PN-ABC-831

WATER AND SANITATION
FOR HEALTH PROJECT

Operated by
CDM and Associates

Sponsored by the U.S. Agency
for International Development

1611 N. Kent Street, Room 1001
Arlington, VA 22209-2111 USA

Telephone: (703) 243-8200
Fax (703) 525-9137
Telex WUI 64552
Cable Address WASHAID

The WASH Project is managed by Camp, Dresser & McKee International Inc. Principal cooperating institutions and subcontractors are: Associates in Rural Development, Inc.; International Science and Technology Institute, Inc.; Research Triangle Institute; Training Resources Group; University of North Carolina At Chapel Hill

APPROACHES FOR PRIVATE SECTOR INVOLVEMENT IN RURAL WATER SUPPLY SYSTEMS

WASH TECHNICAL REPORT NO. 57

APRIL 1989

Prepared for
the Office of Health,
Bureau for Science and Technology,
U.S. Agency for International Development
WASH Activity No. 218

PN-AAC-811

WASH Technical Report No. 57

APPROACHES FOR PRIVATE SECTOR INVOLVEMENT IN RURAL WATER SUPPLY SYSTEMS

Prepared for the Office of Health,
Bureau for Science and Technology
U.S. Agency for International Development
under WASH Activity No. 218

by

Jonathan Hodgkin
Philip Roark
and
Alfred Waldstein, Ph.D.

April 1989

Water and Sanitation for Health Project
Contract No. 5942-C-00-4085-00, Project No. 936-5942
is sponsored by the Office of Health, Bureau for Science and Technology
U.S. Agency for International Development
Washington, DC 20423

CONTENTS

CONTENTS (continued)

ACRONYMS

A.I.D.	U.S. Agency for International Development (Washington)
CRS	Catholic Relief Services
EDUCSA	*Education Comunitaria Sociedad Anonima* (Honduras)
NRWC	National Rural Water Corporation (Sudan)
O&M	Operation and Maintenance
PVO	Private Voluntary Organization
RWS	Rural Water Section (Malawi)
SODECI	*Société de Distribution d'Eau de la Côte d'Ivoire*
UNDP	United Nations Development Program
USAID	Overseas Mission, U.S. Agency for International Development
VLOM	Village Level Operation and Maintenance
WASH	Water and Sanitation for Health Project

EXECUTIVE SUMMARY

This report analyzes successful private sector roles in rural water supply and provides lessons from these experiences that planners of water resource projects and programs can draw upon.

The private sector is defined as that sector of the economy not owned by the government. It includes private enterprises as well as community and voluntary nonprofit organizations.

Private sector involvement in public water supply systems is not common worldwide. However, international donors and developing country governments alike are showing increasing interest in improving cost effectiveness, reducing subsidies, and improving levels of service to water users. They are looking for greater contributions from beneficiaries for project initiation, design, construction, and operation and management (O&M), in the belief that community participation is necessary to sustain water supply projects over the long term.

A formula for the most effective use of project funds should be based on a partnership of government agencies, the private sector, and the beneficiary communities. The role of each, within the limits imposed by government policy and regulation, can usually be determined by the choice of technology and the scale of the proposed water supply system.

The three technologies most widely used are mechanically driven, gravity, and handpump systems. Mechanically driven systems are usually organized as public works for which the government has major responsibility, whereas gravity and handpump systems tend towards organization and management at the community level with less government intervention. Mechanically driven systems usually require large capital investments in pipe networks. They are often installed in areas where access to water sources is otherwise limited. Governments subsequently take on responsibilities that relate to equity, water quality, and protection of resources.

The technical simplicity and low cost of gravity systems make it possible for communities to take full responsibility for local water supplies, including collecting fees and managing O&M, and direct government involvement is often unnecessary.

Handpump systems, characteristic of smaller villages where gravity systems cannot be used, usually involve a greater degree of government intervention. Government responsibility extends to drilling, installation of equipment, and some equipment repair.

