of needed parts, all of which had to come from the U.S.-based rig manufacturer, which was located in Pennsylvania. It took seven months to obtain the parts. The lesson given from this activity is that imported equipment, even when provided free by a donor agency, must have a reliable source of spare parts.

Third, the cost of operating the technology must be within the financial means of whoever will bear the cost. Peri-urban dwellers may be unable to afford the fees necessary for household connections but may be able to pay for and be satisfied with, at least temporarily, standpipe service. Similarly, many rural residents may be unable to pay user fees necessary to operate a diesel pump but may be able to afford less costly handpumps. Costs to be considered include not only operation and maintenance costs but replacement costs as well. For example, systems using renewable energies such as wind or solar power generally have low operation and maintenance costs but high replacement costs.

The fourth test for determining the suitability of a particular technology might seem to contradict the third: although technology must be affordable, it must also be attractive and desirable. WASH and other organizations have found that some low-tech, seemingly affordable technologies are rejected while higher-tech, seemingly unaffordable technologies are accepted. At times technologies may not provide a level of convenience that the potential users value. Thus, they may not be willing to pay a modest amount for a hand-pump a quarter of a mile away but may be only too willing to pay more for a standpipe in their courtyard. Similarly, in peri-urban areas people may show no interest in building an affordable latrine but may show great interest in the far more expensive flush toilet. Flush toilets add to the value of one's house and, unlike latrines, they do not emit odors. Consequently, peri-urban dwellers may be willing to pay ten years for such a toilet. It must be pointed out, however, that technology choice is often related to available financing. If capital costs can be spread out over time, users

often surprise planners by preferring more expensive solutions.

The point, then, is that the appropriateness of a technical solution depends on the specific situation. There is no approved list of interchangeable "appropriate technologies." A technology appropriate in one situation may lead to problems in another. Some nations can use a higher level of technology than others. Notable differences exist not only among countries but also among different areas of the same country—in one region, for example, electric power may be more reliable, technical back-stopping may be more accessible, or operation and maintenance capability may be more sophisticated.

Engineering and construction design and practices. When selecting a particular technology, planners must consider not only local conditions but also local practices. These, too, can vary from one country or locality to the next. For example, in many developing countries the method of mixing concrete differs from the textbook method, often with the result that the concrete is weaker and therefore cannot be used in exactly the same manner as textbook concrete. Engineers should know what local practices are before they begin to think about appropriate engineering solutions.

In developing countries, poor engineering practices and low-quality construction are more common problems than overly sophisticated technologies. Many systems are poorly, inefficiently, and sometimes incorrectly designed, reflecting fundamental misunderstandings of basic engineering principles. In part, this results from flawed training and in part from a lack of practical skills and experience. Engineering is an art as much as a science, and there is a basic need for training in the former along with education in the latter. On the construction side, failure to build according to design specifications, faulty materials, and inadequate supervision are among the culprits.

In peri-urban areas both the art and science of engineering can be strained. Though peri-urban communities are quite different in many respects from rural or formal urban areas, engineers continue to use guidelines that do not include alternative technologies or some of the constraints unique to peri-urban areas.

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In developing countries, poor engineering practices and low-quality construction are more common problems than overly sophisticated technologies.

Local engineers—and often their expatriate advisors as well—prefer systems they are already familiar with. These systems are usually the most modern and are often based on the adoption of engineering design and construction standards for developed countries. These often turn out to be inappropriate for the difficult topography and soils and other conditions of peri-urban settlements.

Engineers usually rely on conventional systems even for nonconventional situations because they were educated according to a curriculum developed by expatriate engineering professors or local engineering professors who had received their training overseas. Also, in many developing countries engineering standards are borrowed from developed countries. Hence, even in urban areas where half the city is considered peri-urban, it is very rare to find engineering students taking even one course on technologies for peri-urban water and sanitation.

Examples exist of simple engineering solutions for providing water and sanitation in peri-urban areas. For the most part, however, the world engineering community is either unaware of their existence or distrustful and reluctant to even consider these alternatives. The conceptualization, design, and construction of such simple systems appropriate to peri-urban areas are complicated engineering challenges that require skilled, experienced, and innovative engineers working on interdisciplinary teams with social scientists, economists, and others.

