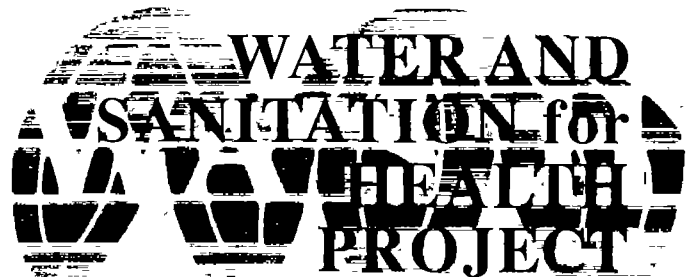


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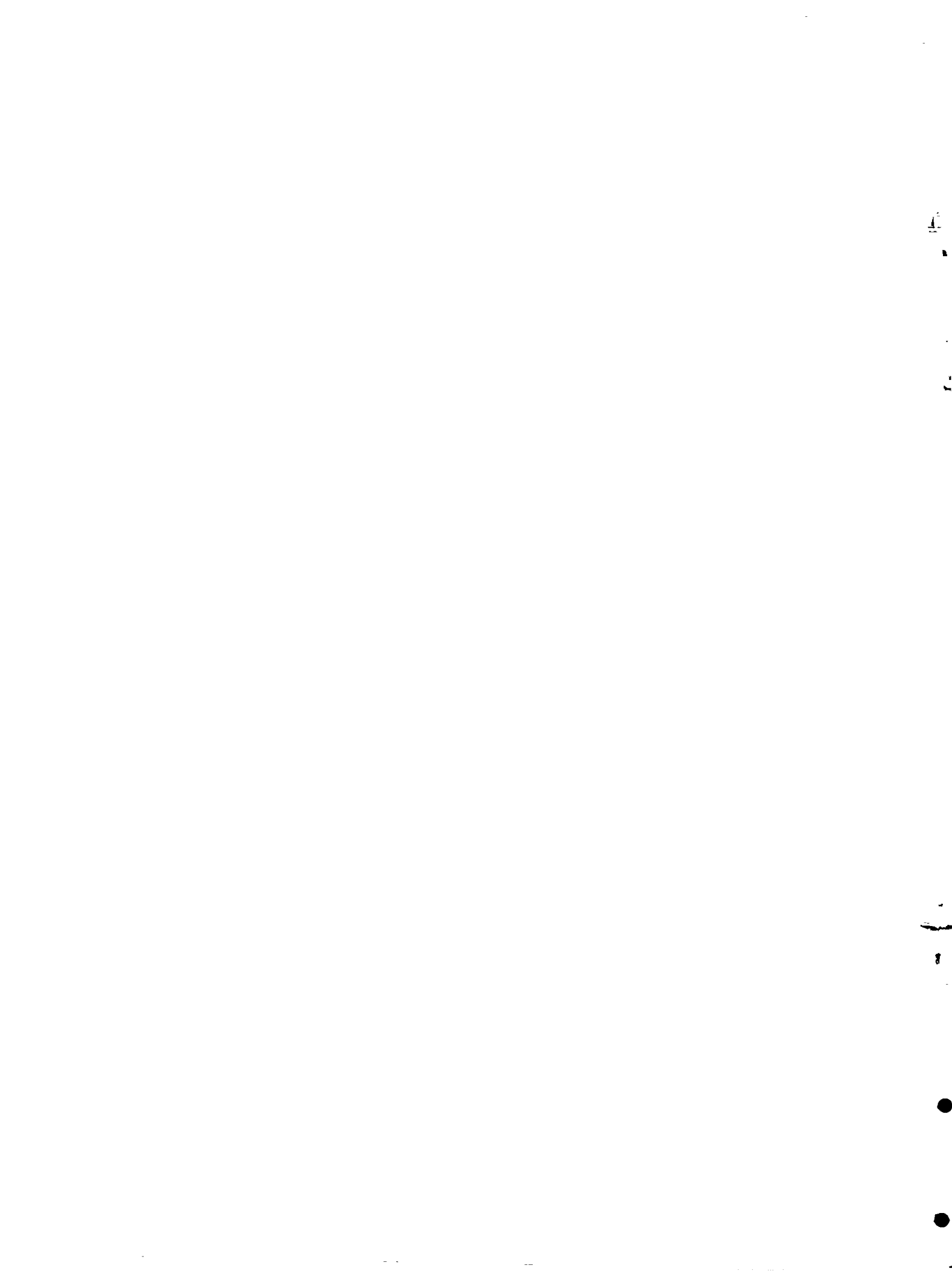
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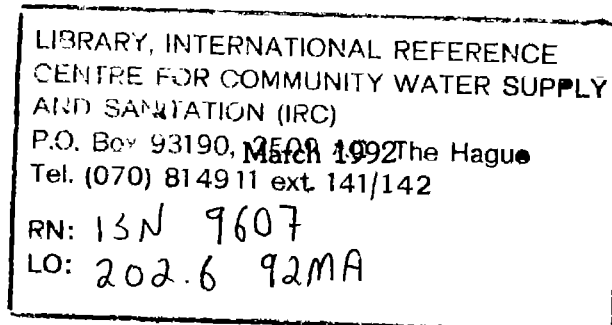
WASH Technical Report No. 74

MAKING CHOICES FOR SECTORAL ORGANIZATION IN WATER AND SANITATION

Prepared for the Office of Health,
Bureau for Research and Development,
U.S. Agency for International Development,
under WASH Task No. 027

by

Daniel B. Edwards
Edward Salt
Fred Rosensweig



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Guidelines for Institutional Assessment. February 1988. WASH Technical Report No. 37. Prepared by Donald E. Cullivan, Bruce Tippett, Daniel B. Edwards, Fred Rosensweig, and James McCaffery. (Also available in French, Spanish and Arabic.)

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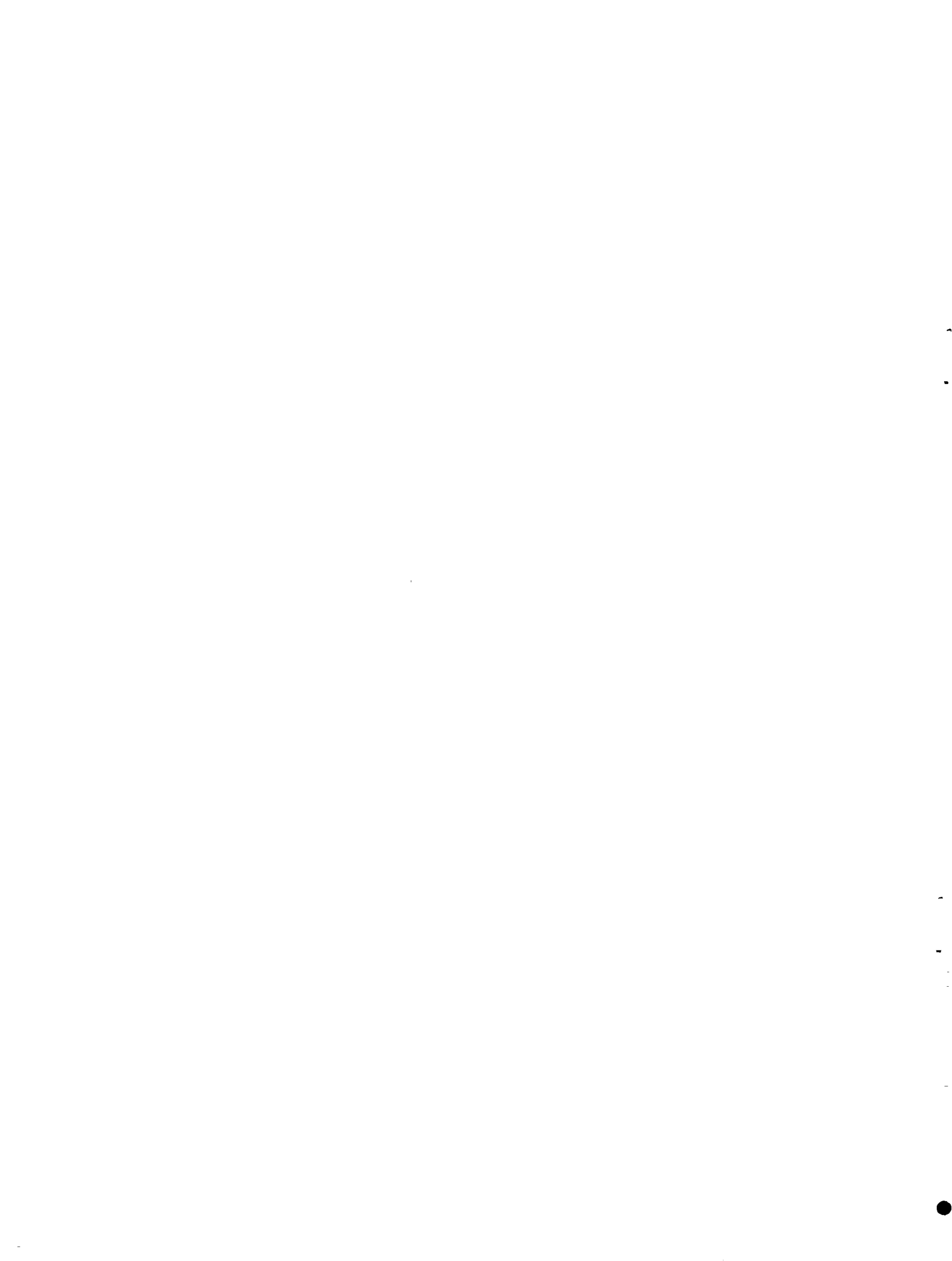
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ABOUT THE AUTHORS

Dan Edwards has been with Training Resources Group since 1981. He has over 25 years of experience as a training and organizational development consultant in Latin America, Asia, and the Middle East. He has worked on numerous WASH assignments over the past nine years, primarily in the area of training and institutional development. Mr. Edwards has been heavily involved in projects in Sri Lanka, Ecuador, Thailand, and Egypt. He has lived in the Dominican Republic and Panama and speaks fluent Spanish.

Ed Salt has been with Training Resources Group since 1984. He has consulted in training and organizational development in Africa and Asia for the past 20 years. He has been involved in an A.I.D.-funded project in Sri Lanka to strengthen the National Water Supply and Drainage Board since 1986. He has also lived in Ethiopia.

Fred Rosensweig has been the Associate Director for Human Resources and Institutional Development for the WASH Project since 1981 and an employee of Training Resources Group since 1984. He has been directly involved in institutional strengthening activities in Tunisia, Ecuador, and Zaire. He has lived in Tunisia, Senegal, and Cameroon and speaks fluent French.



EXECUTIVE SUMMARY

One of the more difficult questions to resolve in the water and sanitation sector is the question of how the sector should be organized. This question is often at the root of some of the important obstacles to improving sectoral performance. Indeed, it may not be worthwhile to undertake new projects in the sector without first addressing critical organizational problems. These problems include a multiplicity of players in the sector, overlapping roles and responsibilities among agencies, lack of responsiveness to community needs due to overcentralization, and lack of a body with responsibility for managing sectorwide issues. Pressures currently confronting the water and sanitation sector in country after country are having a significant effect on how sectors are organized. Principal among these pressures are the need to extend coverage, involve the private sector, recover costs, protect the environment, and increase efficiency (see Chapter 1).

The purpose of this report is to provide an analytical framework to assess the organization of a water and sanitation sector and to suggest lessons learned about sectoral organization based on five case studies. To study the issue of sectoral organization, the WASH Project undertook a two and a half year activity. The first phase consisted of data gathering through interviews and a literature review. The second phase consisted of field visits to five countries (Chile, Malaysia, Paraguay, Tunisia, and Zimbabwe) to learn how each country organizes its water and sanitation sector and what issues are involved in the choices each country has made. The third phase consisted of an analysis of the field information.

The expectation at the beginning of the project was that the study would yield a generic model of how water and sanitation sectors should be organized. The study team found, however, that it was not feasible to develop a model of sectoral organization that would apply to all countries. The issue of sectoral organization is so complex and so dependent on a range of factors that vary from country to country (including a country's level of economic development, political system, historical background, size, and natural resource endowment) that a generic model would be of little value.

The process of visiting the case study countries and reflecting on the findings resulted in the following major outcomes (and structure for this report).

Framework for Assessing Sectoral Organization

Chapter 2 presents an analytic framework for assessing how a water and sanitation sector is organized and why. The framework covers four areas of inquiry:

- The sectoral context, that is, the primary factors influencing the sector's organization, including historical background, political system, level of economic development, land area and population, and availability of water resources
- The division of roles and responsibilities among agencies active in the sector
- The adequacy of institutional arrangements for accomplishing basic tasks of any sector: setting policies and standards, planning, financing, and implementing projects
- The sector's ability to address specific water and sanitation issues: cost recovery, community management, health and hygiene education, and operations and maintenance

Appendixes A through D provide questions to be asked in the field in pursuing each of the four areas of inquiry.

Case Studies

Five case studies provide examples of different sectoral organizations (Chapter 3). The case studies are not intended to be complete sectoral reviews. Rather, they are presented to frame the issues and lessons learned. They also provide examples of the types of analysis that are possible using the assessment framework.

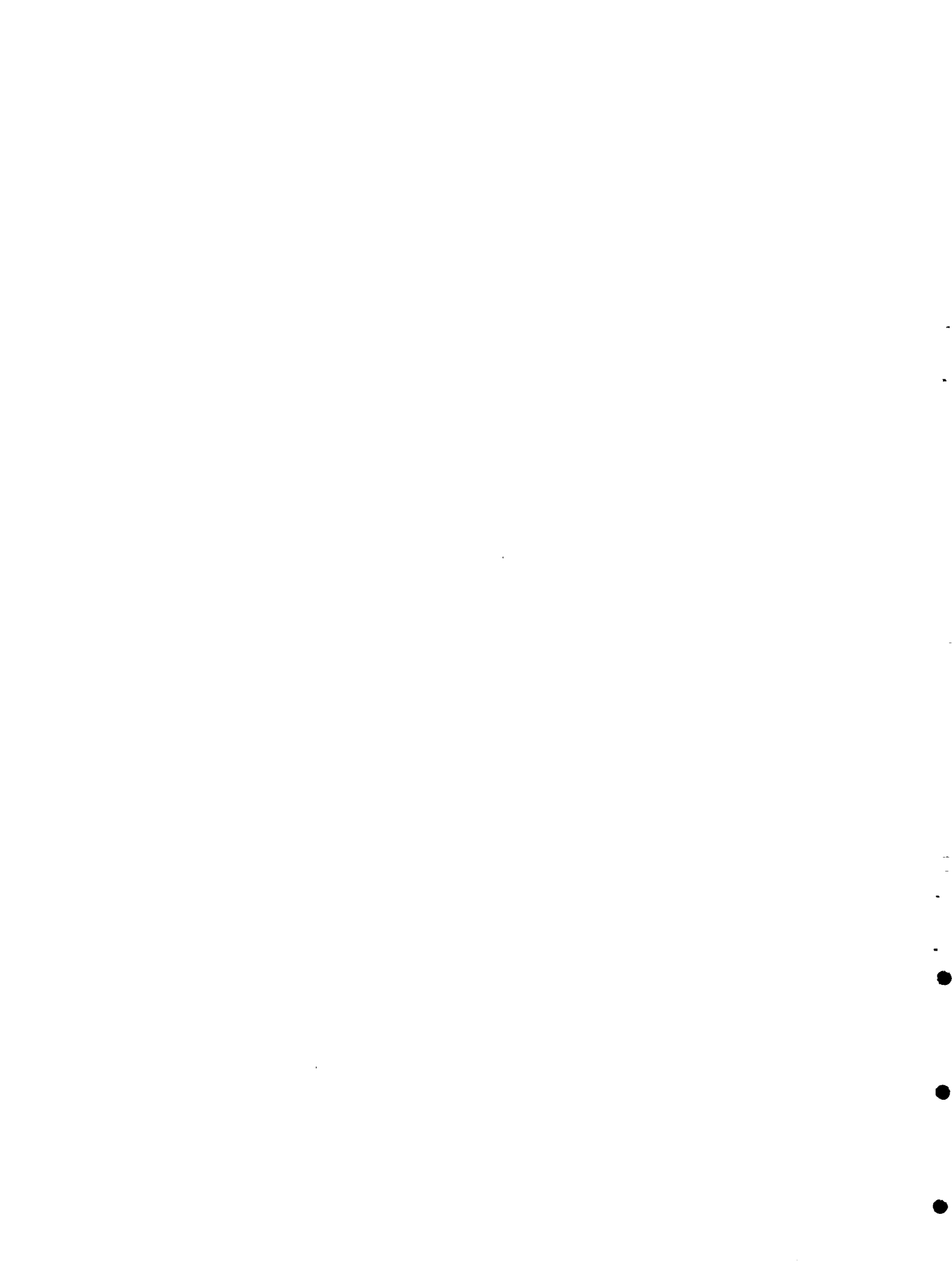
Lessons Learned

Eight lessons learned from the experience of the case study countries are discussed (Chapter 4). The lessons are intended to guide decision making as countries consider new ways to organize their water and sanitation sector. The major lessons learned are the following:

- Pressures to become more efficient and effective are beginning to change the role of government from service provider to that of promoter and regulator.
- When responsibility for rural water and sanitation is diffused among a number of government agencies, the consequences are generally negative.
- The movement toward decentralization is a natural response to a number of common pressures. There are effective ways to

decentralize, and a case can be made that a decentralized structure can be more responsive to sectoral needs than a centralized structure.

- A decentralized sector must still account for the major sectoral tasks.
- A ministry of health is generally not the most effective agency to have full responsibility for rural water supply. A ministry of health can play an important role, however, in providing hygiene education services and in the construction of simple systems, such as improved springs and shallow wells.
- It is important to have a body that addresses sectorwide concerns.
- Strong regulatory control is needed at the central level.
- It is not feasible to have a commercially oriented urban utility manage a subsidized rural water and sanitation program.



1

THE PROBLEM OF SECTORAL ORGANIZATION

1.1 The Need for Guidance on Sectoral Organization

Among the more difficult problems facing development planners and project officers in the water and sanitation sector are situations in which it is not possible to intervene directly at the service-delivery level because the sector's organization is too weak or fragmented. Occasionally, institutions are weak because sectoral-level problems present hindrances. A sectoral-level problem, for example, might be that the sector is highly politicized and primarily interested in providing jobs for the party in power. Another might be that the sector has no government priority for planning or funding because of outside competing demands for very scarce resources. These are among the more difficult problems to resolve. A great many other obstacles to improved sectoral organization, however, are easier to overcome.

Development planners may ask what constraints the organization of the water and sanitation sector poses for the delivery of services. In the literature review that formed the background for this study, a majority of the documents indicated that significant obstacles to meeting the need for water and sanitation could be directly attributed to sectoral organization. For example,

- A great deal of sectoral organization is confusing. Roles and responsibilities overlap among agencies, and consequently, fragmentation and lack of coordination are common.
- In many countries, the sector is overly centralized, bureaucratic, and not very responsive to community or consumer needs.
- Whatever the sectoral arrangements, there is often a public sector orientation to institutions, and they operate under outmoded civil service regulations and without a means to measure performance. Performance is poor; standards, if set, are not enforced; planning does not take place; constructed systems are not maintained; vision and leadership are lacking; and skills are weak.
- In many instances, central planning and funding processes are dominated by inefficient government ministries, and the delivery of services is subsidized to support high and wasteful overhead.

1.2 The Case for Sectoral Intervention

When faced with many indicators of poor performance, it is often difficult to sort out what the real problem is or where to begin. It is the premise of this study that often the place to begin is with sectoral analysis, possibly followed by projects that address sectorwide needs. The assumption is that the way a sector is organized forms the entry point for sectoral investment, overall problem solving, allocation of resources, and decisions about the overall need for services. Sectoral problems require intervention if long-term improvement in service delivery is to take place. It may not even be worthwhile to undertake projects or other investment without first addressing the organizational problems within the sector.

Sectoral improvement often requires communication about policy and organizational issues. These issues are sometimes difficult for external support agencies and lenders to address because they tend to require changes in the way sectors are managed or organized. Yet improvements can be initiated through appropriate policy discussions. For example, a development planner may have to say to a government, "We really cannot assist you with rural water supply when the primary implementing agency you have set up is highly centralized and 150 percent overstaffed, and when 60 percent of the staff we would train in a project will turn over the next time there are elections. If you want assistance, we have to discuss how this agency can be moved out of the political spoils system and made into a semiautonomous, professional, stable agency." This type of conversation often needs to occur, but many governments would react negatively to outside development planners who advocate measures that could alter power and political benefits for individuals or groups. Yet ways must be found from within the positive and forward-thinking elements of countries to undertake this type of sectoral reform if real breakthroughs are to occur.

The contrary assumption is that intervention at the project, local, or single-agency level is a primary basis for improving sectoral performance. This is what most often has been done. The data on project evaluations indicate that, at a minimum, a sectoral-level approach, along with project interventions, should be considered. It is clear that many of the constraints on performance addressed in this study can be traced directly to the issue of sectoral organization. The form, configuration, and structure of the sector can greatly facilitate or greatly hinder getting the job done.

Much of the work that has been done by the U.S. Agency for International Development (A.I.D.) and the Water and Sanitation for Health (WASH) Project has been at the project and institutional levels. Project-level issues addressed in the past, for example, have provided guidance on the following:

- How to consider or diagnose the economic micro-environment of an urban water utility
- How to construct low-cost systems effectively

- How to assess institutional output and effectiveness using performance indicators
- How to train managers in water and sanitation organizations
- How to set up an operations and maintenance (O&M) program in rural water supply
- How to train staff
- How to provide hygiene education
- How to involve users in decision making

Such interventions look inward or treat problems within the boundaries of single institutions or ministry-sponsored projects. Sectoral-level studies, on the other hand, address the following types of questions:

- What goals should be set for meeting the public need for water and sanitation services?
- How should the commodity provided to people be defined or considered? Should it be sold as an economic good or given, or mostly given, as a good for public health and welfare?
- What should the role of public and private service providers be in meeting the public need?
- How should resources be organized?
- How do a number of agencies providing similar or complementary services coordinate to minimize duplication?
- How does long-range master planning take place for the provision of water and sanitation services so that it does not harm the environment?
- How do institutions that supply manpower to water and sanitation institutions become informed about the specific skills needed by individuals in the sector?
- What is the total subsidy and the overall cost to the country of providing different levels of services for water and sanitation?

- How much centralization or decentralization is required to provide services?
- How are policies set and enforced?
- How are jurisdictional disputes between service catchment areas managed? For example, disputes may exist between urban and rural communities, between different urban companies, between municipal and state systems, and between agricultural and domestic water users.
- How is overall investment by external support agencies or lenders coordinated and equitably managed, and who is responsible for debt repayment?

1.3 Defining the “Sectoral Level”

The focus of this study is the organizational structure of the water and sanitation sector : those various institutions, agencies, or other governmental bodies which interact to regulate, promote, and, in many cases, deliver water and sanitation services to rural and urban populations. The term “sectoral level” is used in this report to focus on the level where policy and inter-institutional practices are set which affect the entire sector. Such policy or practices may be purposefully addressed by a coordinating committee or other regulatory body, seeing that distinct ministries or agencies have consistent and supportive policies. Or the sector may be weakened by unclear or even contradictory policies of various institutions operating in the sector.

A sectoral-level analysis examines whether the sector is set up to deal with overarching issues which are not usually handled adequately by service delivery institutions. These issues include setting standards, developing regulations, establishing tariff policy, providing funds for research and development, and planning for human resources. An example of a sectoral-level decision might be a tariff policy decided at a central level which requires that O&M costs be met out of the revenue of all water-providing organizations. Sectoral-level analysis also may consider how an action taken at a lower level might be useful to others; a project in one rural province might develop a new methodology which others might use to economize resources.

A sectoral-level approach also considers relationships among smaller units, i.e., how common problems are solved, how jurisdictional disputes are dealt with, and how limited resources within a country are distributed to meet the needs of all citizens. To the extent that the government provides financing, sectoral-level analysis also includes setting priorities and criteria for project selection.

1.4 Pressures for Change in the Water and Sanitation Sector

The study team examined a number of sectoral situations and made field visits to five countries to consider how those countries organized their water and sanitation sector and what effect that organization had on the way services were provided. In its examination, the team did not discover a single “best” structural or operational method. The water and sanitation organizations in the case study countries did contain common elements, but those elements have evolved into a variety of complex arrangements over a period of time to meet water and sanitation needs.

In fact, a characteristic of the sector in the countries visited and in other countries studied is that its organization is in a continuing state of change. Document review and personal interviews revealed that the way the sector is currently structured is usually quite different from how it was structured in the past. Key actors in the sector often see the need for significant change in the future. Thus, current sectoral organization can reflect the remnants of a past situation which has changed dramatically. This may be due in part to the colonial legacy the country inherited. The team found few examples of sectors that had not made fundamental changes in the past five years or that were not considering significant changes in the near future. Many of the changes are in response to demands that are being made on the sector in countries throughout the world. These pressures come from a wide range of sources—from consumers and external support agencies, from the larger needs of the nation and its government, and from organizations within the sector itself. These “constituencies” are requesting water and sanitation organizations to:

- **Extend Coverage**—meet a range of political, developmental, and health needs by providing water and sanitation services to populations that are not adequately served, including those who live in the most remote and dispersed communities. Ensure that growing population centers, including urban and peri-urban areas, are well served.
- **Improve Efficiency**—decentralize operations and decision making. Get communities involved in management. Develop long-term plans and establish priorities for the use of limited financial and personnel resources. Reduce the size of governmental payrolls; train and deploy civil service staff in ways that are related to sectoral goals. Question whether appropriate technological choices are being made.
- **Use the Private Sector**—redefine the government’s role to be responsible for promoting, not providing. Get the private sector involved. Look for alternatives to expensive, centrally managed governmental programs that cannot be paid for by the government or the consumers.

- **Ensure Sustainability**—improve the viability of constructed systems. Develop increased capacity for O&M.
- **Recover Costs**—recognize that coverage goals cannot be met unless the sector's operation can be largely self-financed. Develop systems to recover the cost of operating and maintaining water and sanitation systems. Convince users that water is a service that must be paid for, not a right.
- **Consider the Environmental Impact**—deal with the broader implications of water provision and sanitation for the environment, for example, technology choice, source protection, and decisions related to urban sewerage. Set, monitor, and maintain water quality standards that protect public health yet allow for appropriate commercial and industrial development.

Sectoral organization determines how effectively water and sanitation institutions respond to these demands. As the sector pays more attention to cost recovery and sustainability, for example, it must decide which of its characteristics constrain or support improvements in those areas. As questions of sectoral efficiency are raised, traditional ministerial relationships and interactions must be critically reviewed and in many cases realigned. Also, it becomes clear that meeting water supply and sanitation needs using current funding approaches is too expensive; the role of the government in the sector must be scrutinized and redefined.

Clearly, sectors face various demands and a wide variety of choices. Although the organizational charts of countries can look quite different, the need to structure the sector to deal with these demands is universal. This premise—that the water and sanitation sector is in the midst of dynamic change in response to a number of specific demands for improved performance—provides the basic framework and focus for this study.

1.5 Study Methodology

This study was begun in February 1989. A detailed work plan was developed that included three major phases. The first phase involved basic data gathering through interviews and review of the literature. Staff of the Pan American Health Organization (PAHO), the World Bank, the Inter-American Development Bank (IDB), A.I.D., and WASH were interviewed. The literature review included a large selection of project evaluations, technical papers, and sectoral studies and reviews. At the end of the first phase, a review document was generated that discussed the primary issues that recur in considering sectoral organization and performance. Based on the review document, a field research approach was developed in which the primary issues were separated into "major sectoral tasks." For each task, a number

of questions were defined to guide field investigations into how a sector is organized and how it is performing.

The second phase, carried out over a one-year period, consisted of field visits to five countries—Chile, Malaysia, Paraguay, Tunisia, and Zimbabwe—to inform the study team on the organization of the water and sanitation sector in each country. The field visits were short investigations during which the question framework developed in phase one was used to determine how sectoral issues, such as centralization, decentralization, delegation, and role clarity, were being handled in the case study countries and why. The investigations were also open ended to allow for unexpected or nonhypothesized observations to emerge. In addition to the five case studies, the study also drew on field visits and sectoral studies made by the WASH team to Bolivia, Ecuador, Egypt, the Philippines, Sri Lanka, Thailand, and Zaire. Information gathered about these countries was used, as well, to inform the team about sectoral issues.

The final phase consisted of a complete analysis of the field information. This led to the formulation of lessons learned, drawing on examples from the case studies, and of operating principles to guide the organization of a water and sanitation sector. The analysis also clarified the major variables that affect the way a sector is organized.

1.6 Purpose and Organization of the Report

The report has two overall purposes. The first is to provide an analytical framework for assessing the organization of a water and sanitation sector. This framework will allow planners to determine the effectiveness of the current sectoral organization and identify ways it might be strengthened. The second purpose is to present lessons learned about sectoral organization based on visits to five countries and the authors' familiarity with several other countries. These lessons offer specific guidance on sectoral organization for decision-making.

This report is designed to raise issues and provide a framework for better analysis and understanding of sectoral organization and the sectoral level of investigation, as differentiated from the project or institutional level of examination. The report can be used as a guide for sectoral analysis and, potentially, as a framework for considering problems and needs in designing sectoral reform projects. The discussion is not prescriptive because all of the evidence gathered indicates that there are too many variables in sectoral organization to prescribe a "best case" arrangement for all countries. Examples are provided, however, of how countries have opted to organize their sector (e.g., decentralized versus centralized, increased private sector involvement) and the circumstances and reasons behind their choices. This type of analysis provides the "situational logic" of different options.

Chapter 2 provides a framework for assessing sectoral organization, including major tasks that any sector must attend to and those that are specific to water and sanitation. Chapter 3

presents five case studies of sectoral organization based on the survey field work conducted, and demonstrates the application of the sectoral investigation framework developed in Chapter 2. Chapter 4 presents a discussion of lessons learned using examples of how countries have successfully and unsuccessfully responded to sectoral needs and issues. The case studies could guide decision making by other countries as they make choices about how their water and sanitation services should be organized. Chapter 5 presents a number of operating principles derived from the lessons learned and offers some suggestions on how this report can be used by project officers and development planners.

2

FRAMEWORK FOR ASSESSING SECTORAL ORGANIZATION

This chapter provides a framework for assessing the organization of a water and sanitation sector. It is based on factors the study team discovered to be critical during its investigations. The framework consists of four areas of inquiry that, if followed, could structure the analysis of a sector in any country.

The starting point, if one is to understand the organization of a sector and what may have to be done to improve it, is to consider the current situation. It is important to understand how the sector is currently organized, what its organizational strengths and weaknesses are, and what major constraints influence its organization and performance. Based on the study team's field analysis in the five case study countries, understanding the complexity and dynamic nature of sectoral organization requires that the following four primary areas of inquiry be considered:

- The sectoral context—historical, political, and environmental
- The definition of roles and responsibilities
- The major sectoral tasks that must be accomplished
- Specific water and sanitation issues that must be addressed

The first area of inquiry comprises the sectoral context. It encompasses the country's history, population, geographic factors, availability of water, and political context.

The second area of inquiry concerns the current division (and, in some cases, diffusion) of roles and responsibilities. The question of who is currently doing what becomes an entry point into the subsequent areas of inquiry.

The third area entails a review of the major tasks the sector must perform and an assessment of how well those tasks are being accomplished. The tasks are those that are required of any sector (setting policies and standards, planning, financing, and implementing programs).

The fourth area consists of issues the water and sanitation sector must address. These issues, such as the provision of health and hygiene education, cost recovery, and community involvement, are critical to the sustainability of water supply and sanitation systems. Without special attention to health and hygiene, for example, the intended health benefits of water supply and sanitation improvements may not be achieved. Cost recovery ensures financial

sustainability over the long term by decreasing the need for governmental subsidies. Community involvement at all stages, especially in managing systems, is particularly important in rural areas to ensure local ownership of the system and the resulting motivation to contribute time and money to operate and maintain the system. Although some of these issues are particular to the water and sanitation sector, others may also be important to other sectors.

Each of the four major areas of inquiry is discussed below in order to define sectoral organization and the potential gaps that may exist. Figure 1 provides a graphic summary of the assessment framework. Appendixes A through D present specific questions to help guide investigations into each of the four areas of inquiry. These same questions were used to guide the case studies presented in Chapter 3.

2.1 Sectoral Context

Each country faces a number of constraints. In some measure, the way a country addresses the problem presented by each constraint affects its sectoral organization and, often, its policies. These constraints stem from an array of historical, socioeconomic, resource, and political factors.

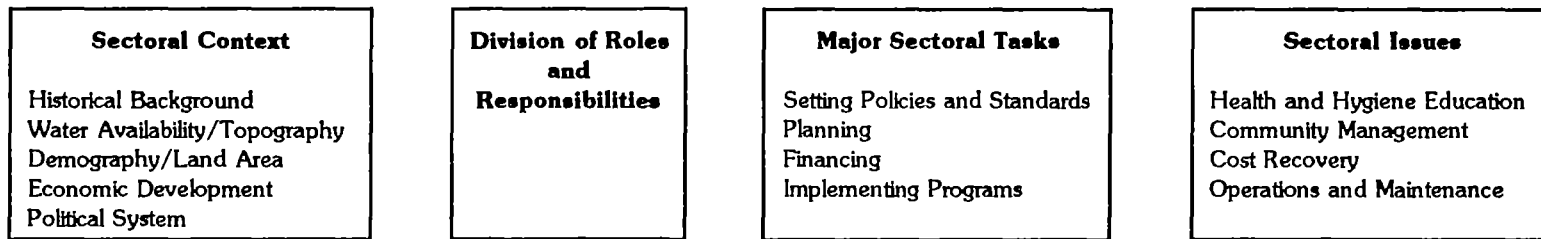
The field investigations asked the same question of each country visited, What has led to the particular sectoral organization that exists here? Based on the field work, the following factors were identified as being major influences in the evolutionary process of sectoral development:

- The historical background of the country
- Availability of water as a resource and the topography
- The size of the country and the target population (demography, land area)
- The level of economic development (the strength of the private sector and the overall economic strength of the country)
- The political organization, tradition, and strength or viability of the political system.

Appendix A contains a list of questions to help determine the primary factors that have shaped the sectoral context.

Figure 1

Assessment Framework



2.1.1 Historical Background

All countries have history and tradition which greatly affect the way that services are provided, and create the conditions for solving common problems, such as the need for safe drinking water. A history of colonialism, for example, may affect land tenure, the governmental and legal system of organization, disposition toward hierarchy and democracy, and the extent of self-reliance or dependency at community levels. Ethnic and religious composition may influence social communication and political power in situations in which two or more groups are vying for control or self-determination. This is the situation, for example, in Sri Lanka, where service delivery is constrained by a requirement for separate operations for competing ethnic groups.

Some of the clearer examples of the impact of historical factors among the case study countries are related to colonialism. In Zimbabwe, prior to independence, the white population had historically farmed land where rainfall was good and intensive agriculture was possible. The black communal lands, on the other hand, were in areas where droughts were frequent and infrastructure development ignored. Since independence, the technical and organizational response of the rural water and sanitation subsector has been influenced by the need to serve the historically neglected areas. A similar example comes from Bolivia, where the indigenous population is dispersed throughout the mountainous areas and has access, largely, to water from high mountain streams, which may have to be piped for long distances. The European population lives in urbanized clusters at lower elevations. The level of service provided varies greatly between the two populations.

If a development planner is to understand why a particular organizational model was chosen, knowledge of such historical factors may explain situations that might otherwise be counterintuitive. As well, an apparently logical intervention may not be worth the effort if major social and political issues present insurmountable obstacles. An example might be that the political division of territory along ethnic lines has determined that one group must live in one area and another elsewhere. Creating a unified service agency that crosses the boundary might bring with it a great many staff and jurisdictional problems.

2.1.2 Water Availability and Topography

The relative scarcity or availability of water has an obvious influence on resource management. If a given country is an island, with one major source of water, the sector may compensate for this constraint by developing a way to limit access to the water supply. Such a situation calls for control and centralization. If a country is largely desert and has scarce water resources, water can become a commodity as precious as electricity. This may also influence the sectoral organization toward tight resource control, and it frequently results in a commercial orientation, often from a centralized perspective. This is the case in Tunisia.

In a country or region with abundant water resources and easy access to water supply, the pressures to organize the sector tightly and control water resources would not be as great. This also decreases the need for resource planning and measures to economize. A country with abundant water resources, however, may have a strong need for wastewater management. For example, in the delta area in Egypt, where Nile River water is relatively abundant and the water table is close to the surface, engineers have been looking for ways to dispose of wastewater and avoid groundwater contamination.

2.1.3 Demography and Land Area

It is also important to consider the pattern of settlement within a country—the extent to which the population is in villages, dispersed, in urban or peri-urban areas, migrating from rural to urban areas, and so on. The nature of the need to be met is directly related to a country's demography and land area. What will it take to serve the number of people in the area under governmental control? If a country has a relatively small population or can be broken down into relatively autonomous state units, it has the option of organizing a structural response to the people's need for water and sanitation through one, centralized agency, such as an urban agency that extends services into rural areas. Examples of this exist in Sri Lanka, at the state level in Brazil and Malaysia, and in city-states such as Singapore and Hong Kong.

Many countries do not have enough appropriate land for population settlement, growing food, and animal and resource use in the same areas. Some countries have dealt with such resource constraints by clustering rural populations in villages. Rural China is a good example of this. Villages often become increasingly urbanized over time. Concentrated populations permit sectoral organization so as to channel resources and realize economies of scale.

Other countries have enough land to sustain rural populations in scattered settlements and to have families living on individual land plots (such as in Chile, Brazil, and northern Paraguay). These land-use patterns create problems of coverage, however, because it is so expensive for the state to supply water. Many families thus resort to hand-dug wells, which may be contaminated. Dispersed populations often mean a higher cost per user for the infrastructure, and often O&M costs are also higher. These factors may affect the choice of system design, level of service provided, and the amount of cost recovery that can be required of the community. If the sources of water are dispersed and the population is settled over a wide area, successful responses may require a more decentralized and regionalized management mechanism. This is the case in Chile and Tunisia.

In countries that have a large population, are less developed economically, and have limited piped water or services, the government may have to concentrate skills and services in one or two specialized agencies. In some countries, there may be one agency for urban supply and one for rural; in other countries, specialized ministries, such as health and public works, may work together, particularly for rural water supply. However, when responsibilities are divided into manageable units and located in a number of specialized agencies, such as construction

(public works ministry), health (the ministry of health), and planning (central planning office), a great deal of coordination is required. (This topic is discussed in Chapter 4, "Lessons Learned.") Sometimes, central governmental units have parallel regional governmental units with varying degrees of responsibility. Most of sub-Saharan Africa, for example, divides responsibility for rural water supply among two or more agencies. In the Philippines and Egypt, implementation is managed regionally, but control is exercised centrally. The point is that large countries with dispersed populations may require a regionalized sectoral arrangement, whereas small, unified countries may have only one agency managing the entire sector.

2.1.4 Level of Economic Development

The level of economic development, another critical factor in sectoral organization, is often reflected in the strength of the private sector, although there are exceptions to this in single-resource, affluent countries, such as oil-rich kingdoms. The availability of private sector resources for the provision of water and sanitation and the availability of financial resources in general are important to sectoral organization. In developing countries that are more economically viable and led by the private sector, the pattern is to decentralize and delegate water supply and sanitation increasingly to private interests. In Malaysia, for example, the availability of funding permits experimentation in seeking alternative and less expensive technological solutions. Chile has recently been developing an increasingly decentralized, private sector response. Both Malaysia and Chile are considered advanced developing countries with fairly strong economies.

In countries in which economic strength is coupled with political freedom and democracy, sectoral organization may reflect a great deal of variety and less coherence. In the United States, the sector is generally organized by city and county, but it may be owned by community groups, private companies, cities, or the federal government. State regulations are not uniform and there is little sectorwide coherence nationally, but water quality and environmental standards are set at the central level. A similar situation exists with the quasi-federal system of Malaysia. On the other hand, strong economies that are centralized and nondemocratic (for example, oil-rich kingdoms) often provide service through a centralized, unitary, and often fully subsidized mechanism.

2.1.5 Political System

The political system often determines the degree of control exercised over services. This, in turn, may influence the degree of citizen participation, the strength of local government, the social policy behind the government's provision of services, the degree of centralization, and the effectiveness of performance. All of these political factors may affect the way a government organizes the water and sanitation sector and the type of sectoral reform required. The use of water-providing agencies as instruments of political patronage may be a major obstacle to sectoral reform, however.

Governments have the ability to constrain, through law, what it is possible to do economically and organizationally. Governments regulate ownership, land tenure, tariffs, taxation, delegation of powers, centralization versus decentralization, and so on. For example, during the years in Chile when rural water supply organizations were being organized, the national law did not permit local towns or villages to create an incorporated entity and manage it as a business. Only the central government had that right. The national cooperative law did, however, allow a private entity to form a cooperative business. Thus, all local water user associations were required to be either a cooperative or under the legal protection of the state or parent ministry that organized them (the Ministry of Public Works). They were never legally owned by local communities.

The relative success of the political system and its strength, combined with economic, demographic, and topographical constraints, may indicate the degree to which a country has the resources to respond to sectoral needs. Some governments with severe resource constraints and little sectoral organization have in large measure relinquished responsibility for meeting sectoral needs to external support agencies or private voluntary organizations (PVOs). This is true of such countries as Haiti, Bolivia, and Zaire.

2.2 Division of Roles and Responsibilities

One of the characteristics of a well-functioning sector is that roles and responsibilities are divided and defined in a way that ensures the sector will operate in the most efficient and effective manner, given available resources and other constraints. This implies a certain amount of explicit decision making around what should be the appropriate roles and responsibilities of the government (at the national, regional, and local levels), external support agencies, the private sector, and local communities. The task of the sector is to ensure that whatever setup is organized, roles and responsibilities are defined in such a way that they can be clearly understood and acted on. A preliminary examination of basic sectoral organization will reveal whether this is the case.

The water and sanitation sector normally must account for a range of responsibilities and functions regardless of policies. These activities include the following:

- Planning, budgeting, funding, and allocating resources
- Developing policy and enforcing policies and standards
- Assigning institutional roles, staffing, sectoral maintenance, and providing for staff development and training
- Financing and cost recovery

- Designing and constructing systems
- Providing for operations and maintenance
- Promoting community involvement
- Providing health and hygiene education

These functions must be accounted for in rural and urban areas and for water supply and sanitation.

Because of the range of cultural, historical, political, and economic variables that affect the sector, it may be unclear who is, or should be, responsible for carrying out the various functions. Choices can be made that tend to reduce the sector's efficiency and effectiveness. For example, when authority is overly centralized in a single ministry, it might be more effective to decentralize activities that relate to the provision of services to consumers. In some countries, however, responsibilities are shared by many levels of a ministry (or ministries) or other agencies. This may require more coordination than is either possible or cost effective. This was the case in Zimbabwe and is also the case in many other sub-Saharan African countries. For a fuller discussion of this issue, refer to Chapter 4, "Lessons Learned."

The functions of the sector do not have to be carried out by government. Increasingly, the sector is turning to NGOs and private sector organizations for many of these functions. Private sector groups are involved in providing operations and maintenance services as well as in designing and constructing systems. NGOs often have full responsibility for project implementation.

Unclear definition of sectoral roles and responsibilities can result in serious damage to the achievement of sectoral objectives, including wastage of funds, constructed systems not being maintained, rural systems being constructed with little impact on health, and in the long run, a lack of support for the sector by internal constituencies, external support agencies, and other investors.

The development planner should first determine what agencies are responsible for each of the above-outlined areas of responsibility and where gaps and overlaps occur. Within each of the broad categories of inquiry, it is then possible to consider more specific performance issues. The major sectoral tasks are more fully defined in the next section. Appendix B contains a list of questions to determine the division of roles and responsibilities within the sector.

2.3 Major Sectoral Tasks

As in any other sector, the water and sanitation sector must provide for the accomplishment of four major sectoral tasks:

- Setting policies and standards
- Planning
- Financing
- Implementing programs

In considering the need for sectoral reform in a given country, the development planner should investigate the extent to which these tasks are being successfully performed within the sector. Specific research questions relating to each task area are listed in Appendix C.

2.3.1 Setting Policies and Standards

A mechanism must be in place for considering the sector as a whole and defining what is in the common interest and what is not. In the water and sanitation sector, these interests comprise such things as design criteria, construction standards, water quality, cost recovery, and health and its linkage to the provision of water. The public safety must also be protected, which requires that engineering standards be set and enforced.

2.3.2 Planning

Planning in the sector should determine how the big picture is defined, as well as the incremental program to achieve sectoral development. Master plan development, as well as shorter range planning, financial planning, cost and annual operational planning, sets sectoral priorities and guides the allocation of resources. The planning process will determine who gets what and under what circumstances. Effective planning interacts with the recipients and implementers in a way that considers implementation feasibility and appropriate costs. Macro-level planning also sets the agenda for funding requests to external support agencies or the national treasury.

2.3.3 Financing

A major sectoral task is to secure sources of financing and to ensure that the cost of capital investment is repaid. Financing through external support agencies and lenders often brings with it requirements for particular policies or programs. The financing task also entails decisions about how much to finance. That decision alone requires consideration of coverage, levels of service required or desired, and fiscal policy relating to cost recovery. (Cost recovery is

sufficiently particular to the water and sanitation sector that it is considered separately; see Section 2.4.3.)

2.3.4 Implementing Programs

Any sectoral or institutional arrangement must account for program implementation. In the water and sanitation sector, implementation programs frequently include system promotion, design, and construction. They may also include community hygiene education, institutional improvement, and related projects. The primary question to consider is how does the sectoral organization provide for program implementation and how effective are the implementation arrangements at meeting stated goals.