Standards and norms. The issue of appropriate standards and norms comes up in a variety of ways in developing-country water and sanitation projects. For one, the issue of spare parts, alluded to above, is usually complicated by policies requiring that the donor's own country's equipment be purchased for systems for which the donor has provided money. In some countries, a variety of pumps exist side by side, each requiring different parts and tools for repair. Developing countries simply cannot support so many different technologies. This problem can best be addressed by establishing consistent national design and installation standards. For example, all systems of a certain size and type in a particular country could use the same equipment.

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If the government takes the lead in establishing standards and thus demonstrates its willingness and ability to take charge of the development process, donors will be much more likely to be flexible in implementing their "buy American," "buy British," or "buy German" policies. Benin, for example, has successfully insisted that only India Mark II pumps be used for its handpump systems. These pumps initially were manufactured in neighboring Togo, ensuring easy access to spare parts. The operations of the Togo factories were recently suspended, but Benin has contracted with a local importer to purchase the pumps in India. Belize has a similar policy, also focused on the Mark II pump. More and more countries are now adopting this approach. For their part, donors should learn to be more flexible in imposing standards, particularly those that are unrealistically high priced.

Standards also help protect communities and programs from well-intentioned but poorly designed projects. In some countries, nongovernmental organizations have independently constructed many low-quality, stopgap facilities that quickly become inoperable. Not only does this disappoint the community and make it difficult to work with on a more sustainable project, but it often reflects adversely on the country's water supply and sanitation program, even if the project was not part of that program. Although the participation of NGOs is often desirable and important, for reasons outlined in Chapter 3, the government should insist that facilities built meet minimum standards.

Water quality is another area in which appropriate norms and standards are important. Adopting external standards and attempting to force them into a different context is as great a mistake as trying to force a given technology into an unsuitable situation. Developing country governments need to adapt external water quality standards or design their own standards, looking first at what they want the standards to achieve. World Health Organization water quality guidelines, for example, are often mistakenly treated as "standards." In some settings, however, it may be unrealistic or too expensive to meet these guidelines completely, if doing so could substantially reduce the number of people to whom water can be supplied. Building less costly systems may mean lower water

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quality, but at least more people may be given access to water of a quality acceptable to the country involved. Research has shown that increasing the *quantity* of water available to targeted populations often has as many health benefits as improving the *quality* of water supplied.

Norms and standards should also be developed for wastewater treatment, especially if the wastewater is to be reused for irrigation or other purposes. The same goes for solid waste disposal. What are the requirements for safe landfills? Such standards must be established in the context of environmental sustainability, but they, like water quality standards, must be realistic for developing countries. Too often, solutions that industrialized countries have adopted are viewed as unalterable, even though they may be out of reach for developing countries. There is no one technical solution, but a range of options, each with its pluses and minuses.

Viewing norms and standards in their institutional, social, and political context and recognizing that adjusting them is not unthinkable, combined with the use of truly appropriate technologies, are bringing down the cost of water and sanitation, thus permitting sustainable coverage to be extended to a greater number of people at the same cost.

Community involvement. Since local operation and maintenance is often the key to sustainable rural systems and to the appropriateness of the technology selected, members of the community should be involved in making technical decisions. Convenience is often the most significant factor governing community interest in and use of new facilities. It is more important to most users to have a water supply nearby than to have clean water. Thus, conveniently located polluted sources are sometimes still used even when a new well that provides safe, clean water is available, if that well is further away or requires greater effort to obtain its water. Latrines may be ignored if there are convenient bushes nearby or if people consider latrines unhealthy.

Although consumers may initially consider convenience the overriding factor in their choice of facilities, appropriate hygiene education can help them appreciate the health benefits of improved facilities.

Viewing norms and standards in their institutional, social, and political context and recognizing that adjusting them is not unthinkable, combined with the use of truly appropriate technologies, are bringing down the cost of water and sanitation.

However, if this change is to occur, consumers should be involved in the project from design through implementation, operation and maintenance, and evaluation.

Water and sanitation systems that build upon culturally acceptable technologies already in use within communities have a much better chance of being adopted and sustained than other systems. Radical innovations are often met with skepticism and a lack of enthusiasm. Rainwater harvesting in Thailand is a good example of successfully building on old technologies. Rainwater has been collected from rooftops for domestic use for hundreds of years in Thailand. In an effort to improve this technology, the Asian Institute of Technology has studied the problem of durable containers to collect the water and keep it safe from contamination. Improvements have been made using low-cost, local materials. Self-operating diversion buckets designed to avoid the first flush of rain from roofs have been an important improvement.