Successful program implementation requires structural arrangements that address the full range of implementation required and manage all program steps. If the program includes subprojects for rural water supply, for example, that will require promotion of community involvement in design, construction, health education, and maintenance. Sectoral arrangements often designate one agency, such as a public works ministry, or create a special agency to deal with projects. The objective of implementation is to complete the project cycle so that water is provided in sufficient quality and quantity, at a cost-effective price, and with provision for sustainability of the operation.

Program implementation can be arranged in many ways. It can be centralized, regionalized, or decentralized. It can be conducted by public or private agencies. And it can be carried out by one or several agencies.

The way the sector arranges for program implementation (centralized, decentralized, PVO, private lending agency, public agency) may have consequences for sustainability, acceptance, and use, in addition to the quality of promotion and construction. Different development philosophies or political systems will lead to different treatment of such questions as community dependence, community empowerment and responsibility, degree of subsidization, and tariff structure. These issues are also often approached differently by implementing agencies. Purely engineering-oriented agencies, such as a public works construction agency, may consider the goal to be to construct systems as quickly as possible. A social and community organization agency that is integrated with a construction capability may decide that the task is to use water as a means to create community organizations and provide community education.

2.4 Issues Specific to the Water and Sanitation Sector

The task areas discussed above, as noted, apply to any sector. The issues discussed in this section are particularly important to the water and sanitation sector (both rural and urban subsectors) and exist as special issues due to the nature of the good and to current trends and

pressures acting on the sector. These items are no less important than the issues in Section 2.3. Four issues are considered:

- Health and hygiene education
- Community involvement
- Cost recovery
- Operations and maintenance

Specific questions relating to these issues are provided in Appendix D.

2.4.1 Health and Hygiene Education

The essential issue for sectoral consideration is whether health and hygiene education should be an integral part of rural water supply programming and sectoral organization. A great many studies have been conducted to identify the health benefits of water supply and sanitation. Many have indicated that the existence of water in sufficient quantity and quality is a necessary precondition for improved health, but that water alone will not improve health in the absence of other factors (e.g., good nutrition, improved hygienic practice, and health education).¹

The issue is important for several reasons. One is that external support agencies (such as A.I.D.) may be willing to finance rural water supply and sanitation only if it is part of an overall strategy to improve basic health and child survival in a country. If rural water and sanitation systems alone are not sufficient to improve health and child survival, then providing them would be for convenience and overall quality of life rather than basic human need.

When health is not considered an issue, it is sometimes argued that rural people should pay for the full cost of water systems or come under the same general policy as urban dwellers. This may have implications for program structure or service delivery programming. When health is at issue, a certain degree of subsidization is frequently built into the program structure, usually by providing for payment of the cost of capital works construction and, sometimes, a portion of the operational costs.

The assumption is often made by development planners that all rural people have access to water (of some sort) for basic survival. They may not, however, have water in sufficient quantity for bathing, washing clothes, and maintaining a hygienic environment. Moreover, the quality of the water may be such that, unless treated in some way, it is one factor (among

¹ Steven Esrey, et al. 1990. *Health Benefits from Improvements in Water Supply and Sanitation: Survey and Analysis of the Literature on Selected Diseases*. Technical Report No. 66. Arlington, Va.: WASH Project.

many others) in causing diarrheal and other diseases. But should they have piped water? The crux of the issue is whether the entire cost and associated difficulty of providing rural water should be undertaken by external support agencies/lenders if health and hygiene education and promotion are not included in the program.

From the perspective of sectoral organization, the issue is particularly important because if health and hygiene education is integrated into rural water supply programs, coordination among several agencies may become necessary, or some other arrangement may have to be made to ensure the integration of the two programs.

From the community involvement and consumer point of view, the issue is important because there is some evidence that the community will not necessarily recognize the health benefits of an improved water supply. Communities are often more interested in convenience and are less willing to pay recurrent costs or for a level of service that will provide sufficient quality and quantity to meet the basic health precondition. Additionally, the community must be willing to participate in education programs on the proper use of water to ensure health benefits.

In the poorest countries, the approach has been to link health and hygiene education activities in the sector directly to provision of rural water and sanitation services. If the good is defined as a basic need, it must be provided if possible. This has been one of the major reasons for heavy governmental subsidization of construction and sometimes operating costs as well. In the richer countries, this has not been the case. Water is defined as a convenience and a factor in the social standing of a community in those countries: the community normally pays the full cost of system construction and operation.

2.4.2 Community Management

Community management refers to the capability of a community to control, or at least strongly influence, the major aspects of its water and sanitation system, including project development and system O&M.

Community management is seen as a critical means of achieving a series of objectives. For example, some studies have shown that at any one time up to 70 percent of pumped systems installed without community participation were not functioning, were not being used, or were being misused.² Lack of community participation and management is often pointed to as a major cause of such problems. Others note that the cost of providing services is increasing, and they see community management and greater community contribution as the way to address such factors as failure and abandonment of new systems, low level of capital-cost recovery, and insufficient support for ongoing O&M

²Ole Therkildsen. 1988. *Watering White Elephants?* Uppsala: Scandinavian Institute of African Studies.

Experience is beginning to demonstrate that the provision of rural water and sanitation services by agencies external to the recipient communities without concern for the issue of community management is ineffective and results in systems that cannot be maintained by either the external authorities or the community. One of the characteristics of a well-functioning sector is that it recognizes the value of community management and that it utilizes proven principles of community management to enhance sustainability, expand coverage, broaden and make more equitable the distribution of benefits, improve community problem-solving capabilities, and leverage resources.

2.4.3 Cost Recovery

One of the primary issues that the water and sanitation sector must face is how to set up a system such that as many of the recurrent costs as possible can be met by the users. In addition, recovery of some of the capital costs for loan repayment, especially in urban areas, is at issue. By and large, governments cannot afford to give water systems to communities. There are significant differences between financing and cost recovery in rural and urban systems, however. Rural systems are usually highly subsidized (for capital costs), but urban systems attempt to achieve full cost recovery over time.

In many countries, such as in sub-Saharan Africa, where the need for rural water supply is far greater than can be met by government resources, lending and external support agencies have often provided all of the capital financing. But due to inherent limitations of affordability, only a small portion of the sector receives coverage. Those areas with the greatest need often pay the most for water.

Part of the cost-recovery equation is to determine how much to spend in the first instance. What level of service should be attempted (i.e., what type of water supply system and what degree of convenience to the consumer)? For example, in a rural area a simple, low-cost system might provide untreated water that is lifted by a hand pump or fed by gravity flow from a mountain spring to public standposts lower in the distribution network. A diesel- or electric-pump system with filtration and individual household connections would represent a high level of service choice. There are many intermediate levels of service and design choice between these two examples. These factors and many more will determine the cost of the system.

Once a system is selected and financing of capital investment costs is arranged, the recurrent costs of operating and maintaining the system must be provided. These costs are directly related to design and level-of-service choices. They include such things as energy (for pumping), chemicals (for treating), labor (for system O&M), parts for system upkeep and repair, and replacements for essential equipment. Administrative and technical support (such as operator training, billing and collecting, and specialized repair) must also be provided for.

The choices that are made regarding financing usually follow the principle that communities should have the highest level of water and sanitation that they want, can pay for, and have

the institutional capacity to sustain. The record indicates that when a community has all the information necessary, can choose what it wants, and has a vested interest in system ownership, the chances are much greater that it will pay for the level of service it chooses. Cost recovery is also a critical issue in urban areas because of the substantial capital investment required. Cost recovery is especially difficult for sanitation since people are traditionally less willing to pay for this public service.

Success in dealing with cost recovery requires the coordinated efforts of a range of institutions. Service delivery institutions need to base their planning on the demand of users rather than the supply of water available. They must make technology choices which reflect willingness and ability to pay. They must also provide a reliable, quality product. In addition, sector lending institutions need to charge interest rates which are consistent with the market. Policymaking institutions need to have the necessary political support to recover costs and not continue to subsidize the sector. The close cooperation of all these institutions is necessary to achieve cost recovery.

2.4.4 Operations and Maintenance

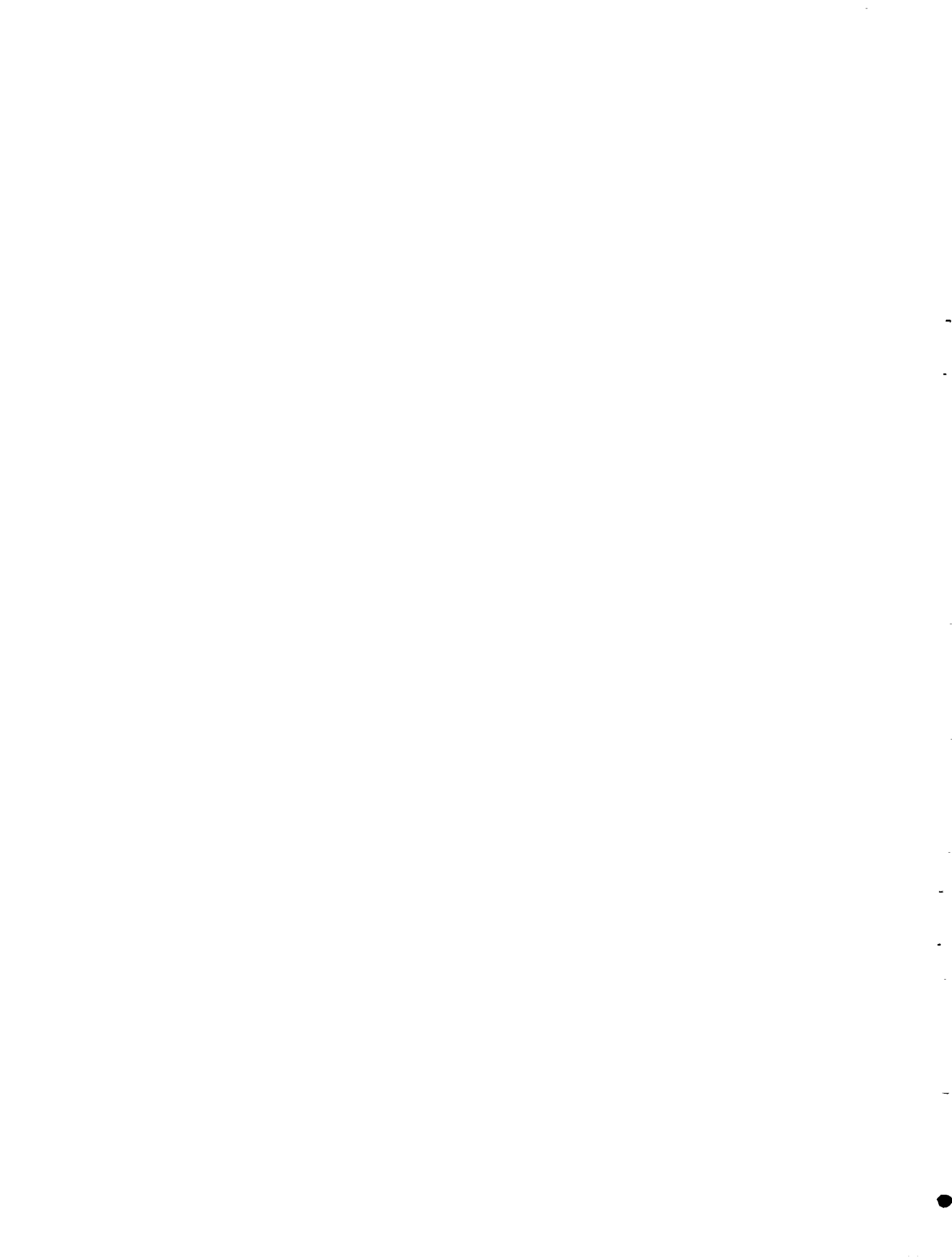
One of the more difficult issues to resolve in the water and sanitation sector has been how to ensure that constructed systems are operated and maintained to ensure safe water and that the equipment and infrastructure will be useful over the full period of time for which they were designed. Consideration must also be given to the timely replacement of broken or worn parts.

Most studies of rural water supply indicate that O&M is closely linked to the degree and quality of community participation. If properly involved, community members will feel a certain degree of pride and ownership in "their" community water supply and system. This increases the chances that they will care for the system, replace broken parts, and either carry out routine, preventive, and emergency maintenance or make sure that the employees of the community water board do so.

As a rural subsectoral organizational issue, O&M requires that structures be set up within implementing agencies or within community development agencies so that O&M systems and training are incorporated into projects. As well, agencies often build in a continuous O&M program so that government-sponsored programs have staff who visit and provide outreach to rural communities to train community water boards and their employees and provide community education in O&M, including business aspects and the physical system. Very complete programs were in evidence in the case study countries of Chile, Paraguay, and Zimbabwe. Similar programs are being attempted in Ecuador, Sri Lanka, Tunisia, and elsewhere.

In the urban subsector, O&M is also an important requirement and is a very large area of investment for external support agencies and lenders where poor O&M has necessitated the replacement of expensive pumping equipment and water treatment systems. The replacement

of infrastructure and pipe is always a continuous process in large urban systems, which require more sophisticated technologies. Complete O&M systems are integral to all urban systems. In peri-urban areas, O&M may also involve community participation.



3

CASE STUDIES IN SECTORAL ORGANIZATION

This chapter presents case studies of sectoral organization in five countries in which field work was conducted. Each case study is presented, generally, within the framework of investigation discussed in Chapter 2. The case studies are not designed to be complete sectoral reviews and, thus, do not provide all of the information sought by the questions posed in Appendixes A through D. To do so would probably require a complete sectoral review in each country, which was not possible within the limitations of this analysis. However, sufficient information is presented to frame the issues and lessons learned (discussed in Chapter 4) and to provide examples of different types of sectoral organization. The case studies also provide examples of the type of analysis that is possible using the framework discussed in Chapter 2.

As discussed in Chapter 1, the water and sanitation sector in countries throughout the world is confronting demands to extend coverage, improve efficiency, use the private sector, ensure sustainability, recover costs, and consider the environmental impact of the ways in which service is provided. Most of the case study countries are attempting to respond to these same demands, and the way in which they respond has direct implications for sectoral organization. In the case of Chile, cost-recovery, private sector, and efficiency pressures have led to the creation of a semiprivate, decentralized structure, according to interviews conducted there. Cost-recovery pressures have pushed most case study countries to scrutinize and, in some cases, revise tariff structures. This is true of Paraguay. Indeed, studies and proposals to revise tariffs are currently being pursued throughout the developing world. Few countries are dealing well with environmental impact issues, but lending institutions are increasingly demanding that environmental safeguards be incorporated into programs. This is the case in Paraguay, where the first environmental coordinating group is being set up with assistance from PAHO. It is also the case in Chile, where there is a great deal of concern about the potential impact of mechanized and chemical agricultural practices on water sources.

In the case study for each country, specific issues are identified that are related to sectoral pressures and the conditions that exist within the historical and physical context of each country. In Chapter 4, specific lessons that derive from the case studies (and other sectoral examples) are discussed.

The five case studies are of the water and sanitation sector in Paraguay, Chile, Tunisia, Malaysia, and Zimbabwe. Each country reflects a different sectoral organization and different historical and geographic constraints. The countries span a range from low to high economic strength; from centralized to newly decentralized; from low to high community involvement; and from politically controlled to very democratic. No one case purports to represent the ideal

sectoral organization; rather each case is illustrative of situations from which one may extract lessons learned.

3.1 Paraguay

3.1.1 Sectoral Analysis

Sectoral Context

Most of Paraguay's relatively small population (approximately 4 million people) is concentrated in the industrialized and urbanized south—a small portion of the overall land area. A great deal of the southern region is semi-urban or peri-urban. The northern part of the country has vast expanses of unpopulated land and a farm-dwelling or village-dwelling population. Until very recently, Paraguay's government maintained a tightly controlled central government.

Roles and Responsibilities

In Paraguay, the roles and responsibilities of the water and sanitation sector are divided as follows:

- Paraguay has two centralized government agencies in the sector; one for rural (up to 4,000 inhabitants) water and urban and rural environmental health (*Service National de Sanlamiento Ambiental*, or SENASA) and one for commercialized urban water supply (*Corporación de Obras Sanitarias*, or CORPOSANA) with no health mandate or programs.
- Both agencies have centralized responsibility for planning, design, and implementation (all construction is conducted through government contracts). Each agency conducts its own programs, without interagency collaboration, and each vies for its own resources and programs. There is little compatibility of standards between rural and urban service (e.g., service levels, metering, pipe size, hours of service, tariff).
- The urban program has one agency, based in the capital (Asunción), that operates all urban systems. Administratively, CORPOSANA has district supervisors for O&M management (one district supervisor may have oversight for two or three municipalities). A centralized billing and collection mechanism, which is semiautomated, is used for all municipal systems.

- The rural program has one agency based in Asunción. SENASA is dependent on the Ministry of Health and has no administrative autonomy. SENASA is responsible for all aspects of rural water supply.

Policies and Standards

- The rural and urban subsectors set policies and standards separately. The rural agency defines water as a health issue or good. Its standards are designed to provide water to the rural population that is safe to drink and that can be used for hygienic purposes.
- The urban agency defines water as a product or economic good that is controlled and provided for consumer convenience. Standards are set for 24-hour service and as much water as the consumer wants to pay for or use. The standards reflect community practices.
- There is no unified standard-setting body in the sector.

Planning

- There is no overarching sectoral coordination or planning mechanism, although the national planning office in the president's secretariat has nominal responsibility for long-range planning and is now undertaking the first sectoral study.
- Each agency conducts its own planning, which has been "project driven" by international lenders and external support agencies. In 1990, SENASA conducted an internal exercise, with the help of PAHO, to develop its first budget based on work plans. Prior to this, the budget was simply determined by the president's office.

Financing

- In general, the sector is underfunded and, for years, has suffered from lack of central-government priority attention, lack of planning and vision, and political manipulation. Many of the attempts by external support agencies to strengthen the sector have been subverted by poor fiscal policy and lack of managerial control over funds. For example, the loan repayment that rural communities have made to SENASA for

capital investment³ has reverted to the national treasury instead of becoming a revolving fund. That capital is no longer available to SENASA, and the agency has no funds for the construction of systems or for travel by field staff.

- Notwithstanding a series of World Bank and Inter-American Development Bank loans, rural coverage remains at around 8 percent, with rural defined as communities with a population under 4,000.
- The tariff for water is supposed to cover wastewater, too. But CORPOSANA administrators indicate that the tariff is too low to support this activity. CORPOSANA carries a large debt burden to repay loans from the French government for wastewater and drainage infrastructure, and it has insufficient income to even service the debt.

Program Implementation

- The facilities in most cities have been constructed through international turnkey contracts and have modern equipment (at least at the time of construction the equipment was considered state-of-the-art). The facilities have been financed by international loans, for the most part. Water quality in Asunción is considered good, and monitoring is conducted citywide.
- Rural construction has been carried out totally through private contracting mechanisms and includes a certain amount of contributed community labor. The quality of construction is variable and contract management has been a problem. Communities often have no recourse when they wish to require correction of construction faults that develop due to low-quality work, such as tanks cracking or pipe not being laid deeply enough to avoid exposure and breakage after rainstorms.

Health and Hygiene Education

- Responsibility for environmental health rests with SENASA (in both urban and rural areas). The health inspector's role is multivalent. He

³ Communities pay about 30 percent of the total capital investment cost; 12 percent is paid before the system is turned over. The remaining 18 percent is paid over 20 years at 0.083 monthly interest on the balance of the loan. Communities must include a portion of their monthly income from tariffs for loan repayment. This averages to about 8 percent of total income per month.

acts as a community promoter for new systems and also maintains a continuing relationship with the community for purposes of health education, support of school health programs, inspection and education on food handling in public restaurants, and cleanup of community solid waste. He is also the key supervisor of community water boards and O&M support.

- There is a ratio of one district (usually only one community system and nearby areas) for one health inspector. This ratio may not be viable, however, as SENASA increases coverage beyond 8 percent of the rural population.
- Wastewater in urban areas is the responsibility of CORPOSANA. A division within the agency manages sewerage and wastewater treatment, along with surface drainage.

Community Management

- The rural program has used community involvement extensively and has developed community mechanisms, called community health committees, for organizing contributions of labor for construction and for collecting O&M fees.

Community water boards have employees to keep books, collect fees, and operate pumps and distribution networks. However, the government supervises them, as noted, through the use of a health inspector. The government must approve all tariffs and can intercede in a water board's activities and take it over if it does not operate properly.

- In general, most of the principles of community participation and integration of health education and water supply are followed in the rural program.

3.1.2 Issues Related to Sectoral Organization

Planning and Coordination

Sectoral planning has, by and large, not taken place. A decade plan, developed in 1980 using resources provided by PAHO, was never integrated into the national policy and planning framework and was never given counterpart funding. That has made financing and obtaining loans from multinational sources very difficult. The situation is now changing with the current

government, and a sectoral study, with oversight by the Office of the President's Planning Council, is in progress.

Definition of sectoral goals is a planning issue. There is an apparent lack of compatibility between urban and rural systems. In countries where there is a clear division between urban and rural areas, this presents less of a problem, but in Paraguay most of the southern part of the country consists of the capital city and a few medium-sized cities, connected by peri-urban communities that are quickly becoming integrated. The northern and central parts of the country are very rural and have dispersed farm-dwelling populations. Most of the construction thus far of "rural" systems has been in areas that will become urban-like in the next 10 to 15 years. Because of a lack of compatibility, it will be difficult to integrate these systems.

The lack of sectoral coordination and planning is beginning to create a situation that will be very problematic in a short time. An earlier review conducted by PAHO, in conjunction with the International Drinking Water Supply and Sanitation Decade, also found very little coordination between the rural and urban subsectors.⁴ A formal coordination committee was recently set up by PAHO to address issues of environmental impact. This may serve as a beginning mechanism for wider sectoral coordination.

Coverage

Due to population distribution and political priorities for attention to the more populous southern area of Paraguay, there has been a heavy concentration on providing coverage on the urban periphery and lack of attention to the more isolated and needy areas. The primary sectoral problem on the horizon is the need to deal with the transition of rural systems to peri-urban status while extending coverage to less easily developed rural areas.

In the heavily populated south of the country, the area surrounding Asunción has systems that were constructed over 10 years ago for villages of 2,000. Many of the villages have now grown to more than 4,000 inhabitants. The proliferation of small wells and distribution tanks may not be the most efficient or cost-effective solution for system expansion. Yet, no mechanisms exist for regional master planning in the rural and urban agencies.

Tariffs and Financing

Representatives of the rural and urban agencies have said in interviews that tariffs are far below current operating costs in most systems. Neither agency has the authority or autonomy to change the tariff without presidential approval. Because the tariff is controlled politically, the agencies have no recourse but to ask for subsidies or curtail services. In interviews conducted

⁴ Pan American Health Organization, *International Drinking Water Supply and Sanitation Decade: A Regional Progress Report*. Washington, D.C., 1987.

during the field visit, particularly in the urban subsector, the tariff issue was raised as the single most important reform needed.

Currently, neither the urban nor rural subsector has even a start on the financing needed to expand services. Multilateral lenders currently have no plans for investment loans. It is possible that without tariff reform or other measures, the sector may begin to deteriorate.

3.2 Chile

3.2.1 Sectoral Analysis

Sectoral Context

Chile's water and sanitation sector was in the process of a major decentralization and cost-delegation effort at the time of the field visit in October 1990. From 1975 to 1988, the sector was organized under a single agency for rural and urban water supply within the Ministry of Public Works (*Servicio Nacional de Obras Sanitarias*, or SENDOS). SENDOS managed urban and rural water with separate programs using a regionalized office structure. The regional offices corresponded to 12 geographic regions and 2 major urban areas. The total population of Chile is approximately 13 million.

Rural water was the direct responsibility of the SENDOS rural directorate; active programs were sponsored by the IDB. The rural program of the 1980s was considered a model program in terms of coverage. The cost of rural investment and all technical assistance were subsidized by the central government through SENDOS. Each community, organized into a nonincorporated water board or incorporated community cooperative, paid a small portion of the capital investment and all O&M costs, but in most instances, not the amortization for equipment replacement or emergency maintenance.

Urban water was managed by SENDOS through an urban directorate, which managed water companies in urban areas. Each urban water company was organized under a relatively self-sustaining tariff structure for O&M; overall debt servicing for investments was absorbed within SENDOS and the Ministry of Public Works. Large water companies in the two primary urban centers (Santiago and Valparaiso) operated with some degree of autonomy and reported to the central SENDOS office (although tariff collections were forwarded to the central treasury). In Santiago, two private water companies also developed to serve the newer and affluent suburban areas of the city.

The central office of SENDOS was responsible for overall program and sectoral planning, project development, technical standards, and monitoring. All the costs for ministry overhead were not directly supported from tariffs, but were a part of the central governmental subsidy.

The primary investment thrust in the 1980s was to provide treated water to as many people as possible. As a result, coverage is very high in urban areas and in rural areas in which the population is clustered. The urban subsector provides treated water to about 98 percent of its population. The rural subsector has a coverage rate of 79 percent for people living in dense rural population clusters (150 to 3,000 inhabitants). Those who live in population clusters represent approximately 30 percent of all rural dwellers; the 70 percent of the rural population outside of population clusters live in individual farmhouses and dispersed rural areas. Many of these people are served by individual wells.

Emphasis in urban areas has also been placed on providing wastewater hookups and sewerage infrastructure; coverage is 89 percent. However, almost no priority has been given to dealing with wastewater treatment. Only two small treatment plants are in operation in Chile, and the country is facing serious environmental and related contamination problems as a result of the policies and priorities of the 1980s.

It was the policy of the former government during its final years to move all governmental programs as much as possible toward increasingly decentralized and economically self-sustaining, capitalistic, and/or semiprivatized operations. Cost-recovery pressures and the need to decentralize most governmental services drove the policy of the government. Within this overall policy framework, a major sectoral reorganization effort was designed and pushed through during the last days of the former government.

The transition began with the drafting of new laws designed to remake all water and sanitation operations into state/private corporations, transfer assets for urban and rural operations to regional water companies, and substantially eliminate the role of the Ministry of Public Works, except for a minimally staffed technical and normative oversight role.

Implementation of the newly designed governmental system began in January 1990, but most of the new structure was not operational until April 1990. The sectoral description provided below identifies the newly formed sectoral organization and the issues that remain, or are emerging, under this particular form of organization.

Roles and Responsibilities

Roles and responsibilities within the sector are divided as follows:

- Regional and metropolitan water companies are responsible for all urban and rural water supply and sanitation. The system is an "extended urban" system. The country, as noted, is divided into 12 regions and 2 major metropolitan areas (Santiago and Valparaiso). Each region/metropolitan area has a regional water company, which is responsible for all services within the urban catchment area. Each water company is legally incorporated as a public and private share-

holding company (up to 49 percent of the shares may be privately held under the law). The catchment area includes all nearby rural communities of 150 to 3,000 people that have a population density of 15 houses per kilometer.

All rural communities formerly supported by SENDOS have been passed to the regional company for technical assistance, along with the debt burden of the investment cost. All urban assets and liabilities have been assumed by the regional water company. Most of the regional staff of SENDOS have been absorbed by the regional water companies.

- The Development Corporation of Chile (*Corporacion de Fomento*, or CORFO), an arm of the Ministry of Budget and Interior Affairs, is responsible for national and regional enterprise development, monitoring, and management. CORFO is the sole owner of all of the shares of the incorporated regional water companies until such time as private shares can be sold. The board of directors of each water company is controlled and appointed through CORFO. CORFO has primary oversight of the financial and management decisions of each regional or metropolitan water company. CORFO has historically played a similar role with the electric utilities and other state enterprises in Chile.
- The Sanitary Services Superintendent (*La Superintendencia de Servicios Sanitarios*) is the national standards regulatory body within the Ministry of Public Works; it has been set up to ensure that oversight of the public interest is maintained. The three primary functions of this body are to negotiate and set tariffs, enforce technical standards, and oversee and regulate the granting of business concessions for operating semipublic utilities. The last function includes determining and regulating territorial concessions and physical and geographic boundaries of catchment areas. A temporary duty of the concessionaire function is to ensure the legal transfer of assets from the formerly centralized state operation to a regionalized, "state/private incorporated utility" status.
- The Ministry of Public Works' National Planning Directorate formerly supervised all water and sanitation programs through SENDOS. The residual water and sanitation responsibilities of this ministry are to complete the current loan operations from the IDB (the fourth rural development loan) and, perhaps, negotiate any future rural water supply loans. The ministry maintains a skeleton staff of a few specialists

from SENDOS to assist with this function and to advise on sectoral issues.

Policies and Standards

- All policies and technical standards were developed under the prior system by SENDOS. The enforcement of the technical standards in the area of engineering is now carried out by the Superintendent for Sanitary Services. Water-quality standards are monitored by the Ministry of Health.

Planning

- Each regional utility is responsible for its own operational, technical, and corporate/strategic planning. Interviews and data reviews indicate that considerable, thoughtful planning is taking place in the three utilities visited during this study.

Financing

- Financing of water and sanitation has been decentralized and delegated to each regional water company. Sectoral debt burdens have been shifted from the national government to the regional companies. Each company has the legal structure to enter into financing loans from national or international lending institutions. Currently, the law does not allow semipublic utilities to issue utility or municipal bonds, a potential source of financing with national assets.
- Tariff studies and formulas are currently being developed by the Superintendent for Sanitary Services. The utilities interviewed for this study believe that tariff reform is important for future service and critical for future investment. Many had not begun to consider how tariff reform could or would include costs for wastewater treatment in urban systems.

Program Implementation

- All design and construction have traditionally been carried out under contract. This continues under the decentralized system. Each regional water company provides construction supervision and control. Construction in Chile is technically of high quality. New and rehabilitated urban water treatment plants have modern, high-tech designs and components. Most water sources, except in a few very

large cities, are from deep wells. Hydroelectric power provides a relatively inexpensive source of energy.

Community Management

- Rural systems have been promoted with extensive community involvement, and all of the systems are operated through community water boards. Most regional water companies provide technical assistance visits to rural communities every three months. The technology is relatively simple—deep-well submersible pump, automated pumping system, elevated galvanized steel tank, and plastic (PVC) pipe distribution system.
- Urban systems have minimal community or consumer involvement.

Health and Hygiene Education

- The rural water program has achieved very high coverage in population clusters, and according to those interviewed the areas with piped water have decreasing indicators of morbidity and mortality. The rural program previously included a component on community hygiene and water usage, but it is uncertain whether this program will continue with any force or direction under the new, regionalized structure. The link between the Ministry of Health and Ministry of Public Works was very weak in the past.
- In general, the sector has not sought to include health as an integral part of a “public works” program.

3.2.2 Issues Related to Sectoral Organization

Clarity of Roles

The role of the Office of the Superintendent of Sanitary Services is somewhat in doubt. Although the responsibilities of this body are clearly identified under the law, most interviewed did not believe that sufficient resources existed for the office to provide technical audits or settle disputes. The fact that the office has a staff of approximately 45 persons to cover the entire country and has primarily worked on tariff questions to date led most observers to expect that the office will prove to be inadequate for the task required.

As for the role of CORFO, it was unclear during the study why a state holding company should inherit all the shares of the utilities and, without any known expertise in water and sanitation, provide direct supervision of the water companies. One could argue that if the

intention is to make utilities increasingly private and responsive to cost-effectiveness and community service, why not require private financial and management audits (instead of CORFO audits) and responsiveness to municipal government by letting the local government appoint the board of directors? As one interviewee observed, "The only change I can see is that we exchanged the Ministry of Public Works for CORFO; we don't have any more autonomy and we are certainly not a private utility."

Within the current system, local government has no role in, or control over, the utility that serves it. All master planning for urban development remains the responsibility of the Ministry of Urbanism and Housing. System extension is the purview of the water utility and the ministry; disputes over jurisdiction are handled by the superintendent's office. All tariffs are outside the control or concurrence of local government as well.

Transition to a Decentralized System

At the time of the field visit, regional water companies were unclear about the transfer of assets and responsibilities for rural water systems. Some companies stated that the rural systems really belonged to the communities and their responsibility was only to provide technical and administrative support. Others believed that the property and assets of the rural systems had been transferred to the regional companies. However, none believed that the rural pump operators and local staff were their employees or were eligible for equal pay and benefits. Under the previous government, there was no provision for the formation of incorporated community enterprises. There was provision, however, for community cooperatives. Some community enterprises were formed as cooperatives, and the remainder were considered property of the state.

Health

In both the rural and urban subsectors, health has been a marginal consideration. In the urban areas, water has been defined as an economic and convenience good, not a health good. The Ministry of Health has only been involved as an entity to monitor water quality. The rural program encompassed community education and hygiene, but primarily as a means of organizing the community to pay for water service.

Because there is almost no wastewater treatment in Chile, the rivers and beaches near urban areas are polluted. This affects the shellfish, river fish, and coastal marine life. Seventy percent of the wastewater from the city of Santiago finds its way into irrigation water that is used to produce a great many of the vegetables for urban dwellers. Because of water rights disputes and the economic power of a large number of producers, the solution is politically difficult. Health indicators for typhoid fever, hepatitis, and gastrointestinal infections among the population in urban areas, and for Chile in general, are considered very high for an advanced developing country.

Planning

In the move toward a decentralized structure, all planning was delegated to each regional company. Most planning in the past was managed by SENDOS, and the type of planning that occurred (according to interview data from the planning directorate of the Ministry of Public Works) was project and loan related. No body currently has direct responsibility for coordinated, long-range national planning. The Planning Ministry, a body for coordinating national investment and forecasting economic trends, has indirect responsibility. Yet, a number of critical national sectoral planning issues not addressed in the past remain, and their resolution is far beyond the resources and capability of the regional water companies.

One major planning issue is the virtual absence of wastewater treatment in the country. Some regional and metropolitan companies recognize the need and have projected 10-year investment programs, but the financing and the regional and master plan studies needed are beyond the capability and scope of newly formed regional companies.

Coordination and planning at the national level by external support agencies are also gaps within the current planning structure. Can regional water companies enter into loan negotiations? How will the technical and other sectoral interests be represented to bodies that wish to regulate overall balance of payments and national investment?

Environment

Coordination and oversight for overall protection of watershed and water resources have been omitted as a sectoral task in the decentralized setup. The potential impact of increased agricultural industrialization and the use of chemical fertilizers and pesticides, along with other water resource concerns in major urban areas, are issues that are increasingly emerging on the technical and political fronts.

The Future of Rural Programs

The previously centralized and regional rural and urban programs were developed and maintained with considerable national subsidy. In the rural program, most of the construction and continuous technical assistance were paid for with IDB loans to the central government. Under the decentralized/semiprivatized reorganization, all of this debt, and a great deal of the responsibility for state-provided services, has been transferred to the regional water companies. The prior tariff structure was not designed for this debt burden. Currently, when an urban system provides any technical assistance to a rural system, it is totally subsidized by the urban dwellers.

Financing of rural systems was never designed to cover investment, replacement, or ongoing technical assistance. Cost recovery for these services is highly unlikely in most cases, anyway. This will require that water companies continue the subsidy through cross-subsidization from

the urban systems or raise rural tariffs substantially. Regional water companies, however, do not have the autonomy to raise tariffs to cover costs. It is highly unlikely that regional water companies have the resources to repay the debt burden of the past 10 years for rural water supply.

3.3 Tunisia

3.3.1 Sectoral Analysis

Sectoral Context

Tunisia has a population of approximately 8 million, of which 5 million live in urban areas. The rural population of 3 million includes over 1 million who live in dispersed areas. The country is semiarid; rainfall is higher in the north than in the arid south. Water availability is a major issue in the organization of the sector.

Tunisia is considered to be one of the success stories in the water and sanitation sector among developing countries, particularly in those areas served by the national water and wastewater authorities. The national water supply agency, *Société Nationale des Eaux* (SONEDE), is a highly successful commercial enterprise and is held up as a model by most external support agencies. *Office Nationale de l'Assainissement* (ONAS), the national wastewater authority, although more recently established and not yet as developed as SONEDE, is also considered to be very well run. According to a 1989 study by the National Institute of Statistics, coverage in urban areas was estimated at 88 percent for water supply and over 55 percent for wastewater.

One of the major reasons for the success Tunisia has achieved is the priority given to potable water. The water subsector has traditionally had great political support. This support resulted in the creation of autonomous agencies in SONEDE and ONAS. It also included support for full cost recovery and resulted in standards that offer a high level of service.

Rural water supply has not been nearly as successful as urban water supply. This is due primarily to the need to drill as deep as 600 to 1,000 feet to find adequate quantities of water and to the dispersed nature of the rural population. The result is that it may cost as much as \$200,000 for an installation that may serve only 3,000 inhabitants. Because the capital cost is so high, rural water supply is likely to remain highly subsidized. The Ministry of Agriculture, is attempting to introduce the concept of water user associations all over the country in order to increase the participation and responsibility of local communities in managing their water systems and in meeting a large part of the recurrent costs.

One of the major trends in Tunisia in recent years has been decentralization. SONEDE has completely decentralized its operations to each governorate; the central office is only

responsible for coordinating plans, providing technical advice, arranging for external financing, setting standards, and preparing agencywide budgets for the Ministry of Planning. ONAS is also in the process of decentralizing its operations, and the Ministry of Agriculture has already decentralized through its regional agricultural commissions, which are located in each governorate.

Roles and Responsibilities

In Tunisia, sectoral roles and responsibilities are divided as follows:

- The Ministry of Agriculture has primary responsibility for water resources planning and development. Three major offices grouped under the Secretary of State for Water Resources in the Ministry of Agriculture have responsibility for water. One is the Directorate of Studies and Major Hydraulic Works (*Direction des Etudes and Grands Travaux Hydrauliques*). This office identifies and plans major water resource projects. The second is the Directorate of Major Hydraulic Works (*Direction des Grands Travaux Hydrauliques*), which implements major water resource projects, such as constructing dams and irrigation systems. The third is Rural Engineering (*Gente Rurale*), which is responsible for rural water supply for the dispersed populations throughout the country. The Ministry of Agriculture, as noted, operates through regional agricultural commissions in each governorate.
- SONEDE is the national water company and is responsible for water supply for all cities, towns, and some rural communities. SONEDE is tied administratively to the Ministry of Agriculture, but it has wide-ranging autonomy and financial self-sufficiency. SONEDE serves 75 percent of the population (900,000 connections). It serves all communities that are grouped together, are close to a water main, and are willing to pay. SONEDE plans ultimately to serve about half of the 2.5 million rural dwellers who are currently unserved.
- Wastewater is the responsibility of the Ministry of Equipment and the municipalities. ONAS, as autonomous as SONEDE, is currently tied administratively to the Ministry of Equipment. In the future, ONAS is likely to be tied administratively to the newly created Ministry of Environment and Land Development. ONAS is responsible for wastewater and storm drainage in urban areas. The Directorate of Urban Hydraulics in the Ministry of Equipment is also responsible for storm drainage in urban areas, as well as in rural areas and areas outside the cities. The municipalities are responsible for wastewater

wherever ONAS is not. In practice, however, the municipalities do not have the capability to provide wastewater services.

- The Ministry of Health is responsible for monitoring bacteriological contamination and overall water quality.
- The National Agency for Environmental Protection is a new agency and is dependent on the Office of the Prime Minister. It is responsible for conceiving new environmental projects and monitoring overall environmental issues.

Policies and Standards

- The National Water Committee, an interministerial body, was established in 1978 to deal with interagency issues in the sector. In effect, this body does not function well as a policymaking body, in part because there is no permanent secretariat responsible for doing the staff work for the committee. In the absence of an effective policymaking body, policy matters are initiated by the operating agencies, which raise issues they believe are critical. If it is considered important, the issue is raised by an operating agency to the ministerial level, then to the Council of Ministers, and eventually, to the National Assembly for legislation.
- The three implementing agencies (SONEDE, ONAS, and Genie Rurale) like this ad hoc policymaking process because they believe it gives them considerable flexibility. The coordinating agencies, on the other hand, all believe the country could use a coordinating body. This is understandable in that the operating agencies have wider ranging authority if there is no overarching mechanism monitoring their actions.
- Some external support agencies believe that the sector's technical standards are too high. Engineers believe they will be held responsible for using lower cost technologies if they do not work. Yet, they realize that the facilities are often too expensive. Design offices can request a change in standards for a given project, but they generally do not, in part because of the sector's reliance on foreign firms, which use European standards, to design complex projects.

Planning

- Planning, like policymaking, is a bottom-up process. Tunisia operates on the basis of five-year plans. Each agency in the sector asks its district offices to submit its plan, which it then gathers at headquarters and integrates into an agency plan. The agency plan is then reviewed by the National Committee of Water Resources, which makes sure that water resources planning is well coordinated. This committee is chaired by the secretary of state of the Ministry of Agriculture. The revised plans are then submitted to the Ministry of Planning, the agency responsible for looking at all agency plans and determining the budget for each agency.

Financing

- The central office of each agency in Tunisia is responsible for arranging its own financing, which it must coordinate with the Ministry of Planning, the guarantor of all loans. In practical terms, the agency negotiates a loan with the external support agency, and the Ministry of Planning signs off on it. Also, once an external support agency loans money to a Tunisian agency, say SONEDE, all future loans are considered extensions and do not require the same approval as the first loan. Thus, SONEDE, which has had seven separate loans with the World Bank over the past 15 to 20 years, only dealt extensively with the Ministry of Planning for the first loan.
- SONEDE's tariffs are progressive—customers pay more the more they use. For example, in 1990, the rates were as follows:

under 20 cubic meters	106 millimes ⁵ per cubic meter
20-40 cubic meters	136
40-70 cubic meters	280
70-150 cubic meters	470
over 150 cubic meters	530

Thus, the high users subsidize the low users. This tariff structure also encourages users to conserve water.

- SONEDE has traditionally covered 125 percent of its recurrent costs through user fees; the additional 25 percent goes toward funding capital costs. This exceptionally sound financial position has enabled

⁵ 850 millimes = US \$1.

SONEDE to pay competitive salaries and benefits and attract the best people.

- ONAS covers about 50 percent of its costs by adding a charge onto SONEDE bills. The rest comes from local taxes (25 percent) and state subsidies (about 25 percent). The World Bank is pressuring ONAS to continue to reduce the subsidies it receives.

Program Implementation

- Tunisia uses the classic French method of project implementation, which is basically like the U.S. system—feasibility study, design, and implementation. ONAS and SONEDE implement construction through private contractors selected through competitive bidding. The more complex design work is done through foreign firms. Field engineers supervise construction and ensure compliance with the specifications and overall quality of work. Genie Rurale does its own design work, but it also implements construction through private contractors and monitors the construction and compliance with the design.

Health and Hygiene Education

- The Ministry of Health is responsible for monitoring water quality in urban areas and for health education in rural areas. In reality, minimal health education goes on in rural areas because of the traditional curative orientation of the Ministry of Health and the lack of trained personnel. The structures currently do not exist for the ministry to play much of a role in hygiene education. The current minister realizes that the ministry needs to shift its priorities to such preventive measures as health education and is trying to redirect limited resources to effect this shift.

Community Management

- Tunisia has decided to move toward community management in rural areas. Legislation approved in the National Assembly in 1989 made water user associations legal entities. Genie Rurale is developing a strategy for creating water user associations on a national scale. This strategy will address, among a range of issues, the responsibility of the governorate in providing backup maintenance, support to be provided by the central office of Genie Rurale, the staffing required in each governorate to establish water user associations, the training required

at the community and agency levels, and the most effective way to work with communities to establish the associations.

3.3.2 Issues Related to Sectoral Organization

Sectoral Planning

Because there is no functioning interministerial body responsible for policy, sectoral issues can be overlooked. At present, the operating agencies (SONEDE, ONAS, and Genie Rurale) can raise policy concerns to a national level, but they generally do so only if it is an issue that is important to their programs. Cross-cutting issues, such as the environment and coordinated municipal planning, can easily be overlooked. The operating agencies favor the current system, presumably because it gives them greater flexibility in that there is no overarching mechanism to review their actions. The current system has generally worked because of the limited number of operating agencies in the sector, because each operating agency is national in scope, and because all three agencies work through decentralized structures.

Municipal Planning

The current planning process does not allow for adequate coordination at the municipal level. Each agency does what it believes is necessary, often in response to local political pressure. As an example of the types of problems that can occur, the national housing agency could construct new low-income housing only to learn later that ONAS and SONEDÉ do not plan to provide water and sewer connections for several years to come. This lack of horizontal planning is tied directly to the development of the capability of the municipalities to play an enhanced role in the sector.

Standards

Because of the overall success of the sector in Tunisia, in particular of ONAS and SONEDÉ, the relatively high design standards have not been seriously questioned. Yet, there is a growing realization in Tunisia that the country cannot afford the standards currently being used; as a result of the standards, the sector cannot serve as many people as needed and the cost of water is high relative to income levels. The problem is much more pronounced in regard to wastewater because of the cost of conventional wastewater treatment and the percentage of urban dwellers yet to be served.

Environment

In the past few years, the Tunisian government has become increasingly concerned with the environment. The recent creation of the National Agency for Environmental Protection is evidence of the government's concern. Currently, ONAS has a more operational role, and the

National Agency for Environmental Protection plays an advisory role. Clarification of the roles of both agencies will be an important issue over the next few years.

Rural Water Supply

Tunisia has had remarkable success in expanding municipal water and wastewater services, as much as any country in the developing world, but rural water supply remains a problem. The dispersed nature of the rural population and the high cost of providing water make the delivery of services in rural areas particularly problematic. The creation and high degree of political support for water user associations offer great hope for the operation and maintenance of rural water systems. Because of the high cost of constructing rural systems, however, it is unlikely that the capital costs will ever be recoverable through user fees. If the water user associations are successful, it is possible that a major portion of the recurrent costs will be covered by users and that basic maintenance will be ensured. The success of the rural water supply effort will depend in large measure on the success of the water user associations.