In order to select technologies based on perceived community needs, planners must provide consumers with a clear understanding of the available choices in simple but not patronizing terms. Community members are unlikely to be technical experts, nor do they need to be, since there are usually a variety of technologies available that will adequately address the hardware needs of the project. For example, some villages in Burkina Faso were skeptical of drilled wells with handpumps because of past experience, and preferred the assured supply of a large-diameter well. For communities with many animals that require water, open wells may allow water to be drawn faster than hand pumping because they enable several people to use buckets and ropes at the same time. Moreover, for isolated communities, where travel and acquiring spare parts are difficult, the alternative of an open well gives villagers confidence in the reliability of the water supply and its convenient accessibility.

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Lesson Nineteen Operation and Maintenance

Making operation and maintenance plans before facilities are constructed helps to ensure that sustainable technologies are selected.

As noted above, planning for operation and maintenance should begin at the project design stage when various technologies are being considered for use. Broad, general consideration of operation and maintenance needs is not enough; careful thought and serious planning must be devoted to designing operation and maintenance plans to prevent future problems.

Too often, operation and maintenance plans are given inadequate attention; the task is simply assigned to the central water agency. Not until the systems are in place does the magnitude of operation and maintenance needs manifest itself. Then it becomes clear that other arrangements will have to be made. At that point, however, it is often too late to devise a satisfactory solution. Operation and maintenance plans cannot be tacked on as an afterthought but should be prepared very early in the design process; they must be realistic and consistent with available resources.

The operation and maintenance plan should address who is going to operate and maintain the system, how, and when, as well as what materials, equipment, and parts will be used, who will pay for them, and in what manner. It should include the following:

- Personnel plans—How many people at what level of expertise and compensation will be required on a regular basis, supplemented by what kind of specialized expertise?
- Human resource development plans—Who will operate and maintain the systems? Where are they? How accessible is specialized expertise? How much training have the intended operators had, and how much additional training will they need? Who will provide that training? Where? How?
- Procedures—What operations will be performed? How often? Under whose supervision?

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- Plans for obtaining supplies—What parts, materials, and equipment will be needed? How much will they cost? Where will they come from? What are the logistics of getting them?
- Budgets and financial plans—How much will all of this cost? Who will bear the financial burden? How much is the community willing to pay? What other financial resources are available? How will money be collected?

Unless all of these questions are answered and plans made before facilities are constructed, the result may well be another unsustainable system. Operation and maintenance plans should be fine-tuned during the trial period of project implementation, before technical assistance is terminated, to allow communities time to adapt to their new obligations. While this can be a time-consuming process, it is time well spent when compared to the potential waste of resources if this is not done.

A key part of any operation and maintenance plan will be the human resource component, i.e., the people who will actually operate and maintain the system. These people will most likely include community members, specialized repair people, and, in some cases, private sector firms, as described below.

Community responsibility. Most operation and maintenance plans for rural systems place a significant share of the responsibility for their adherence on the community. This can be an excellent solution if community members have or can develop the capability to shoulder this responsibility. They will not necessarily be able to do so, however, without ongoing support.

The training needs of community members should be determined when operation and maintenance plans are being made, and a training plan should be drawn up at that time. Training can either be on-site one-on-one training, or group training on a regional basis, or some combination of the two. Training should be performance based, that is, it should be participatory in nature. Arrangements for follow-up technical assistance should be included in training plans along with provision for higher-level back-up

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expertise in case of system breakdowns that cannot be handled at the community level.

Specialized repair people. Depending on the technology involved, some operation and maintenance tasks will require a higher level of skill than can realistically be created at the community level. Repairing a diesel or solar-powered pump, for example, is likely to be beyond the capability of community members. Sometimes the technology chosen may simply be inappropriate for community operation and maintenance.

In these cases, arrangements must be made for access to a higher level of expertise. This may be handled by creation of a regional or district operation and maintenance center with more specialized personnel on call for a number of communities. In small countries, a national center might be more appropriate. As an alternative, the private sector may be able to provide the needed services, particularly if the system in question is located near a large population center. However this problem is dealt with, it should be recognized and planned for; it is highly unlikely that community members will be able to carry out all operation and maintenance tasks unaided, nor should they be expected to do so.