3.4 Malaysia

3.4.1 Sectoral Analysis

Sectoral Context

Malaysia is a moderate-sized country with a population of about 17 million in 1989. Thirty-five percent of the people live in areas defined as urban—towns of 10,000 people or more. It is projected that 50 percent of the population of 21 million in 2000 will live in towns.

Water supply and sanitation has been a national priority. For example, water sector investment under the Fourth Five-Year Plan (1981-85) was 3.5 to 4 percent of overall public development expenditures. Of the total population, 66 percent were served by piped water in 1983, up from 51 percent in 1970. In urban areas, 91 percent of the population receive piped water. In rural areas, the level of coverage varies among the 13 states. A major turnkey project now under way will raise coverage nationwide to 73 percent.

Geography, ethnicity, and industrial activity play an important part in water supply politics, strategy, and technical issues. Peninsular Malaysia (called West Malaysia) is generally better developed, especially the west coast, than East Malaysia (the states of Sabah and Sarawak). Most of the population is Malay, although many are Chinese or Indian. The rural population of West Malaysia is Malay, and for political as well as developmental reasons, there has been a heavy commitment to providing water to rural areas in West Malaysia.

Roles and Responsibilities

Malaysia has a federal government and 13 state governments. The major federal agencies in the sector are the Water Supply Division of the Ministry of Public Works, the Ministry of Health, the Economic Planning Unit in the Office of the Prime Minister, the Ministry of Housing and Local Government, the Department of the Environment, and the Ministry of National and Rural Development. Specific roles and responsibilities at the federal level follow:

- The Ministry of Public Works/Water Supply Division is the most important federal agency in the water sector; it does virtually all complex planning and design work. This division also supervises technically complicated construction, is responsible for coordinating all water supply activities executed through state public works departments and water boards, provides technical advice to the states, and represents the state water supply entities in the national budgetary process. Water is a state matter under the national constitution. By right, a state can develop water resources without federal help. The state applies to the national treasury for funds through the Ministry of Public Works.
- The Ministry of Health, Environmental Health Engineering Unit, has had an active, community-based, self-help program for a number of years. The ministry's community-managed projects have significant federal funding, but they are not revenue producing, and the water is not treated. Providing piped, treated water is the role of the state public works department or other state water agency. A primary responsibility of the Ministry of Health is the national water quality surveillance program.
- The Economic Planning Unit determines overall sector investment as part of its responsibility for development planning. The unit also convenes the Interagency Planning Group to coordinate the development of the five-year plan.
- The Ministry of Housing and Local Government maintains administrative control of local governmental affairs and assists local authorities (municipalities, city and town councils) in preparing and implementing wastewater disposal, drainage, and solid waste systems.
- The Department of the Environment is a new actor in the water and sanitation sector. The Ministry of Health has had a long-standing role at the national level in setting standards for water quality and monitoring those standards at the state and district levels. In the past

few years, however, the Department of the Environment has become involved as water quality in rivers and other sources has deteriorated. Sewerage is the responsibility of local governments and municipalities, but there is growing pressure for water agencies, the Department of the Environment, and those concerned with local government to work together on this largely overlooked area.

The objectives of the Department of the Environment include “balancing economic development against the maintenance of a sound environment,” and its activities include modern programs on noise pollution, environmental impact reports, and toxic and hazardous waste. The department has eight regional offices for monitoring and enforcement and about 80 to 100 staff in the regional offices.

- The Ministry of National and Rural Development is involved in planning and allocating funds to states for development projects.

At the state level, public works departments, water supply departments, and water boards are major actors in the sector. Each state assembly has the power to choose how the state’s water supply and sanitation function should be organized. Historically, the function has been a part of the responsibility of the state public works department, which is also responsible for roads and all public buildings. Some states have moved away from this structure to form a separate water supply department, whose director reports directly to the state secretary, or a more independent state water board, whose director reports to a separate board of directors. Each of these arrangements has unique characteristics, as described below:

- A typical water board is made up of the chief minister (who is chairman), state secretary, state legal advisor, state financial officer, state director of public works, and six appointed members, who usually have connections to a political party. A water board is financially autonomous and can negotiate loans on its own. Generally speaking, water boards are seen as being more efficient than other structures. A board, for example, can raise a tariff by first convincing the members (who are politicians) and then the state assembly.

Boards can also develop their own budgets for O&M and determine the terms of service for staff. They do not have to adhere strictly to government procurement procedures.

- A state public works department is usually responsible for roads, waterworks, and government buildings. This traditional arrangement is generally viewed as being the least effective arrangement—too often water supply and sanitation is given low priority by management, and

resources are primarily devoted to other sectors. Observers see this approach as not being supportive of the “customer” focus of supplying water and sanitation and the resulting need for attention to commercial aspects of the sector.

- The third kind of arrangement is a state water supply department that is separate from the state public works department. The director reports to the state secretary, and the department has its own resources devoted to water supply and sanitation, including its own accountants, surveyors, and vehicles. Stores, however, might be held in common with the public works department.

At this point, three or four states are using each of the approaches. Over the past few years, however, there has been movement away from state public works departments to the other two models. Although there are clear operational advantages to having a water board or water supply department, some states have been unwilling to create one or the other of these structures because the state is financially weak or too small and to create another organizational structure would tax already limited personnel and physical resources. Moreover, some states do not seem to be enthusiastic about the two models because water is an important generator of cash, and they fear a loss of control, but the World Bank has consistently been making a change in structure a condition for loans in the sector.

Policies and Standards

Although Malaysia has a national policy in a number of other related areas (e.g., agriculture), it does not have a national water policy or one overall coordinating agency for water resources development. The responsibility for planning and operating the sector is centered in the states, but the federal government’s role in establishing policy and setting standards is growing. Below are a few examples of how the federal government has been strongly, if not systematically, influencing policy related to water supply and sanitation:

- National policy strongly emphasizes rural development (the Malays are primarily rural), and as a result there has been strong financial and infrastructure support for the rural water subsector for a number of years. Coverage in the rural areas is a commonly talked about measure, and by 1991 it is expected that 83 percent of the rural population (96 percent of the urban population) will have piped, treated water.
- The federal government makes grants or loans available to the states for the development of water systems. Most of the systems are designed by the Ministry of Public Works.

- Several governmentwide policies influence the operation of the water subsector. The federal government values “efficiency,” and some legislation (e.g., the Water Funds Act) has been passed to support the efficiency of water agency operation.

Planning

- Most planning takes place as a part of a highly structured national planning and budgetary process. Capital investment in water has been a key element of a series of national five-year development plans. The emphasis in the next five-year plan for the Ministry of Public Works will include three areas—reducing nonrevenue water, upgrading the capacity and quality of 71 priority plants, and carrying out some major new urban works. The Interagency Planning Group, which has been preparing the Sixth Five-Year Plan (1991-1995), is coordinated by the Economic Planning Unit, but many see the latter as more of a coordinating body and not as leading an integrated planning process.
- Local planning also is tied to the budgetary process. Elected members of state legislatures chair committees made up of representatives of key departments in a variety of areas of government operation. Typically, one of those committees is a water/electricity action committee, on which affected departments are represented. This committee develops economic analyses, annual plans, and budgets with the state water department (or other water agency) and takes a lead role in identifying priority areas for significant new development of piped water supply. Other ministries, particularly the Ministry of Health, then plan accordingly. The committee provides an opportunity for community input and lobbying by politicians.

Financing

- Most funds for capital expenditures are budgeted and appropriated at the national level as a part of the five-year planning process. Individual states “bid” for the systems they think ought to be developed over the next five years, and several federal ministries get involved in making the decisions on funding. States that have well-developed sources of funds receive loans from the federal government (or the federal government guarantees foreign loans). States that are less developed receive grants for capital development from the federal government.
- States set their own tariffs for water. Three tiers are used throughout the country as the basis for rate setting: a lifeline supply of up to 4,000

gallons/month, which is heavily subsidized, 4 to 10,000 gallons, and over 10,000 gallons/month, which involves a penalty rate.

Tariffs are not particularly well tied to the actual cost of producing water. As noted, water is seen as a revenue source by the states, and there seems to be little concern by most states (or at the federal level) for recovering capital costs. Having a positive cash flow and being able to cover O&M costs are seen by most of those involved in the sector as being sufficient.

- Setting tariffs, recovering costs, and carrying out effective financial management are substantially constrained by the lack of well-trained accounting staff and the fact that few states have the capability or will to use a commercial accounting system. Many believe that the federal government is not fully committed to cost recovery. Like many other countries, Malaysia is torn between a number of objectives in providing water to its citizens. Some officials believe the federal government's role is to provide water and extend coverage, not to recover costs.

Program Implementation

- Generally, there is little design capability at the state level except in the very large states; design work is carried out by the Ministry of Public Works. Even in the larger, more sophisticated states, the Ministry of Public Works is often used when more complex designs are needed and when there is a shortage of funds. The states normally supervise construction, but the Ministry of Public Works also takes on this role.
- Many of the states are considering the privatization of the O&M of some plants. This effort has come about as a result of governmentwide interest in experimenting with this approach. Several government-built plants are run by private concerns, and the government pays for water on a bulk basis.

Community Management

- The Ministry of Health began the National Environmental Sanitation Program in 1969, when it formed the Environmental Health Engineering Unit. The objective of the program was to provide low-cost water to rural communities through community participation. The federal government would provide subsidies, and the community would provide labor and some materials. Water was not treated. The

philosophy was to provide ample water for personal hygiene and to rely on people to boil water for drinking.

- The national program was established on the principle that there should be one handpump per 10 houses, and that every house must have a toilet before a pump would be installed. Thus far, about 2,000 gravity-feed systems have been built. Between the efforts of the state water agencies and the Ministry of Health, most rural areas in most states are now served with piped water. One health official commented that “now only the hard core group is left.” Even when piped, treated water is extended into an area, however, many residents typically cannot afford the cost of connection. The Ministry of Health is experimenting with several programs that support a “self-help” approach to making connections, thereby reducing costs while maintaining system integrity.

Health and Hygiene Education

- Most of the water supply facilities being developed in Malaysia at this time are justified on the basis of convenience and coverage. Improved health is not a specific outcome directly associated with extended coverage.
- The Ministry of Health plays a key role in regard to water quality. The major interaction between Ministry of Health staff and water department or public works staff is often in the monitoring of water quality. Other interaction is related to coordinating efforts to ensure that the ministry is not developing community-based projects in areas where the water supply agency is working.
- The next major health intervention in the sector will probably come as a part of dealing with issues related to sewerage.

3.4.2 Issues Related to Sectoral Organization

Malaysia’s water and sanitation sector is characterized by a multiplicity of organizational models. In some ways, it has not needed to be “efficient” in the way it has organized the sector. It has sufficient resources (and a good credit rating) to develop simultaneously a number of ways to organize to meet sectoral needs. This variation in the kinds of organizational structures used in the states and by the federal government has allowed Malaysia to respond to needs in states with widely varying resource bases and levels of economic and political development. These organizational structures have supported a

program that is rapidly extending coverage to all parts of the nation. Nevertheless, as Malaysia faces the challenges described earlier in this study, several issues are ongoing:

- Movement toward a commercial orientation for the sector is still stymied in many states. Formation of water boards, adoption of commercial accounting practices, experimentation with privatization, and training of more technically oriented staff are some of the strategies that are being pursued, but much remains to be accomplished. From the standpoint of how the sector should be organized, it is curious that although the Ministry of Public Works is effectively providing technical assistance in design and construction, there does not seem to be any national backstop for the “nontechnical,” commercial/accounting aspects of sector operations.
- Continuing attention will have to be given to finding mechanisms to coordinate important policy matters. Each ministry has its own traditional objectives, and informal interaction has not, as of yet, focused the sector on dealing with large emerging issues, such as solving technical and financial problems related to sewerage. What framework exists for working together systematically on this kind of issue is still in the formative stage.

3.5 Zimbabwe

3.5.1 Sectoral Analysis

Sectoral Context

The population of Zimbabwe in 1985 was 8.5 million. About 58 percent of the population lived on communal and resettlement lands, and an additional 21 percent lived on commercial farms. In 1989, the population was estimated to be 9 million—26 percent urban and 74 percent rural.

In 1980, an estimated 60 percent of dwellers in urban and peri-urban areas were supplied with clean water by house connections and the remaining 40 percent by standpipe; 79 percent of urban dwellers had an adequate house connection for sewerage and 21 percent had either septic tanks or pit latrines. In rural areas, an estimated 10 percent had access to an adequate water supply and 15 percent to adequate sanitation. By 1985, 32 percent of the rural population had access to clean water, 15 percent had access to adequate sanitation, and about 66 percent of the communal/resettlement area population drew water from unimproved water sources.

In rural areas in November 1989, there were approximately 20,000 primary water points (boreholes, wells, and springs). In high rainfall areas, most rural water for domestic purposes was drawn from between 150,000 and 200,000 private, unprotected wells. About 3,000 water points (including about 1,000 boreholes) are being developed each year. About 150,000 ventilated improved pit (VIP) latrines have been constructed since independence (1980), although in the late 1980s, materials shortages (especially cement) were slowing the construction rate.

Prior to independence, infrastructure development in the communal areas had been largely ignored, and much of what had been developed was destroyed in the war. Since independence, some attention has been given to resettlement of black farmers onto formerly white lands, and considerable resources have been devoted to redressing the imbalance in infrastructure development between the communal lands and the commercial farming areas. Water and sanitation has been a key focus. Since independence, there have been and continue to be significant shifts in sectoral organization.

Roles and Responsibilities

Zimbabwe's water and sanitation sector consists of the following:

- A large, technically oriented, central water ministry, which has a limited role in rural areas, but which provides bulk water to most municipal authorities
- A health ministry with a strong commitment to integrated water and sanitation programs and a large staff presence in rural communities
- A moderately well-staffed and organized governmental structure at district and provincial levels, which is undergoing efforts toward further decentralization
- A district-level capability to build and maintain public works, including a limited capacity in the water and sanitation area
- Several ministries whose function is related to mobilizing community resources

Rural water and sanitation activities are coordinated by an active National Action Committee (NAC). Specifically, ministerial responsibilities for the sector as of 1990 were as follows:

- The Ministry of Local Government, Rural and Urban Development (MLGRUD) has the lead role in planning and coordination for the sector. The National Coordinating Unit (NCU), the secretariat for the

NAC, is located in the MLGRUD, and the chairman of the NAC is the permanent secretary of the MLGRUD. At the district level, the district administrator chairs the district development committee, and other MLGRUD staff provide essential staff support.

- The District Development Fund (DDF) is located within MLGRUD and is responsible for boreholes, blasted wells, small and medium-sized dams, and all O&M. DDF is a parastatal, which makes it less bureaucratic than other agencies. It has special operational capabilities not available to other agencies in the sector, including the authority to recruit its own staff, which makes it much easier to hire people quickly. DDF also has the authority to go directly to local stores to purchase supplies instead of using a central procurement process. DDF is an arm of the district administrator, and its staff is primarily located at the district level. It manages a three-tiered system (village, ward, and district level) of maintenance.

DDF is also responsible for district roads. The Water Division was created in 1985, and now there is a field office for water and one for roads. The strength of DDF is its ability to construct systems in the field; headquarters has a training unit, budget responsibilities, and a workshop. In concept, DDF should be funded from the district, but in practice, there is no revenue and it gets a central government grant each year.

- The Ministry of Energy, Water Resources and Development (MEWRD) provides the technical backup for water resource planning, constructs large dams and piped supplies, and drills boreholes. MEWRD is responsible for bulk supply of water for urban settlements. It is primarily a technical ministry and acts on behalf of other ministries with regard to water resource planning. The National Master Water Plan (NMWP) noted that the MEWRD does not have the necessary infrastructure to mount and coordinate a major development offensive in rural areas and that it has preferred to continue regarding itself as a water resources organization that works as a technical-service ministry rather than as a leader and coordinator.
- The Ministry of Health (MOH) is responsible for small water supplies, particularly shallow wells and springs, rural sanitation, and health education. The MOH's Department of Environmental Health Services is heavily staffed at the local level with district-level health officers who serve as ward-level environmental health technicians and have usually had technical and construction experience. Within the MOH, a Blair

Research Laboratory has spearheaded investigations into water and sanitation technology in Zimbabwe.

The environmental health technicians are assisted by village community workers. In the past, these workers were part of the MOH, but they have been shifted to the Ministry of Cooperative and Community Development (MCCD). The MOH is deeply involved in planning and carrying out water and sanitation projects, and it has had a great deal of success implementing rural sanitation programs that make use of the Blair VIP latrine.

- The Ministry of Cooperative and Community Development has the responsibility for community mobilization. Currently, absorption of the community mobilization function into the Ministry of Political Affairs is being considered.
- Other agencies are also involved in the sector. Town councils are responsible for the provision of urban water from MEWRD bulk supplies and for urban sanitation. In addition, the sector works with MLGRUD's Department of Physical Planning and with Agritex, the agricultural extension service of the Ministry of Lands, Agriculture and Resettlement, with respect to land-use planning.

There is little connection between the urban and rural water and sanitation subsectors. There is no direct cross-subsidy by the urban sector of rural costs, and there is no provision for technical support/assistance to rural areas by potentially more experienced urban water staff. In a few areas, a single ministry has responsibilities in both urban and rural areas. For example, MEWRD supplies bulk water for some urban areas, and it is also involved in the operation of piped water systems and some borehole drilling in rural areas.

Policies and Standards

In addition to individual ministry's policy development processes, efforts to develop consistent policies and standards have been supported successfully by the NMWP (see below) and NAC frameworks, and particularly by an active technical research and development capability. A few examples of policies and standards supported through these frameworks follow:

- A successful effort has been made to ensure the sector's use of low-cost and appropriate technologies. Two standardized handpumps are used in government-funded programs—the bush pump for deep wells and a bucket pump for shallow wells or tubewells. Rural sanitation technologies have also been standardized.

- Four specific technologies have been approved by the NAC—family wells, shallow wells, deep wells, and boreholes. There are 300 piped systems in the communal lands, but because there is no cost-recovery program, the NAC has not approved new construction or rehabilitation of piped systems.
- The project planning and implementation process in the districts is highly standardized. For example, financial guidelines are being issued to all districts, and it is expected that the guidelines will allow the monitoring of standardized inputs and outputs.

Without the forum provided by the NAC, many of these issues would be addressed haphazardly, if at all. The NCU is also taking on responsibility for reviewing district plans and project monitoring, but many key functions take place outside the NAC framework, including the budgeting of other ministry funds in support of the sector, prioritizing other ministries' work in the sector, and the planning and funding of some externally supported projects.

Planning

- In 1985, an 18-volume National Master Water Plan was developed. This document has not been formally adopted by the cabinet, but implementing ministries use its conclusions as the basis for their planning. Zimbabwe's approach to the sector relies heavily on national and local planning processes. The NMWP provides an overall description of desired goals in coverage, the functions and organization needed to achieve those goals, and technical plans for many aspects of sectoral operations, ranging from obtaining hydrological data to human resource management.
- At the national level, the NAC has adopted a phased approach to rural subsector development. Phase I (1987-1997) will concentrate on rehabilitating primary water points and providing a basic level of water coverage for the populations of the communal lands and resettlement areas. Phase II (1997-2005) will comprise the provision of safe water within 500 meters for all and one latrine for each household.
- At the local level, the sector places great emphasis on district-level integrated planning, including community and governmental planning bodies. A detailed 400-page *District Coordination Handbook* for integrated projects includes instructions on project preparation, annual planning and budgeting, financial procedures, field implementation procedures, and monitoring and reporting. Integrated projects require two plans—an initial project proposal and, once the proposal is

approved by the NCU, an implementation plan. Training for district-level staff on the use of these planning processes is being conducted.

Financing

- Since independence, Zimbabwe has subsidized basic sector services; community contribution of labor and materials is the only cost paid for rural water and sanitation. In 1988, governmental expenditure in the sector was estimated to be about US \$4 million, and external support agencies contributed about \$15 million, an annual capital investment level that will have to be sustained in order to achieve goals set for the year 2000.
- External funding is an essential element in sector activities, particularly for supporting the strategy of decentralized planning for integrated projects. In 1982-83, external funding accounted for 32 percent of development costs in the rural water subsector; it is estimated that by 1987-88 the share had increased to over 60 percent. The level of external financing since 1984 has been largely provided by one donor, the Norwegian Agency for International Development, which has provided approximately 50 percent of all external funds.
- Each integrated project has a single donor supporting the extraordinary capital and institutional development costs proposed through the district planning process. This approach seems to postpone the resolution of questions about the government's taking on O&M costs for the systems developed under the integrated approach.
- With the challenge of keeping funding on the same level and spending it efficiently, substantial attention is now being placed on recovering costs for O&M of rural water supply services. The focus on cost recovery is a driving force toward shifting institutional responsibilities.

Program Implementation

- District-level staff rely on centralized resources for borehole drilling, siting, and hydrological data. DDF and MEWRD have borehole-drilling capabilities and both are called on to provide this service at the district level. DDF is responsible for O&M, and in some areas there are volunteer pump caretakers, who are quite often women. The DDF's O&M program relies on a system of paid pump minders, who are responsible for about 10 pumps each. In the past, there was a serious problem with turning over improved water points to the community,

but the various parties involved now seem to be much more conscious of issues related to siting and community participation.

Health and Hygiene Education

- Little health and hygiene education has taken place. The central Health Education Unit does not have the capability to service the sector, and the district technical staff neglect hygiene promotion in favor of construction.
- District-level MOH environmental health technicians are heavily involved in the promotion, planning, and construction of small water systems and in training local workers to build latrines, and as a result neglect hygiene education activities.

Community Management

- In 1984, the government created a decentralized structure for promoting community involvement and decision making that includes village development committees for about 100 families and ward development committees, which cover about six villages. There are about 15 wards in a district. Each ward has a counselor, who sits on the district council. The senior civil servant at the district level is the district administrator. DDF, the MOH, MCCD, the agriculture ministry, and MLGRUD also have staff at the district level. These civil servants form the district development committee, which in turn reports to the provincial development committee. Both the district and provincial development committees have water and sanitation subcommittees. The MCCD has the specific responsibility for community mobilization. During the study team's field visit, MCCD was most often mentioned as the ministry that had the most difficulty carrying out its function. One of those interviewed observed that community development was the weakest link in the process.
- Since communities are not required to pay for services, no sense of ownership or community responsibility for facilities is conferred within the national program. By contrast, the well upgrading program requires well owners to pay the great majority of costs and there is no question that the responsibility for management of the facilities lies with the users.

3.5.2 Issues Related to Sectoral Organization

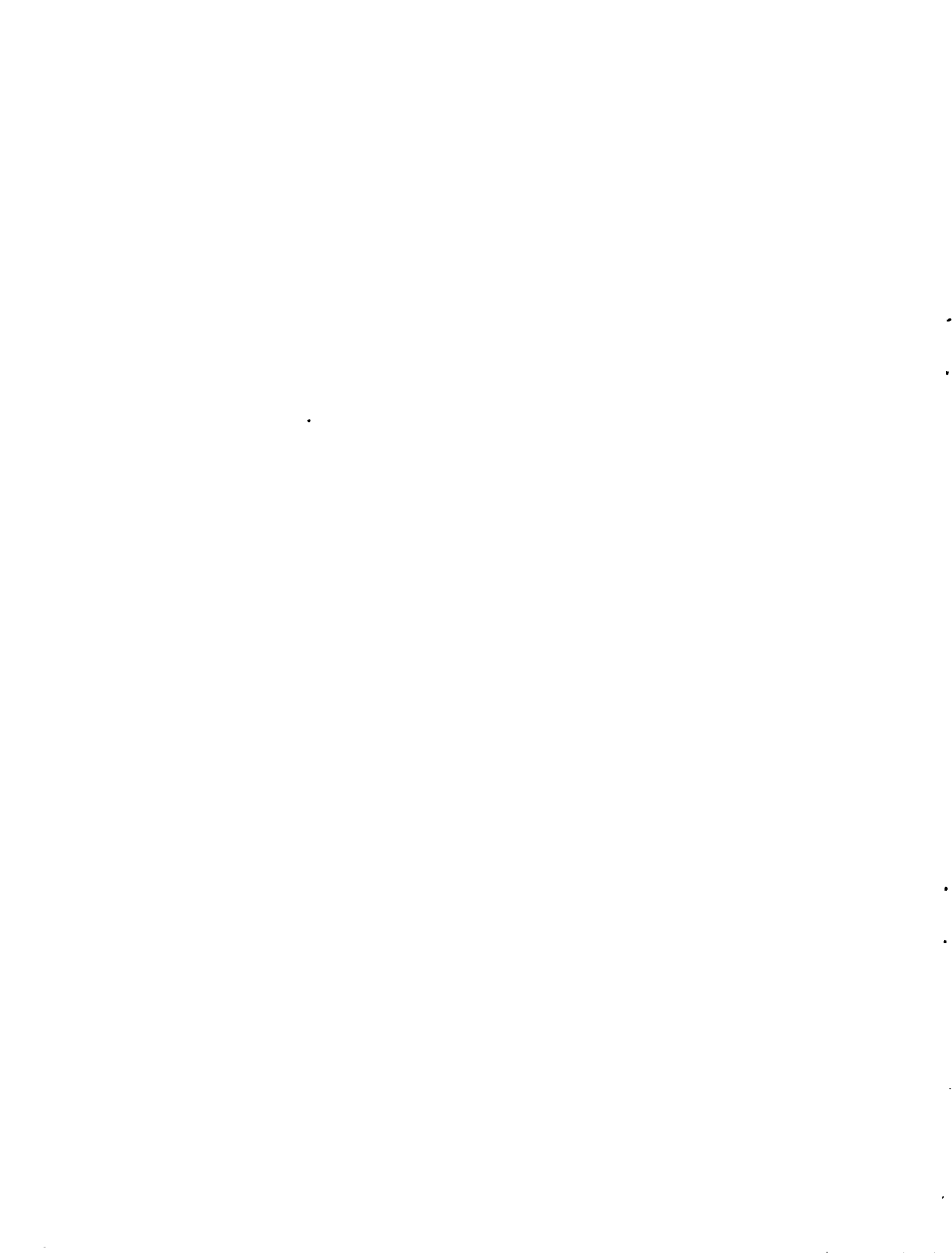
Planning and Coordination

- Although most of those interviewed see the NAC as having served an essential role in moving sectoral programs forward, many of those involved in the sector question the long-term sustainability of this approach. Many note its heavy reliance on extraordinary efforts to “coordinate.” A senior official with long experience in the sector noted that “institutional complexity combined with ambitious sector strategies and limited human resource development have resulted in coordination arrangements which rely on officers assuming unsustainable workloads or reliance upon externally funded technical assistance to make them workable.” Others questioned whether the mechanism would continue to be used if the external support agencies withdrew.
- The NCU’s role in project approval, funding, and monitoring is still being defined. Although the NCU is heavily involved in most externally funded projects, the NAC is not accustomed to allocating government funds. Each permanent secretary goes with his own approach to the Ministry of Finance to support his budget.

Community Management

- The district level has responsibility for plan development and for community involvement in issues like siting and technology choice. Coverage targets, plan approval, and funding are centralized. Decisions proposed in the formalized district planning process and financial responsibility for those decisions are functionally separate, and the district development council and consumers are relatively uninvolved in recognizing and dealing with the financial consequences of their proposed choices.
- Many working in the sector are now recognizing that this largely centralized system reinforces the idea that “someone else” takes care of the cost of the pump minder’s salary. Historically, heavy contributions from external support agencies have unfortunately reinforced this sense that the money is from “someplace else,” rather than strengthening a connection between the decisions that must be made and the resources required to support those decisions. Many believe that steps must be taken to move away from community mobilization to true community management. Over the past several

years, community involvement in setting priorities, siting, and construction have become commonplace, but much remains to be done to include O&M within the scope of community management.



4

LESSONS LEARNED

A number of lessons and trends can be observed across most of the case study countries. Most countries, for example, have difficulty achieving unifying, cross-sectoral coordination and long-range planning and do not make structural provision for them. In this chapter, important findings from the experience of the countries visited as well as other countries studied are summarized. The lessons are presented to guide development planners and sectoral analysts as they go about the task of assessing sectoral organization and designing interventions.

It is important to recognize that most of the countries under study have attempted to respond to the many pressures being exerted on the sector. Some of those attempts provide opportunities to learn about areas for caution as well as success stories for replication.

4.1 The Role of Government in the Water and Sanitation Sector Is Changing

The pressures to become more efficient and effective are beginning to change the role of government from that of provider to promoter and regulator. There are observable trends and a growing belief that governmental agencies will serve the public best by letting the private sector, semiautonomous agencies, or nongovernmental groups provide direct service in the sector while the government serves as stimulator, enabler, and regulator. In some countries studied in which the government was getting out of the business of directly providing water and sanitation services, efficiencies have been realized, and in other countries they have not. As central government agencies redefine their role, the result is a significant shift in responsibility among the various agencies and organizations in the sector.

4.1.1 General Trends

A good example of a country in which pressures to economize have caused restructuring is Sri Lanka. Over the past several years, the National Water Supply and Drainage Board (NWSDB) has been attempting to streamline services and lessen the central government's role. The starting place was a largely centralized, politicized, overstaffed, ministry-centered water construction operation that had inherited municipal and rural water supply responsibility with the creation of the "Water Board" in 1974. By 1984, the costs to the government were so high that the decision was taken by the government to create a water board that operated on a commercial basis. A.I.D. agreed to sponsor an institutional reform project that included sectoral reorganization and development. The creation of a re-formed Water Board has led to a commercially oriented, decentralized, semiautonomous, and performance-oriented

operation. Billings and collections have been vastly increased with the introduction of a computerized system, and the government subsidy has been greatly reduced. Close cash-flow monitoring has been instituted. A part of the new program includes administrative delegation to regional service centers. This limited decentralization has included financial delegation and development of a management information system to monitor unit performance.

Although the government is still in control in Sri Lanka, this example is consistent with a trend toward creation of semiautonomous or autonomous agencies for urban water supply. Some countries, such as Indonesia, are considering going even further and moving government out of the role of direct implementer or service provider and substituting the private sector. In other countries, the government's role is promotion rather than provision; regulation and control, not implementation. These are innovative roles for many governments, especially in developing countries.

As governments move away from direct service provision, they increasingly take on regulation and standard setting. Their role may then become that of resource broker and concession holder. This was precisely the change that Chile put into law and implemented in 1990. Chile created a regulatory body in the Ministry of Public Works, assigned a business oversight role to a business development agency, and delegated all water and sanitation service to seven regional water companies that are publicly and privately held, but publicly regulated.

Another role of governments is to ensure the public well-being and interest through regulation of quality standards and tariffs. This trend has been evident in urban water supply for more than 10 years in situations in which municipal governments have provided concessions (often because the municipalities are not politically willing to bill the full cost) to semipublic utilities and other government offices for water and sanitation services. This trend is beginning to apply to rural water supply as well.

4.1.2 Trends in Rural Water Supply

Governments have primarily pursued four new options for rural water supply:

- Providing support for NGOs (such as private community groups and PVOs) that specialize in community involvement and water supply promotion by creating autonomous community water boards
- Seeking out market-driven mechanisms that can supplant or complement governmental initiatives
- Promoting institutions, such as community water boards, that act as community businesses and assume O&M costs

- **Linking rural water supply to nearby urban skills and urban economic units**

There are numerous examples in rural water supply of the government or a development agency (e.g., an NGO) training community people who then work as free-lance repair technicians or are hired by local water boards. This is one way to stimulate market forces to provide services that the state may have previously supplied. In Zimbabwe, for example, the government has trained well diggers who are hired by local communities to construct wells. In Sri Lanka, Zimbabwe, and Ecuador, governmental programs have trained water point caretakers in O&M of handpumps and/or gravity flow systems. These individuals are often subsequently employed by the community water board or association. Thus, the government does not maintain these individuals on its payroll; rather, it lets the marketplace manage the future transactions and the costs.

These kinds of arrangements are, however, not without problems. In Zimbabwe the trend was toward increasing dependence on the private sector for well drilling. This was in line with a policy to divest government of this responsibility. However, due to import restrictions, taxes, and customs controls, private suppliers found they could not get spare parts for drilling rigs and had to go out of business or operate inefficiently. The lesson in cases such as this is that the government must address all related systemic issues, such as import restrictions and availability of equipment, if it is going to stimulate private sector interest.

Linking rural water supply or peri-urban areas to urban systems is another way of moving responsibility away from the general treasury and toward local users. In order to assist rural communities, urban companies may extend and cross-subsidize service to rural systems. The concept is to define a service area that is large enough to cover both urban and rural areas and to recognize the economic interdependence of the two. The concept holds, in essence, that urban dwellers can afford to pay more for water and because of the economic linkage to surrounding rural areas, they can afford to allow a portion of their tariff to cover higher marginal costs in nearby communities.

4.1.3 Making the Government a Stimulator and Facilitator

A part of the new role of government is to stimulate and facilitate the provision of services without entering into direct service provision itself. For example, mechanisms have been set up whereby communities may borrow money at reduced rates and hire private sector design-build or well-drilling services to do the work. Other mechanisms have been set up to make loan funds available to municipalities and to require that loans be repaid or that municipalities guarantee loans with bonds or other sources of revenue. Municipalities, in turn, hire or contract with the private sector to construct or operate and maintain systems as a business. In Ecuador, a central government bank obtains loan funds from the Inter-American Development Bank and then lends money to municipalities. The government bank must guarantee the loan to IDB, and the municipality must guarantee its loan from the bank. Municipalities may directly

operate or contract operations out as they wish. In Brazil, a similar arrangement exists with the National Housing Bank. It receives loan funds from the World Bank and then lends money to water companies with guarantees from the state governments.

The steps that were taken in sectoral reform to move in the direction of regional water companies with authority to issue shares began in Chile with legislative reform measures. The first step was to redefine the mandate of government ministries and to set up alternative structures. Chile organized all water supply under a series of regional water companies. An interesting option that exists in advanced, free market economies, such as the United States, includes empowering municipalities with the legal right to issue municipal bonds as sources of capital or loan guarantees. This is probably the next logical step in Chile.

There is often resistance to these trends because governments have traditionally used state organizations as sources of political patronage. When the rules change to make organizations semiprivate and self-sustaining, staff are usually put on a performance basis and unnecessary jobs are eliminated. Similarly, some countries have engineering-dominated state water organizations. Institutional and sectoral reforms that begin to emphasize commercial and consumer orientation are often very threatening to such organizations. But governments have been obligated to move ahead with reform because the old ways simply cost too much. Reform is becoming inevitable out of economic necessity.

The redefinition of the role of government is in many ways the driving force behind the major changes under way in sectoral organization. This changing of roles will inevitably lead to more decentralization and use of the private sector and serious questioning of the traditional role that agencies such as ministries of public works and health have played. One lesson learned in this study is that the trend for government to become a promoter instead of a provider is healthy and becoming increasingly accepted.

4.2 Overly Diffused Responsibility in the Rural Subsector Is Counterproductive

When responsibility for rural water and sanitation is diffused among a number of government agencies, a variety of negative consequences, including the following can be predicted:

- Confusing and inconsistent strategies at the community level
- Unnecessarily high costs
- Excessive time devoted to coordination
- Emerging issues “fall through the cracks”

4.2.1 Nature of the Problem

In Zimbabwe, six national ministries have significant responsibilities for water and sanitation in rural areas. In Malaysia, 6 national ministries and 13 state-level public works departments, state water departments, or water boards are involved. Such diffusion can make it difficult to meet sectoral goals. For example, several agencies may interact with the same communities, but bring significantly different messages. One agency may focus on community-based identification of needs, while another may be more interested in building water systems. One may approach the development of water supply facilities as a route to good public health, while another may see improved access to water as a basic convenience that has no inherent connection to improved health. One agency may have a strong commitment to recovering costs, while another may believe that clean water is a “right” that need not be paid for. These common differences in the approach to the community by various ministries can create serious obstacles to success, however it might be defined. In addition, when two ministries maintain parallel capabilities to field borehole-drilling teams, when several ministries are directly involved in supporting community participation in digging shallow wells, or when five ministries have highly paid staff working on the development of a national water project plan, scarce national resources are potentially being wasted.

In some instances, the fact that responsibility for water is diffused means that important developing issues (e.g., the environment, new approaches to cost recovery or urban sewage) receive little focused attention from any part of the sector. A sense that such issues are someone else’s responsibility is further encouraged by the overwhelming costs associated with some issues.

4.2.2 Strategies for Reducing Negative Consequences of Diffusion

As undesirable as the above consequences might be, they should be recognized as natural when responsibilities in the sector are widely distributed. This study identified three options that can be used separately or in combination to help reduce the negative effects of overly diffused responsibility in the sector:

- Build a well-functioning coordination capability
- Minimize the number of players in the rural water and sanitation subsector
- Clearly define boundaries between agencies

Build a Well-Functioning Coordination Capability

The rural water and sanitation subsector in Zimbabwe is characterized by the involvement of a relatively large number of ministries and agencies. Since publication of the National Master

Water Plan (NMWP) in 1985, overlapping functions (with some few exceptions) have not been consolidated, but some efforts have been made to try to coordinate the division of responsibilities. At the national level, the sectoral planning and implementation issues cited in the NMWP (i.e., comprehensive program planning, standardized program strategy, technology choice, program integration, and cost recovery) are being dealt with in a very active manner through a formalized “coordination” structure—the National Action Committee (NAC).

When compared with efforts in other countries to bring coordination to the sector, Zimbabwe’s approach has been successful for a number of reasons:

- The coordination process is tied to the government’s development planning process and approval and monitoring role.
- The NAC is staffed.
- The central coordination body is replicated at other levels—district plans are reviewed at the provincial level and then approved by staff of the NAC.
- Leadership is provided by a “neutral” ministry—the Ministry of Local Government, Rural and Urban Development (MLGRUD). Although many see MLGRUD as political, it is generally acknowledged that it is highly committed and has pushed for revision of its own structures.

Building a workable coordinating capability may be an interim step toward other approaches. In Zimbabwe, some see a greater role for this coordinating body in the future—moving toward the involvement of the NAC in prioritizing the expenditure of government funds by ministries. Others think that as more attention is placed on cost recovery, questions related to the cost of inefficiencies will increasingly arise in the NAC.

Minimize Number of Players

Another way to deal with the inefficiencies that can result from diffusion of responsibility is to minimize the number of players in the sector. Earlier, it was pointed out that in many countries responsibilities are characteristically divided among public works/technical ministries, public health and community service agencies, and governmental units concerned with finance, planning, and resource allocation. Often, these ministries pursue activities based on divergent views of the needs in the sector. Public works/technical ministries can naturally focus on questions like how they can build technically sound systems, maintain the systems that they have, plan and design for the future, make appropriate technical decisions, and develop and retain technically skilled staff. Public health and community service agencies are quite often interested in such issues as improving public health by promoting water, extending coverage, and encouraging community participation so that systems can be sustained over time.

Governmental units concerned with finance, planning, and resource allocation are faced with such issues as control over national expenditures, cost recovery, the relation of water as a priority to other national needs, foreign loan repayment, and assignment of trained engineers.

The resolution of these divergent policy and operational interests need not be inconsistent, and it would not be accurate to say that those dealing with one set of interests are not concerned about the others. However, tradition and strong professional and ideological inclinations often mean that different parts of the sectoral structure tend to focus primarily on one set of interests.

Several points can be made with respect to minimizing the number of ministries involved:

- In order to address the range of issues involved (e.g., technology, health education, and community participation), it is likely that more than one ministry will have a significant involvement, unless a single, multipurpose water agency is formed.
- In situations in which coverage is low, and when extending coverage is an overall goal, it is possible that at least two ministries could be significantly involved—one with a community-promotion capability and the other with technical skills. A special effort would have to be made to coordinate the work of the two ministries, however, and it is likely that once coverage reached an acceptable level, the role of the promotion agency would be diminished.
- Experience has shown that significant involvement by more than two or three ministries will result in the need for a great deal of expensive coordination.
- The ability to minimize the number of players may be restricted by lack of representation of various ministries at the implementation levels of government. For example, limiting involvement to a ministry of water or public works might ignore the fact that the ministry has no capability for implementation below the provincial level, while the ministry of health is usually involved at the district and even the village level.

Clearly Define Boundaries between Agencies

Reducing the number of ministries involved might seem to be the logical step, but it is sometimes not possible for political or other reasons. Nevertheless, in many cases, sectoral performance can be improved by identifying areas in which responsibilities overlap or in which there is ambiguity about who is responsible for particular tasks and then sharply defining respective roles. Areas of overlap or ambiguity in the rural water and sanitation subsector

typically involve the ministry of health and the ministry of public works, both of which may be responsible for system construction. This has been especially true in sub-Saharan African countries, where the two agencies typically cover the sector together.

There are examples, however, of responsibilities being clearly defined between the two agencies. In Malaysia, the health ministry has had an active, effective community-based, self-help program in place for a number of years. Well funded at the federal level, this function is focused on developing community water supplies that are not revenue producing and do not involve treated water. Providing piped, treated water is the responsibility of the technical water supply agencies. Even these clearly demarcated roles do not end the need for coordination, however. Questions of coverage for the next five-year plan will have to be decided among agencies, and the health ministry may have to play a role in the short run to serve nonincluded communities, which may overlap the activities of other agencies.

In sum, the lesson learned here is that too many players can result in inconsistent strategies, increased costs, and serious coordination problems—all of which are difficult to overcome. Limiting the number of government agencies involved, clearly defining roles and responsibilities, and paying close attention to coordination will improve efficiency and effectiveness.

4.3 Effective Decentralization Can Increase Responsiveness to Sectoral Needs

The movement away from centralization, as noted, is a natural response to a number of common pressures. Moreover, a case can be made that a decentralized structure can be more responsive to sectoral needs than a centralized structure. Each of the case study countries has made choices to decentralize to some degree. Each provides examples of how decentralization affects performance in the sector.

4.3.1 Attributes of Centralized and Decentralized Structures

The degree of decentralization can usually be determined by the degree of autonomy to hire staff, raise and retain revenue, and decide on the use and allocation of resources. The case study countries and other countries known to the study team represent most options as one moves from very centralized to nearly fully autonomous, decentralized agencies. However, none of the countries has as yet achieved either devolution or privatization.

Decentralization has been defined in the public administration development literature⁶ as a process that may be characterized with at least four variations in the assignment of power and administrative responsibility.

- *Deconcentration* is an intermediate measure in which staff and resources are shifted to lower administrative units at regional or local levels. The power to mobilize (and ultimately control) resources is retained at central levels, even if some degree of this authority, is administratively delegated to lower levels).
- *Delegation* is the administrative process of allowing authority for management to be taken on by other units such as public corporations or semiautonomous management entities. While day-to-day operational authority is delegated, ultimate approval for resources (such as tariff levels) remains with the owner of the concession (i.e., the central government agency).
- *Devolution* is the complete transfer from central to lower units of government of authority and responsibility to decide how to deal with the service. Authority to mobilize resources, institute tariff reform and hire staff is devolved. In turn, this owner unit of government must then decide whether to directly administer the service, to contract it out to concessionaires, to privatize, or to set up a public corporation.
- *Privatization* is the process of turning over the full responsibility and ownership of the assets and administrative control to a legally incorporated entity that operates for profit and has the capability to pay dividends to shareholders. Publicly owned goods thus privatized are regulated to ensure the public good or trust.

Centralized

In those highly centralized sectors observed (Paraguay and rural water supply in Ecuador), most staff, particularly those with technical expertise, are located centrally. Staff at implementation levels are primarily concerned with community mobilization for rural programs, and though they may have input into technical areas, most engineering decisions were reviewed at the central office. Major implementation activities such as planning, design, and construction are centralized. Typically, in more centralized sectors, resource allocation decisions for capital expenditures and O&M carried out in support of local plans are made at higher levels.

⁶ UN Centre for Human Settlements. 1989, Decentralization policies and Human Settlements Development. HS/158/89E.

Deconcentrated

In the deconcentrated sectoral configuration observed, major decisions with long-term implications (particularly resource allocations) were made at the central level. Centralization of some implementation elements exist when very specialized skills or resources can not be feasibly or economically decentralized. Examples are protection of groundwater resources, borehole drilling, or technically difficult design activities. Planning is conducted centrally but in response to decentralized input or preliminary planning processes, such as a district-level planning or a state-level budget exercise. Some decentralized implementation capabilities exist, particularly for O&M, as well as less complex design and construction activities.

Delegated

In the delegated systems observed, major decisions about resource allocation are made at the local level indicating a high level of delegation as well. Typically, in sectors that are decentralized to this extent, the local level had the capability to bill and collect fees (e.g., for pump repairs or payment for water); some degree of control over resources, like personnel; and significant capability for implementation. The local level also had the skills—without recourse to higher levels—for O&M, design and construction, and resource planning and use, some of which may be contracted out. Tunisia, for example, the national water authority has delegated all operations to regional offices in each governorate. Even in highly delegated sectors, the central government may play a strong role in setting tariff policy, securing foreign loans and grants, and safeguarding water quality and the environment. Foreign loans, however, may be directly negotiated and paid for by decentralized water and sanitation agencies, with central treasury or ministerial concurrence. This is the case in Chile and Tunisia.

Devolved

Of the case study countries visited, the most devolved sector was that of Chile, where there are 12 regional water agencies and 2 metropolitan water companies. Malaysia also has a number of very decentralized elements down to state levels and then a mixture of service delivery elements that run the gamut from contract concessionary water companies to state water boards.

In those situations with increasing delegation and deconcentration, there is generally a high degree of involvement of the people served in identifying their needs and taking part in decision making about how those needs are to be met. In the more completely devolved sectors, local jurisdictions have control of their own financial resources.

4.3.2 Key Factors in Successful Decentralization

Several elements that consistently contributed to effective decentralization were observed in the case study countries:

- The power to mobilize resources; autonomy in staffing and retention; control budgets were clearly evident in the sector.
- Diffusion of responsibility was dealt with at the local level.
- Organizational units that specialize in water and sanitation activities were created at multiple levels in decentralized structures.
- Decentralization of the rural water and sanitation subsector was often associated with the decentralization of other governmental sectors.