Private sector firms. The degree to which the private sector offers a viable operation and maintenance alternative or source of additional expertise depends on the country's economic system. In nations with free markets, such as Lesotho, there are likely to be a number of private plumbing firms that may, depending on their location, show interest in carrying out some or all of the operation and maintenance tasks on small systems. In some countries, the private sector includes small, one- or two-person regional water system repair companies developed in response to a market need. The profit motive may lead to better and cheaper service as a result of market competition.

Where an active private sector exists and offers the expertise needed for system operation and maintenance, it should be considered for inclusion in system plans since it may have the needed capability at less cost and greater efficiency than would be involved in training community members. Care should be taken

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to ensure that the private sector service chosen is reliable, actually has the expertise it claims, and is prepared to be accountable to the community for its work. The community should retain responsibility for system management, and training of community members may be necessary to enhance their capability to monitor the performance of private sector contractors.

Lesson Twenty Financial Viability

To be sustainable, the water supply and sanitation sector must rely on an appropriate mix of donor, national government, and community financial resources.

Financing plans must assure funding for all aspects of planning, designing, and delivering water supply and sanitation services. Cost recovery from users must address ongoing maintenance and operation costs and, increasingly, the initial capital costs of construction. Neither individual projects nor the sector as a whole are sustainable if they depend solely on donors for long-term financial support. Similarly, water and sanitation sectors and projects can no longer depend entirely on subsidies from national ministries for their operation, maintenance, and replacement costs. On the other hand, the disparity between resources and needs in most developing countries and low levels of income mean that, in most situations, users are unlikely to be able to cover all costs themselves, particularly capital costs. Sustainable programs and systems are defined as those which meet all of their operating costs with the appropriate mix of government and community revenues.

Although overall investment in the water supply and sanitation sector remained fairly constant during the 1980s (in large measure because of the impetus of the Water Supply and Sanitation Decade), an increasing proportion of that investment has been financed by loans from international donors that must be repaid. This means that increasingly not just the ongoing operating costs but also the initial capital investment costs must be recovered from consumers directly.

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Inadequate attention to sector financial issues leads to service disruption, deterioration in water resources and equipment, and inability to expand coverage.

Experience during the last decade shows that inadequate attention to sector financial issues leads to service disruption, deterioration in water resources and equipment, and inability to expand coverage. As populations grow and needs increase—particularly for wastewater collection and treatment in urban areas—the problem of how to finance the sector increases. High levels of external debt, environmental degradation resulting from lack of or poor service, population growth, and increasing urbanization will compound the problem even further.

Among the issues to be considered in discussing financial viability are questions of sector financial autonomy, the role of subsidies in order to increase equity, and the willingness of consumers to pay for services.

Sector financial autonomy. To date, the primary model for the provision of water supply and sanitation services has been that they are made available as a public service. In almost all developed countries, public funding of capital infrastructure and operation and maintenance in the water and sanitation sector is the norm. Water and sanitation are considered public goods within the domain of public health. In the case of wastewater collection and treatment services, in particular, transfers from general or municipal tax revenues are common.

In developing countries, there is a growing assumption that this model is no longer valid. The current thinking proposes that the sector must move rapidly toward self-financing and independence. Total dependence on public support through direct and indirect subsidies is considered untenable because general revenues are inadequate to support the increasing demand for public services. Levels of subsidy, particularly for urban areas, must be reduced substantially. In short, the sector should strive, as a matter of principle, to achieve 100 percent cost recovery for recurrent costs. It may not be possible to cover all costs with user fees, but even in low-income areas, users must pay something for what they use—even if the rate is set low. The day is past when developing countries can afford to provide water free of charge to citizens.

The sector should strive, as a matter of principle, to achieve 100 percent cost recovery for recurrent costs.

In the case of water supply, it is possible that, at least in some developing countries, cost recovery through user fees will gradually be able to cover capital financing and the ongoing operation and maintenance costs of water distribution and treatment. In the case of wastewater collection and treatment, however, achieving financial autonomy is less probable. It seems unlikely that purely sector-generated resources will be able to support comprehensive wastewater treatment. Continued reliance on external lending as well as increased reliance on domestic capital markets and private financing are therefore essential.

Even very poor countries, however, can and should be required to commit at least some resources to the sector as an indication of their commitment to meeting the water supply and sanitation needs of their populations. In the absence of such a commitment, development efforts are likely to cease when donor funds and technical assistance stop. Even worse, the progress that has been made may be lost because of a lack of institutional support.