Important aspects of each of these elements are discussed below.

The Operating Entity Has Authority for Resource Mobilization, Autonomy for Staffing and Budget Control

In the case study countries, regardless of the form of decentralization (deconcentration, delegation or devolution), the most successful operations were found where the entity was able to retain its own staff and income, and thus operate as any other private business. The key constraint to efficiency and service provision is the ability to mobilize resources, either through the ability to acquire loans, raise tariffs, issue bonds or reduce expenditures. The most successful operations observed were in Brazil, Tunisia, and Chile. While all of these countries have government regulation on tariffs, substantial amounts of autonomy have been delegated.

The Diffusion of Responsibility at Decentralized Levels Is Controlled

An earlier section described the problems that can result from diffusion of responsibility in the sector and the strategies used to alleviate them. Efforts at the central level to build coordination mechanisms usually entail trying to minimize the number of players and clearly defining boundaries among involved agencies. Decentralized systems also take similar steps and often have parallel coordination and planning bodies at lower levels that are set up in various ways. For example, coordinating or planning bodies that parallel national mechanisms exist in Malaysia as state-level planning committees made up of technical officers and political officials, who work together to set priorities and plan budget proposals. In Zimbabwe, a national-level coordination body plays a key role. At the district and provincial levels, the choice has been made not to encumber a single ministry with the primary responsibility for water and sanitation but to mirror at the district level the coordination that goes on at the national level.

Specialized Water and Sanitation Units Are Created at Decentralized Levels

Another consistent element observed in the case study countries was that decentralized, multipurpose public works agencies have difficulty putting priority on water supply. Ministries of health can also find that the water supply function gets lost in its larger mission. Many

countries have found that it is important to support the creation of organizational units that specialize in water and sanitation at multiple levels in a decentralized structure. These specialized capabilities take a number of forms—an environmental health unit in a ministry of health (Paraguay), a state water department (Malaysia), or a separate water division within a national-level agency (Zimbabwe).

Experience has demonstrated that a specialized capability is usually an essential evolutionary step in setting up a decentralized sector. This evolution was described by a key official in Malaysia in the following way: “The State Public Works Department as a water supply structure was probably adequate at one point. At what point does it become inadequate? When you’ve got pollution, industry, sewage—as costs go up you have to do something. The people who are paying attention to the roads and buildings don’t have time. Technical issues get more complicated.” This realization brought about the formation of state water departments with dedicated staff and equipment. Specialized capability at a decentralized level should include technical capability as well as capability in promoting community participation and in hygiene education.

The Decentralized Structure Parallels the Overall Government Structure and Other Decentralization Efforts

In the countries reviewed, decentralization in the water and sanitation sector was associated with initiatives to decentralize in other sectors. In some countries, the rural water subsector has been used to create models for changes in the way that government relates to community needs, as well as model management structures that other sectors can adopt. This has been true in Zimbabwe. The water and sanitation sector has the potential to provide models for “self-managing” institutions that other sectors, such as health or education, have more difficulty establishing.

Zimbabwe’s efforts to support effective horizontal planning among sectors involved in rural areas, and to ensure that planning is responsive and accountable to local needs, are evident in the way that the water and sanitation sector operates. Much of the focus on district-level planning and project implementation for the sector is possible because the government as a whole has made decisions that demonstrate commitment to a decentralized approach. To date, the process of decentralization in Zimbabwe has not been characterized by giving districts real power (i.e., the ability to generate revenue and make decisions about how that revenue should be spent at the local level), but significant efforts are being made to facilitate and rationalize district-level involvement in decision making.

In Chile, the government’s overall policy has been to decentralize through delegation to semi-autonomous share-holding corporations and to use the private sector where possible. However, this hybrid approach has not included devolution to local units of government for control, regulation or monitoring. It is too soon to tell if parallel provincial structures will evolve along with the regional water companies. One of the hindrances is that some governmental

functions that would provide important counterparts to regional water companies, such as the authority to raise revenue, continue to be centralized.

Decentralization in the water and sanitation sector is occurring in many countries. Every study country was in the process of decentralizing some of its functions, and in most cases officials were pleased with the results. Decentralization is a relatively new phenomenon in the sector, but it holds great promise for resolving some of the difficult issues confronting the sector.

4.4 A Decentralized Sector Must Still Account for Major Sectoral Tasks

The major sectoral tasks (setting policies and standards, planning, financing, and implementing programs) must be accounted for as the sector is decentralized. An incremental strategy toward decentralization has often been observed. The pattern is, first to deconcentrate through regionalization. Increasing delegation follows. The final step is devolution and perhaps privatization. In the process of delegation, some functions are more easily decentralized than others. In the case study countries, some functions were successfully retained at the central level, and others were successfully decentralized. Listed below are those functions that can readily be decentralized and those that are likely to remain centralized.

4.4.1 Functions That Lend Themselves to Decentralization

- Operations and maintenance
- Operational planning
- Construction supervision
- Billing and collections
- Financing (difficult to achieve but a necessary goal)
- Staffing
- Operational management
- Community participation
- Hygiene education

A good example of how rural O&M can be decentralized is the three-tiered maintenance strategy carried out in Zimbabwe. At the village level, the water committee (subcommittee of

the village development committee) is responsible for preventive maintenance. Committees designate individuals, sometimes on a rotating basis, to be alert for problems, ensure that the water point area is clean, and apply grease and take basic care of the pump as needed. At the ward level, employees of the District Development Fund serve as pump minders for up to 50 water points. Pump minders carry out simple maintenance and oversee the work of the volunteer caretakers. At the district level, maintenance teams provide backup to the pump minders and carry out more extensive repairs.

This kind of decentralization for rural water supply services is quite common in other countries. The three-tier system of Zimbabwe is widely understood and supported and is an example of how, in one respect, decentralization can work very well. In another respect, it highlights problems that can come about when functions that should be decentralized are not. One interviewee observed that, "Insufficient attention has been given the long-term costs of maintenance of communal primary supplies, to the level of technology being promoted, and the use of community and private institutions to undertake pump repairs and maintenance." In Zimbabwe, the planning and financial management decisions that are associated with these larger questions remain centralized.

4.4.2 Functions That Require Centralized Attention

- Setting standards and enforcing them
- Establishing tariff policy
- Financing (will remain a centralized responsibility until internal capital markets exist)
- Regulations (e.g., procurement, accounting standards)
- Research and development
- Human resource planning
- Very specialized training
- Cross-cutting sectoral policy formation (e.g., on environment, long-range investment)

Within a highly resource constrained sector, those functions that require high degrees of specialization or that are too expensive to maintain or carry out at local levels are often retained at the central level. For example, ensuring the selection of technology appropriate to local financial capacity and environmental constraints may have to be centralized.

4.4.3 Role of Central Government in a Decentralized Sector

Often it is assumed that when a country decides to undertake decentralization, the process merely involves making appropriate choices for what should be taken away from a central level and what should be retained at the local level. In some cases, this may be true, but in many situations, the process of decentralization involves the development at the central level of new and unfamiliar capabilities to support decentralized operations. For example, Malaysia has a highly devolved sector, but the federal government is finding that it has a significant and growing sectoral role. Given demands on the sector as a whole in Malaysia, a number of new or enhanced federal capabilities are being developed: strong policy support for rural development; growing financial and infrastructure support for rural water; design and construction supervision of complex water projects; development of policies to support the commercial orientation and financial efficiency of water agencies; encouragement of experimentation in privatizing water treatment plants; and leadership in such national issues as water quality standards; environmental protection; and the mushrooming cost of sewage treatment.

A great deal of research remains to be done on the issues faced in decentralizing the water and sanitation sector. Those issues, however, are probably not dissimilar to those faced by other sectors. Much still needs to be tried out as decentralized planning becomes more routine in all sectors and as governments increasingly decentralize operational activities.

4.5 Health Ministries Are Generally Not Well Suited to Having the Primary Responsibility for Rural Water Supply

The Ministry of Health is generally not the best organization to have full responsibility for rural water supply. The MOH can play an important role, however, in providing hygiene education services and in the construction of simple systems, such as improved springs and shallow wells. In many countries, the ministry of health is one of the key actors in the water and sanitation sector, particularly in rural areas. In urban areas, its role is generally limited to monitoring water quality; in rural areas, it has more complicated involvement.

In some countries, especially in Latin America, the health ministry has the primary responsibility for all aspects of rural water supply, including promotion, design, construction, O&M, and health and hygiene education. When the ministry has such broad responsibility, it usually acts through a rural water supply department that is primarily staffed by engineers and technicians. *Dirección de Sanlamiento Rural* in Peru and *Departamento de Sanlamiento Ambiental* in Bolivia are examples of this approach.

Health ministries generally have difficulty carrying out the lead responsibility for rural water supply. They are usually better skilled in providing curative and preventive services. The provision of water supply services is an engineering activity and is fundamentally different from most of the services health ministries typically provide. Moreover, water supply often has to

compete for limited resources with curative and preventive services in an organization in which the decision makers are usually doctors and have a different set of priorities. Such is not to say that health ministries cannot play a role in the construction of systems that do not involve complicated engineering activities. This is the case in Zimbabwe, where the Ministry of Health has developed a significant capability to construct shallow wells and to improve springs.

In some countries, public works or another technical ministry is often responsible for the design and construction of rural water systems, and the health ministry is responsible for hygiene education. This type of solution can be found in Malawi, where the Ministry of Works has responsibility for rural water supply, but interacts with the Ministry of Health in the area of health education. It is also the case in Togo, Burkina Faso, and Benin. This type of arrangement means that the ministries must closely coordinate their activities because the health ministry is generally the only governmental agency that has the capability and the mandate to take responsibility for hygiene education. In practice, however, such coordination is often difficult to achieve. WASH evaluations of A.I.D.-funded projects in Malawi, Togo, and Burkina Faso have pointed out how difficult it is to achieve coordination (see Roark 1986, 1988; Warner 1986).

In countries in which the health ministry has a very limited role in water supply and sanitation, health issues are generally neglected. It is usually unrealistic to expect a ministry of public works or a ministry of agriculture to have the capability or to be willing to develop the capability to undertake a hygiene education program. In Tunisia, the Ministry of Agriculture, which has primary responsibility for water resources planning and development, has been reluctant to get involved in health-related activities on the grounds that such activities are the responsibility of the Ministry of Health. This has resulted in a lack of attention to the health aspects of water supply.

In more advanced developing countries such as Chile, where income and educational levels are high, it may be appropriate for the ministry of health to play only a minor role in the sector. However, in less developed countries in which the incidence of water-related disease is high, the health ministry should be involved either as one of the principal actors or in a serious support role that includes providing hygiene education services that complement the provision of systems by a technical ministry.

4.6 It Is Important to Have a Body That Addresses Sectorwide Concerns

In some of the case study countries, there were sectorwide concerns that seemed not to be the assigned responsibility of any agency. Those concerns tended to be cross-cutting ones, such as the following:

- Long-term sectoral master planning
- Determining service areas between rural and urban subsectors and developing technical and economic standards to guide the design of compatible systems
- Monitoring the impact of water and/or wastewater service on the environment, for example, aquifer and source management, watershed protection, dumping of untreated wastewater, and groundwater contamination.

4.6.1 Sectorwide Planning

In all of the case study countries, there were gaps in sectorwide planning to some degree (e.g., ignoring wastewater treatment while investing heavily in water supply), although attempts were made to fill the gaps. The consequences of the lack of planning or more long-range vision for the sector were manifest in duplication of effort, shortages of funds, crisis management, and other expedient approaches to problems—all of which eventually catch up with a country in very unpleasant ways.

In Chile, for example, with the move toward regionalized commercial urban-rural utilities, no agency is currently charged with the responsibility of considering overall sectoral planning and investment. At the same time, a number of other sectorwide concerns exist. Currently, there is minimal wastewater treatment in the country. How will wastewater as an environmental and national investment need be addressed? The investment requirements and the work entailed will probably span 20 or more years. Can a number of individual water companies tackle this issue technologically and financially?

In Paraguay, there are two primary agencies, one for the urban and one for the rural subsector, but there is no significant coordination or unifying governmental oversight. Insufficient attention is given to overall planning and coordination for the sector, to environmental concerns, and to the fact that rural areas that are becoming increasingly urbanized are being served by small systems they have outgrown. Where urban and rural systems now increasingly interface, there are gaps in decision making about who is responsible for the systems (the urban or the rural agency) and how rural systems should be upgraded to conform with the technical criteria of urban systems. Who will decide jurisdictional issues?

On the other hand, a good example of a central coordinating body exists in Zimbabwe. There, a central coordinating body exists in the Ministry of Local Government, Rural and Urban Development. This provides an agency with staff resources at various local and central levels. Because Zimbabwe must coordinate among a number of agencies, overall sectoral investment planning and coordination are addressed by this body.

A partial good example exists in Chile. There, a central body was created to establish and enforce technical standards, set tariffs, define and manage jurisdictional disputes between rural and urban and among urban agencies, and transfer governmental assets to semiprivate water companies. The agency, however, does not have responsibility for sectorwide planning or other cross-cutting issues, such as environmental protection, macro investment policy, or the need for wastewater investment coordination. Individual water companies in each region are currently charged with all sectoral planning. This may change as Chile learns how to operate a decentralized sector.

The point is that sectors must account for the larger framework of planning. Specific project planning and agency operational planning usually take place. But the larger picture is often left unclear. It is important that planning efforts such as the United Nations International Drinking Water Supply and Sanitation Decade continue and that national plans be updated. The most successful national planning efforts have avoided planning that is top down; they also do not delve into project and implementation planning, which is best left to the implementation level in the sector.

4.6.2 Rural/Urban Interface

Sectorwide concerns often arise over the relationship between the urban and rural subsectors, and it is important that the entire sector have a means for addressing them. One concern is that many rural areas are likely to become increasingly urban. Another is that in-migration makes peri-urban (fringe areas near large population centers) areas grow into small cities over time. Some of these areas actually extend out into rural areas and engulf villages, as in Paraguay.

In countries that have moved toward decentralized structures, such as Chile, a number of gaps between rural and urban responsibilities have emerged or may emerge. As well, in Paraguay, where one agency serves the rural population and another the urban, issues relating to coverage and expansion and who gets what turf have been left unresolved; this may also be true where a large number of agencies are involved.

To avoid the potential gaps in the rural/urban interface, the sector must have a body that can take responsibility for the following:

- Defining what is rural and what is urban using some sort of replicable standard (e.g., number of inhabitants, population density)
- Developing technical and economic standards so that as rural settlements become urbanized or urban areas extend into rural areas, systems that exist on both sides will be compatible (e.g., pipe size, amount of water, pressure levels)

- Providing design parameters that anticipate population growth

4.6.3 Environmental Protection

The relationship of water and sanitation to environmental issues and needs is another sectorwide concern that is frequently not addressed. In all the case study countries, attention to the interrelation between environmental issues and water and sanitation was either neglected or at a very early stage. Generally, no agency within the water and sanitation sector was assigned responsibility for environmental issues. The environment becomes increasingly important as countries become more urbanized and industrialized and experience increased environmental pollution and health problems. Many countries are also facing a shortage of water resources and are attempting to plan for their rational use and protection. In some countries, increased water supply facilities have had a negative impact, such as in Egypt, where the Aswan Dam has resulted in increased incidence of schistosomiasis in downstream areas. There is a growing awareness of the need to pay attention to the environmental effects of water supply and sanitation. The study team noted this awareness in Chile, where wastewater has gone untreated and is often used directly for agricultural purposes, and in Tunisia, which has recently created a small Agency for Environmental Protection in recognition of this important linkage. Although wastewater is handled institutionally in a variety of ways (from combining water and wastewater services in a single agency, to having separate agencies). All countries need to provide for adequate wastewater disposal or risk serious environmental problems.

4.7 Strong Regulatory Control Is Needed

As discussed in Section 4.1, the trend is for government to provide fewer services directly and to take on the role of promoter and regulator. As the central government moves toward less direct involvement, more decentralization, and greater use of quasi-private or private sector organizations, the need for regulation becomes stronger, as does the need for sectorwide planning. Currently, some governments are not doing a very good job of regulating, even when they are directly responsible for services.

There is a need to ensure that technical construction standards, water quality standards, and other norms are established and monitored. The organizational structure must also assure that regulation is objective. In some of the case study countries, such as Tunisia, regulation was conducted by the same agency that provided the service. Additionally, in many countries the regulatory requirement was assigned but not vigorously enforced.

The best example of a separate agency with a purely regulatory mandate was found in Chile, where a new agency, Superintendent of Sanitary Services, has been set up. Its governmental home is within the Ministry of Public Works, but its enabling legislation requires that it operate as a substantially independent body. The agency has staff dedicated to tariff matters, technical

standards, jurisdictional issues between systems, and the transfer of assets to semiprivate water companies. In Malaysia, the Ministry of Health plays a key role in monitoring water quality and has a complete testing program and functional laboratories.

In most of the other case study countries, however, the regulatory function, if it existed, was dispersed among the implementing agencies, and regulation was conducted by internal audit. In many instances, the health ministry was nominally responsible for monitoring water quality, but it did not have laboratories, took few water samples, and exercised little enforcement of regulations.

4.8 Rural Water and Sanitation Should Not Be the Responsibility of an Urban Utility

In Tunisia, because of the acknowledged success of the *Société National des Eaux* (SONEDE), the urban water utility for the entire country, the World Bank and the Government of Tunisia thought it would be a good idea to create a rural SONEDÉ. The idea made sense. Why not ask a highly successful agency to take on an additional responsibility? SONEDÉ had managed rural piped systems for years, and it seemed like a good idea to ask it to manage nonpiped systems as well. Yet, after mulling the idea over for several years, the government decided against it. It was decided that because it was a commercial institution SONEDÉ was not well equipped to manage a subsidized rural water program. Instead, the Potable Water Division of the Rural Engineering Office in the Ministry of Agriculture retained the responsibility it had held for many years.

Having a commercially oriented institution take over responsibility for a subsidized rural water supply program—especially nonpiped systems—would create a number of difficulties. In Tunisia, for example, nonpiped rural water systems serve dispersed populations, about 1 million people overall. The wells in those areas often go down 600 to 1,000 feet and use expensive pumping systems. A system often costs as much as \$200,000 to construct. These kinds of capital costs can never realistically be recovered from the users. To recover even the recurrent costs would be a significant accomplishment. In contrast, SONEDÉ has traditionally recovered 125 percent of its recurrent costs (including debt service); the 25 percent “profit” is used to fund new capital investments. SONEDÉ is a highly commercialized operation, as cost conscious as any successful private sector company, but it realized that it would not be feasible for it to run a subsidized program.

Another example of this difficulty is found in Chile. The recently formed regional water companies have responsibility for urban and rural populations in their area of service. It is clear to those companies that they will have to subsidize their rural systems with revenues from the urban areas. As a result, there appears to be very little incentive for them to expand service in the rural areas. In the future, their efforts are likely instead to focus on serving those customers who will be able to pay the true cost of having water—those who live in cities or

small towns. Because the restructuring of the sector in Chile is recent, the problem has only recently been identified and as yet there is no solution.

There are exceptions to these examples. In the state of Parana in southern Brazil, SANEPAR, the state water and wastewater authority, successfully serves urban and rural populations. This urban-based utility has been able to serve the populations in Parana because of the cross-subsidies from the urban dwellers and because of the relatively high income levels in urban and rural areas. In the United States, urban-based utilities can serve rural areas because rural users pay higher rates for water than urban users. Another exception would be a small island, such as Penang in Malaysia, where everyone can be served by a single distribution system.

In most developing countries, urban and rural water supply, especially nonpiped systems, should be kept separate. There are two basic reasons for this conclusion:

- The commercial orientation that urban water utilities should have is fundamentally different from the orientation of rural water supply programs. Countries that have adopted an “extended urban model” have generally not had much success in serving rural areas. When choices have to be made, the more profitable urban service will generally get priority. It is probably fair to say that it is difficult enough to develop an urban utility that is financially self-sufficient and provides a reasonable level of service without asking it to take on the additional responsibility of running a partially subsidized rural water supply program.
- Rural water supply and sanitation programs call for very different skills from those needed to operate urban water supply and wastewater systems. Working with rural populations requires skills in community organization and hygiene education, in addition to sound engineering. Although some urban utilities have public education programs, they are usually oriented to educating consumers about such things as water conservation and fixing leaky faucets. The programs have little to do with organizing communities and building local community structures. They also usually have little to do with changing people’s behavior in regard to personal hygiene and water use. Rural water agencies must be as socially and educationally oriented as they are technically proficient. Urban utilities do not require the same institutional capability in social and educational matters.

Although it is understandably tempting for some countries to want to give the responsibility for rural water supply to a competent urban water authority, the lesson learned in this study is that it is generally not a good idea. It may make sense for some very small or reasonably well-off countries, but they are the exceptions. Treating rural and urban programs separately is strongly

suggested. Rural water supply may be the responsibility of a specialized rural water supply agency, such as in Paraguay, or a department in a federal ministry, as in Tunisia. If rural water supply is to be the responsibility of a larger agency, the health ministry may not be the best choice because of its curative and preventive orientation and its lack of experience in developing rural infrastructure (see Lesson Five). Governmental agencies with experience in rural infrastructure are probably a better choice. Such agencies are unlikely to have a hygiene education capability, however, which will require coordination with the health ministry for those services.

5

CONCLUSION

The expectation at the beginning of this project was that the study would yield a generic model of how water and sanitation sectors should be organized. It did not prove feasible, however, to develop a generic model that could be applied in most countries. Each country studied was sufficiently different that the answer in one country was not likely to be the answer in another country. Countries differ in their level of economic development, political system, historical development, size, and natural resource endowment. These contextual factors have a significant effect on how a country organizes its water and sanitation sector.

5.1 Major Study Outcomes

The infeasibility of developing a generic model, notwithstanding, the process of visiting the case study countries and reflecting on the findings yielded two very important outcomes:

- **Development of Assessment Framework.** The study resulted in the development of a framework for assessing the effectiveness of the organization of a water and sanitation sector (Chapter 2). The framework ensures that all the critical aspects of sectoral organization are addressed. The framework includes specific questions to be asked as part of the four areas of inquiry that make up the framework (see Appendixes A through D).
- **Development of Sectoral Operating Principles.** The study also yielded a number of operating principles that can be helpful in looking at the macro issue of sectoral organization. The operating principles, derived directly from the lessons learned from the study (Chapter 4), offer concrete suggestions, but they are clearly not prescriptive. Not all of the principles will work in all countries because of the complexity of the issues involved in the organization of a sector. The principles should be applied in any specific situation only after careful analysis.

The assessment framework and the operating principles—and the lessons from which they are derived—provide important guidance on sectoral organization. In addition, it was the intention of this study to stimulate further thinking on the subject of sectoral organization and to make a contribution to looking at the issue in a more systematic way.

The next section presents the operating principles that derive from the study. The discussion is followed by recommendations on how the assessment framework and operating principles might be used by the staff of external support agencies and host country agencies.

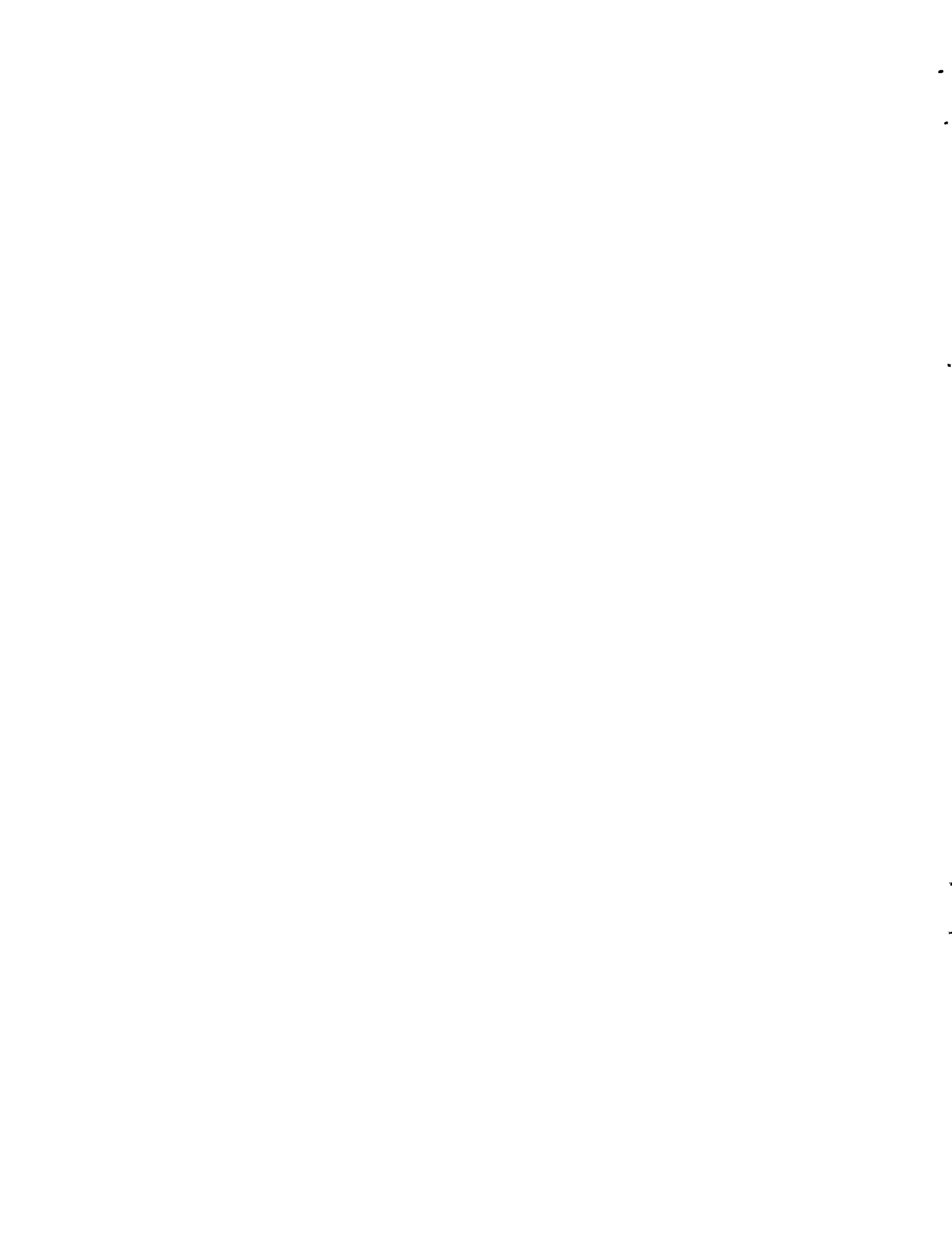
5.2 Operating Principles

Following are the main operating principles that emerged from the study. The principles do not correspond on a one-to-one basis with the lessons learned, but they are directly related. The principles answer some of the immediate practical questions that project officers must address.

1. The number of agencies in the water and sanitation sector should be minimized. Too many actors makes coordination difficult. A more limited number of agencies—with clearly defined roles and responsibilities—is generally more effective.
2. Decentralization must be accompanied by the development of the capability at decentralized levels to plan, design, construct, operate, and maintain water and sanitation systems. Without this concomitant development of local capability, decentralization will not work.
3. In any decentralized system, there is still a critical role for the central government to play in formulating policy, planning, setting standards, providing specialized training, coordinating activities, and possibly, arranging financing.
4. The ministry of health is generally not the most effective agency for managing rural water supply and sanitation programs. Most ministries of health are not set up to develop large-scale infrastructure. Yet, the ministry of health has an important role to play in hygiene education and in the construction of simple systems, such as shallow wells, improved springs, and basic sanitation. No other ministry is likely to have the orientation or the staff to deal with health-related issues.
5. Each country needs a mechanism for looking at and managing such sectorwide concerns as long-range planning, development of standards, and environmental protection. If some type of sectorwide body does not exist, there will inevitably be gaps in policy and planning, such as ignoring wastewater treatment or the depletion of the country's water resources. To be effective, the sectorwide body must have a formalized role and governmental support.
6. Each country needs a regulatory body at the central level. As governments move toward more decentralized systems and more private sector involvement, their need for regulation becomes stronger.

7. It is probably unrealistic to ask a commercially oriented urban utility to manage a subsidized rural water supply and sanitation program. Urban utilities have a commercial orientation, which is different from the orientation of rural water supply and sanitation programs. In addition, rural water supply and sanitation programs require skills in developing community participation and providing hygiene education, which urban utilities typically do not have. Generally, rural water supply and sanitation is given inadequate attention when it is the responsibility of an urban utility.
8. Countries in which a single national agency is responsible for rural water supply and sanitation generally have fewer problems of coordination and are able to concentrate on serving the rural populations. On the other hand, instead of a single national agency, a country could assign responsibility for rural water supply and sanitation to a department within a larger ministry.

There will be exceptions to nearly all of the operating principles. Nevertheless, the principles are a good starting point for looking at the choices that have to be made in a given country. A careful analysis may show that it makes sense to violate one or more of the principles because of the circumstances in that country. The principles, however, will be valid in many cases.



APPENDIX A

QUESTIONS FOR ASSESSING PRIMARY FACTORS THAT HAVE SHAPED SECTORAL CONTEXT

Historical Background

1. How did the organization of the sector evolve to what it is today?
2. What key historical events helped to shape the current organization of the sector?
3. What has been the political support for the water and sanitation sector? How has it fared vis à vis other sectors?
4. Are certain groups within the country favored in terms of water supply?

Water Availability and Topography

1. What are the primary sources of water—groundwater, surface water, etc?
2. Are there adequate water resources in the country? How has the availability or lack of water contributed to the organization of the sector?
3. Has a lack of water resources contributed to tight control? Or conversely, has the availability of water contributed to increased decentralization?
4. What is the topography of the country? Are there any ways in which the topography has been an important factor in the sector and the way it is organized?

Demography and Land Area

1. What is the population of the country and how is it concentrated?
2. Is the country keeping up with population growth in serving people with water?
3. What is the relationship between the country's land area and population and sectoral organization?
4. Has the size of the country led to increased centralization or decentralization?
5. If the country has dispersed populations, how and to what extent have they been served?

Level of Economic Development

1. How has the level of economic development affected the organization of the sector?
Are funds available for financing capital investments?
2. Does the country have a strong private sector? Is the private sector involved in the water and sanitation sector?

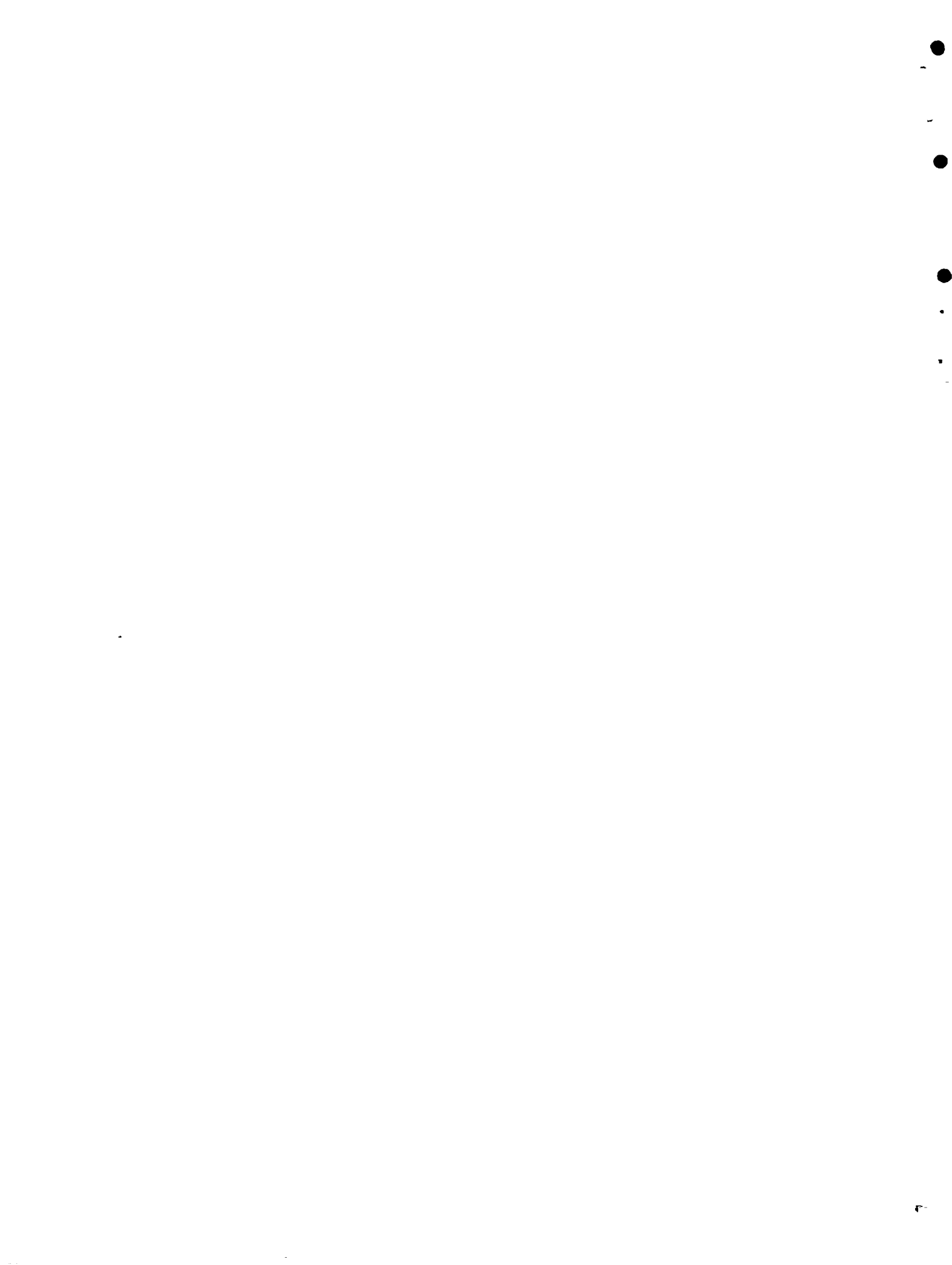
Political System

1. Is the political system an open one? What is the strength of local governments?
2. Does the political system allow for the development of grassroots organizations that manage community water systems?
3. How closely does the government regulate such factors as ownership, land tenure, and tariffs?
4. To what degree are political factors likely to constrain future sectoral reform?

APPENDIX B

QUESTIONS FOR DETERMINING DIVISION OF ROLES AND RESPONSIBILITIES

1. How is the sector organized? Who is responsible for what sector at each level (including not only governmental agencies, but also private voluntary, external support, and lending agencies)?
2. Are the roles and responsibilities divided efficiently? Is anything not being done well?
3. What kind of "coordinating bodies" exist? At what levels? Are their roles clear? Is their functioning relevant to the operation of the sector?
4. Are roles and responsibilities defined in a way that consistently supports articulated policy?
5. How do variables in the political structure influence how roles and responsibilities are divided and how the sector is organized?
6. To what extent are choices related to roles and responsibilities constrained by the availability of trained staff?
7. To what extent does the degree of centralization affect the ability of organizations to be responsive? What roles/responsibilities are decentralized? How did this come about?
8. What formal allocation of responsibilities has been made between communities and the local water agency?



APPENDIX C

QUESTIONS FOR DETERMINING HOW THE MAJOR SECTORAL TASKS ARE HANDLED

Setting Policies and Standards

1. How do overall policies and standards get set and monitored? For example, who is involved and how is the process conducted in making policy decisions related to
 - tariffs?
 - cost recovery?
 - coverage—decisions about who does/does not get water?
 - technology and standards for design?
2. What other important policy areas have been dealt with in support of the sector? Which policy areas remain to be dealt with? Why?
3. What means are used to communicate standards for water quality or design? How are standards enforced? For example, how are records kept; how reliable are they; and what kind of facilities and resources are available for monitoring adherence to standards?
4. What new policies or standards have been developed in the past three years? What changes have there been in the process for developing policy and standards? Why were those changes made? What is the current status?
5. What changes in the process for developing standards and policy are being considered? Why? What is the direction in the sector with regard to policy setting?

Planning

1. How does planning occur? Who does it? How interactive and inclusive is it? What types of planning are conducted in the sector currently: master planning, operational planning, project planning, bottom-up planning? How are plans communicated outside the sector?
2. What types of planning should be carried out that are not currently being done?
3. What macro assumptions have been made about the nature of the good or service: for example, water is a basic need and must be provided; water is a commodity that

must be paid for? How do those assumptions influence the way projects are set up in terms of community involvement?

4. What is the current sectoral coverage (need)? What are the coverage targets of the sector? How were they determined?
5. What strategy is used to gain funding from external support agencies? Does a national plan exist? How are the various requirements and activities of external support agencies coordinated? Is any effort made to standardize project approaches?
6. What are the trends in sectoral planning?

Financing

1. Who is responsible for financing? Does a long-range sectoral financing plan exist?
2. How does water sector funding compete in the overall national budget process with other development priorities? How is this managed?
3. Is funding financed by the treasury or by foreign lenders and external support agencies? How are loans repaid?

Implementing Programs

1. How are programs or subprojects organized in the sector? How are project management and implementation functions distributed among agencies?
2. How effective is the agency(ies) in conducting the full project cycle? What are the strong and the weak areas in project implementation? To what extent are they due to the selection of the particular agency as implementer?
3. To what extent does the implementation agency need institutional strengthening in order to carry out its mandate?
4. What is the implementation philosophy of the agency(ies)—for example, community involvement, paternalism versus community empowerment, high subsidization?
5. How permanent is the implementation structure in the sector, for example, is it a temporary agency set up to implement a project funded by an external support agency?
6. Is the implementation structure integrated with other services (e.g., urban water supply, public works, health)?

APPENDIX D

QUESTIONS FOR DETERMINING HOW SPECIFIC WATER AND SANITATION ISSUES ARE HANDLED

Health and Hygiene Education

1. How has the sector dealt with the question of linking health education to provision of rural water and sanitation over time?
2. What are the sectoral arrangements for integrating health and rural water and sanitation?
3. What has been the role of the ministry of health in rural water supply programs? Has the ministry been an active player in the sector?

Community Management

1. To what extent are communities involved in managing rural water systems?
2. How is "community management" viewed by the sector: Is there political and/or policy commitment to supporting community management? How is this demonstrated? What resources are devoted to the support of community management?
3. What mechanism exists for communities to make clear to "providers" their water needs, interests, and desires (e.g., formal application, work through local politicians, regional planning process)?
4. Do systems planners routinely consider the degree of technology change that a community can manage?
5. Typically, what role does the community play in
 - the design process: What specific techniques have been used to incorporate community input into project design?
 - project negotiations?
 - education about water use and health?

- contributing time and resources?
- cost recovery?

Cost Recovery

1. How is the level of service to be provided determined? Who is responsible for determining willingness and ability to pay for the service?
2. To what extent has/will the community make a fully informed choice about level of service?
3. Are credit institutions or other cost-recovery mechanisms in place?
4. What is the policy on subsidization in the sector? Is provision made for cross subsidization (between urban and rural and/or interurban)?
5. What is the tariff policy in the country? Who sets tariffs? Are tariffs sufficient to cover operating costs? Capital costs?
6. Is there political support for cost recovery in urban areas? in rural areas?

Operations and Maintenance (O&M)

1. Is it clear who is responsible for O&M of rural systems? Explain the division of responsibilities.
2. How has the concept of community participation been incorporated into the promotion of O&M activities?
3. To what extent have programs incorporated business and management skills (bookkeeping, meeting effectiveness, caretaker supervision, regulations, roles and duties of officers) into the design of water projects?
4. How have O&M programs tried to move rural systems toward self sufficiency for system maintenance?
5. How effective is the O&M system? How high is the breakdown rate (downtime for service)?

APPENDIX E

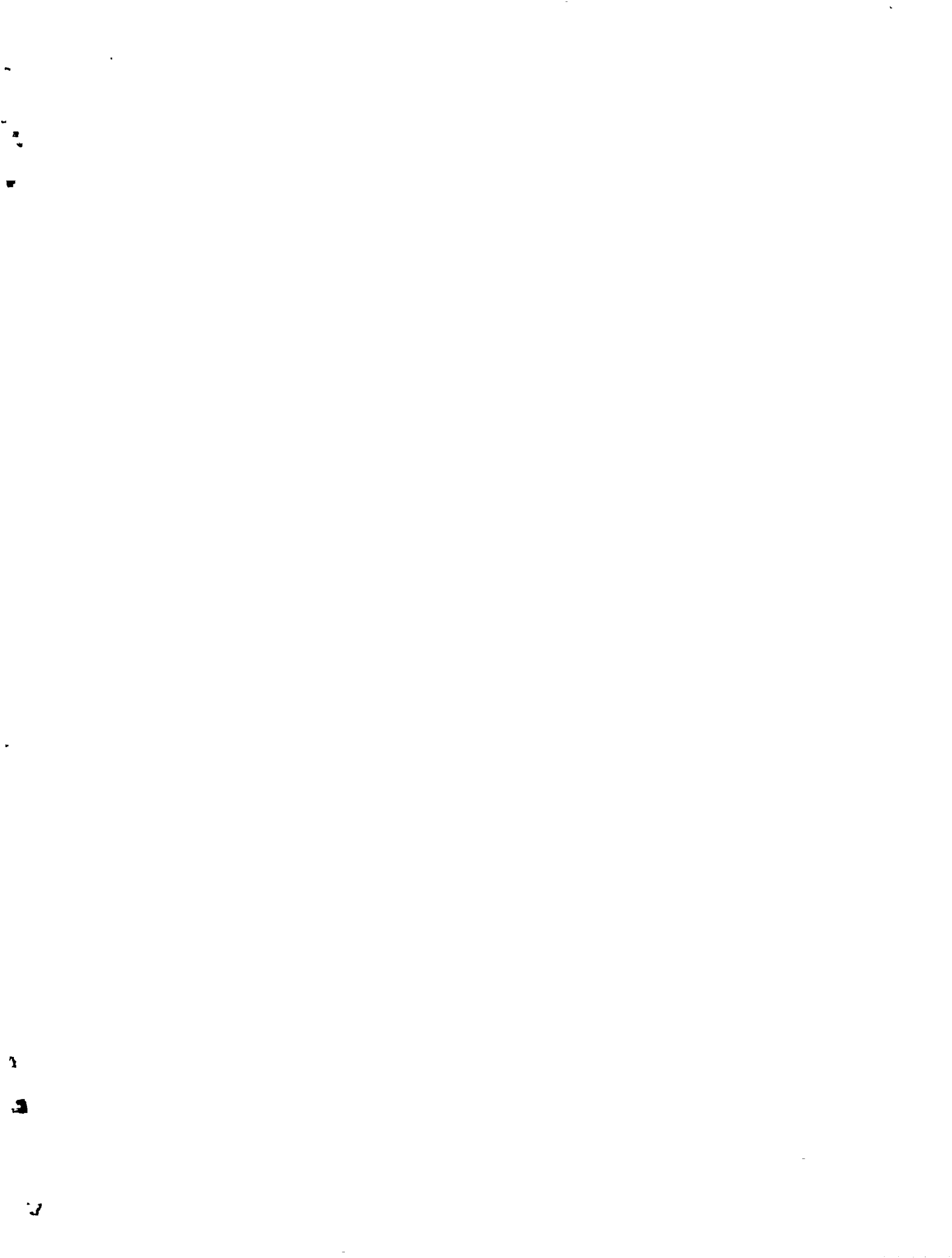
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Camp Dresser & McKee International Inc.
Associates in Rural Development, Inc.
International Science and Technology Institute
Research Triangle Institute
University Research Corporation
Training Resources Group
University of North Carolina at Chapel Hill

WASH Operations Center
1611 N. Kent St., Room 1001
Arlington, VA 22209-2111
Phone: (703) 243-8200
Fax: (703) 525-9137
Telex: WUI 64552
Cable Address: WASHAID

THE WASH PROJECT

With the launching of the United Nations International Drinking Water Supply and Sanitation Decade in 1979, the United States Agency for International Development (A.I.D.) decided to augment and streamline its technical assistance capability in water and sanitation and, in 1980, funded the Water and Sanitation for Health Project (WASH). The funding mechanism was a multi-year, multi-million dollar contract, secured through competitive bidding. The first WASH contract was awarded to a consortium of organizations headed by Camp Dresser & McKee International Inc. (CDM), an international consulting firm specializing in environmental engineering services. Through two other bid proceedings since then, CDM has continued as the prime contractor.

Working under the close direction of A.I.D.'s Bureau for Science and Technology, Office of Health, the WASH Project provides technical assistance to A.I.D. missions or bureaus, other U.S. agencies (such as the Peace Corps), host governments, and non-governmental organizations to provide a wide range of technical assistance that includes the design, implementation, and evaluation of water and sanitation projects, to troubleshoot on-going projects, and to assist in disaster relief operations. WASH technical assistance is multi-disciplinary, drawing on experts in public health, training, financing, epidemiology, anthropology, management, engineering, community organization, environmental protection, and other subspecialties.

The WASH Information Center serves as a clearinghouse in water and sanitation, providing networking on guinea worm disease, rainwater harvesting, and peri-urban issues as well as technical information backstopping for most WASH assignments.

The WASH Project issues about thirty or forty reports a year. WASH *Field Reports* relate to specific assignments in specific countries; they articulate the findings of the consultancy. The more widely applicable *Technical Reports* consist of guidelines or "how-to" manuals on topics such as pump selection, detailed training workshop designs, and state-of-the-art information on finance, community organization, and many other topics of vital interest to the water and sanitation sector. In addition, WASH occasionally publishes special reports to synthesize the lessons it has learned from its wide field experience.

For more information about the WASH Project or to request a WASH report, contact the WASH Operations Center at the above address.