There is always going to be a mix of funding sources, but it is important for sector institutions to be transparent about where their funds come from and to operate according to proven commercial practices that stress good service.

Subsidies, equity, and efficiency. For sector agencies to rely mainly or solely on government subsidies is not only untenable because of the straitened finances of most governments, but it is also inherently inefficient. Indeed, in many countries, it is only the relatively better off people who benefit from subsidized services, since they are more accessible to service institutions than the poor. The system connection fees may be too high for the poorest, who then are forced to buy water from vendors, often at rates much higher per unit than those the utility charges.

Within-sector subsidies (from rich to poor, from large to small users) are usually to be avoided because they encourage wasteful behavior and are difficult to regulate. Further, providing "cheap" water as an income-distribution mechanism may serve to discourage conservation and lower the perceived value of a resource that people should be learning to value more highly.

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Providing "cheap" water as an income-distribution mechanism may serve to discourage conservation and lower the perceived value of a resource that people should be learning to value more highly.

When cost recovery is low, systems may be poorly operated and maintained and there may be no opportunity to extend service to the poor.

Subsidies external to the sector are preferred. In other words, first make the sector financially viable and efficient and, if certain groups need subsidizing, channel the subsidies via public income, taxes, and so forth.

From the point of view of equity, it has often been argued that user charges are disadvantageous to the poor, since such charges seem to place a heavy burden on people who already have limited income for their daily needs. However, in many countries keeping tariffs unrealistically low has not actually benefitted the poor. It may instead benefit the relatively better-off portion of the population who can afford to be connected to the system. But when cost recovery is low, systems may be poorly operated and maintained and there may be no opportunity to extend service to the poor. Cost recovery, which helps to eliminate subsidies, may in the long run serve to bring water to poor communities at a lower cost than they may be paying to water vendors.

Cost recovery and willingness to pay. The amount of funds for water and sanitation that can be generated from users varies from case to case depending on their willingness and ability to pay. Water-vending studies show that people are often able to pay a surprisingly large amount in relative terms for water. Some willingness-to-pay studies have demonstrated that it is even possible to set water tariffs at a level that enables recovery of both capital and operation and maintenance costs.

Willingness to pay measures the monetary value that individuals or the community place on a good—in this case, a new or improved water supply. The WASH Project carried out a number of pioneering studies of willingness to pay for water supplies and showed that such studies can provide information not only about setting the price for water but also about the level of service and type of technologies preferred. In Haiti, for example, WASH found that users in one community were neither paying for water from the standpipe nor using much of it; water use was only five to ten liters per day. A study revealed that the villagers would have been quite willing to pay for a higher level of service—in this case, piped water into their houses—but did not value the standpipe highly enough to justify purchasing water from it.

A WASH willingness-to-pay study conducted in southern Tanzania in 1988—one of the first uses of the contingent valuation methodology—showed that the people treated water as they did any other highly valued commodity in short supply. While they were willing to pay what was to them a large amount for water, the amount was not large enough to cover all operating costs. Nevertheless, by establishing a cost-recovery mechanism (a pay-by-the-bucket system), the government was able to improve the performance of the water scheme so that potential time savings for women could be realized and their labor resources could contribute more to economic and child development.

There is much still to be learned about consumers' willingness to pay for improved water supplies, and further research is needed. But from currently available studies, it appears that price, convenience, reliability, and quality of the new source must compare favorably with existing sources. Potential savings include not just monetary savings but also the level of effort (measured in calories expended) and the amount of time it takes for the household's women to fetch water from sources outside the home. On all these counts, particularly time, the savings are potentially substantial. For households purchasing water from vendors, the monetary savings can be as much as 10 percent of household income, making people very willing to pay for improved supplies.

People care a great deal about system reliability; however, studies have found that they have serious questions about government's capacity to provide reliable service and thus are sometimes reluctant to pay much for new services. If governments wish to shift the cost burden to consumers, sector institutions must be able to provide high quality, reliable service.

It is also important that the level of water and sanitation service offered be geared to what users want and are willing to pay for. Donors sometimes create a problem in this regard because they decide ahead of time what level of service will be provided and fail to provide for later upgrades as the community is able to afford them. A more successful approach is to establish a minimum standard of service that can be raised if either the community as a whole

Price, convenience, reliability, and quality of the new source must compare favorably with existing sources for consumers to be willing to pay for it.

or individuals within it are able to provide funds to increase their level of service.

* * *

The 1992 Rio Conference on the Environment and Development was a watershed: economic development and protection of the ecosystem were linked, never to be separated. To the many tests for sustainability on the project level (effective operations and maintenance, adequate financial support, institutional backup, appropriate technologies, etc.) must be added new tests for sustainability on the environmental level. In the water and sanitation sector, "progress" has often been made at the expense of the environment: depletion of aquifers with the potential for causing land subsidence and saltwater intrusion, pollution of watercourses and oceans with sewage that is collected but not treated, groundwater contamination from poorly designed or constructed latrines, etc. In the future, interdisciplinary collaboration will be required to conserve and protect the world's freshwater supplies. It will take the united efforts of government entities responsible for health, agriculture, trade and industry, housing, and power, among others, as well as the private sector, to assure that water and sanitation development will be environmentally sustainable for the generations to come.



Marc French/Panos Pictures

Solid waste problems are gaining recognition in Haiti, as in many developing countries.

Chapter 6: THE LESSONS ASSESSED

It is customary in the concluding chapter of a report such as this to introduce the caveat that the points previously made regarding effective ways of bringing about water supply and sanitation development are not intended to suggest a model for development of the sector, that those who use the material should be flexible in applying specific lessons to their situations, and that circumstances may limit the utility of any particular lessons cited. While these cautions certainly should be observed, the suggestion of a model cannot really be denied. In this report, four central principles provide the organizing focus for twenty lessons and a host of related points. From these a "model" can be inferred, and it is reasonable to assess the document as a whole from this viewpoint.

In essence the model overlying the lessons and principles in this report constitutes a philosophy or approach built on wide experience. The WASH staff members and consultants who contributed to this report have been influenced not only by their WASH experience but also by their experiences in development work, notably the Peace Corps, the U.S. Public Health Service, and A.I.D. itself. These individuals are working in the field of water and sanitation, but first and foremost they are development specialists. They are chiefly interested in building developing country capacity on all levels—from village committees to government ministries. The goals they espouse are shared by development workers and organizations all over the world.

Every country—probably every region or village—will present the water and sanitation development worker with a different set of problems and needs embedded in a unique context.

In this book, the approach or philosophy comes with a water and sanitation “checklist” tailored to specific situations. This checklist is not a prescription. WASH has learned that it is futile to prescribe a package solution. Every country—probably every region or village—will present the water and sanitation development worker with a different set of problems and needs embedded in a unique context. In trying to solve the problems and meet the needs, WASH relies on the basic development philosophy and the checklist of what has been learned about effective water and sanitation projects. It takes time and commitment to operate in this way, and there are no shortcuts to real development.

Normally success is possible if the basic philosophy and checklist are applied, but sometimes the context is such that nothing positive can be achieved. One item on the water and sanitation checklist, for example, is that without hygiene education water and sanitation projects will probably not have any positive health impact. If the ministries in a developing country government are set up in a way that inhibits coordination between systems construction and hygiene education, it may be impossible to set up effective systems until the ministerial context is changed.

The WASH methodology stresses broad participation coupled with coordinated and sustainable effort. Achieving a workable balance between these two essentially conflicting principles is a tall order even for societies that enjoy a high degree of development. It is

rarely achieved under Third World conditions—or any conditions.

Governments in many developing countries—as well as many newly democratizing nations—still feel uneasy with the participatory approach. Still responding to traditions where “participation” meant dissent and disruption, they are often apt to look for the expert to provide them with the “right” answer in a critical situation. Many of their development professionals are eager to do things for communities, less optimistic about doing things with them. Unfortunately, some of the technical assistance provided to developing nations reinforces these tendencies.

Current economic and political realities can also affect the success of the development model described in these pages. In many countries, lack of local institutional capacity is so great that outside assistance cannot be absorbed, and lack of economic growth has led to a severe lack of internal resources to sustain development. But more important in the long run, the sources of external assistance, both financial and technical, are insufficient to fully address the needs of developing countries. These countries must build their capacity to plan, finance, and implement their own programs. For most this means that governments and local communities must take up part of the burden, and that in turn means that individual citizens are going to have to grow and change. The WASH model is based on this reality.

We at WASH believe that the model is the right one, however incomplete it may be, and we hope that our lessons will be useful to the many persons and organizations dedicated to clean water and sanitation for all.

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