Historically, the most common private sector role in all three technology choices has been in contracts for specific services during construction. Contracts for civil works, survey work, well siting and drilling, and equipment purchase and installation are typical. The extent of participation is dependent on the technology used and the organization and management of the system.

Gravity systems need comparatively few skills and little capital equipment for design and construction and have limited maintenance requirements. Contracting roles have been in survey and design work, provision of materials, and building concrete structures. Most of this contracting is at the village level and is likely to draw upon the informal private sector.

Handpumps systems are slightly more complex, requiring a drilled or dug well and the maintenance of the pump itself. Contracting functions include well site identification, well construction or drilling, and provision of materials (including fabrication of pumps in some cases). There are increasing opportunities in maintenance and repair, typically a response to the failure of government agencies to meet maintenance needs at the village level. Contracting for siting and drilling is likely to be at the regional or national level because of the capital and skills requirements. Hand-dug well construction and maintenance and repair contracting is more likely to be at the regional or local level.

Private sector contracts for mechanically driven systems have covered all phases of installation--design, well siting, drilling, provision of materials, and construction. Only larger firms are usually able to participate because of capital requirements, skills, scope of contracted operations, and the nature of the bidding and contracting process. The private sector has been involved in O&M as well, often for engine or pump overhaul in the workshop.

More comprehensive private sector roles include monopoly franchising and management contracts. These require a favorable regulatory environment, a strong formal private sector, a tariff structure allowing full cost recovery, and lengthy implementation periods. Franchising and management contracting are seldom found in rural water systems because the preconditions for success are rarely present.

Project designers and evaluators should acknowledge community organizations formed to address water and health issues, and should seek opportunities to increase their participation. Where private contracting is not a common practice to relieve staffing, skills, or funding constraints, technical assistance groups should lobby for it.

The full range of government's role in public water supply will be defined by public policy and social attitudes in specific countries, and by perceptions of the degree of responsibility it should assume for the welfare of its population and the control and distribution of public goods.

The major purpose of water programs is to improve the health and living conditions of users by increasing the quantity and upgrading the quality of supplies. Overall resource planning and regulation of use are legitimate government functions, as is the need to check water quality and ensure that it meets required standards. It is possible, however, that private entrepreneurs, under contract to the government, could perform the water quality checks on rural water supply systems. Larger questions of groundwater exploration, water allocation, and protection of watersheds must be left to public policy bodies.

Some aspects of public water supply should remain a government responsibility for reasons of equity, quality control, and resource management. Efforts to promote greater private sector involvement should be made on a case-by-case basis and should take into account the policy environment, private sector capability, the potential for increased efficiency, and the anticipated cost savings of individual initiatives. Government will always have a role in public water supply, at the very least in planning, oversight, monitoring, and emergency assistance for certain technologies. For smaller systems with active community organizations, this role may be limited.

Private sector involvement will be influenced by government stability and favorable policies. Private firms will be encouraged by laws and regulations conducive to investment and the anticipation of an adequate return. Conversely, government policies which restrict resources such as fuel and foreign exchange will discourage the private sector from taking responsibility for performance over which it does not have full control. The business environment is different in every country and must be examined before any commitment is made to broad private sector participation in public functions.

Private sector participation depends, in large part, on who has responsibility for the various aspects of design, implementation, and O&M. Expanded community participation in the smaller water supply projects increases opportunities for local entrepreneurs in the formal or informal sector. The more ambitious projects with a public works component are more likely to generate opportunities for larger established firms.

Although broad private sector participation may be beneficial, contracts for discrete tasks are the best and most effective first steps in introducing the private sector. Those where performance can be easily measured and monitored are most likely to succeed. In addition, they are usually the most acceptable to governments which perceive the provision of water as a public sector responsibility.

Chapter 1

INTRODUCTION

1.1 Need for Guidelines

There has been an increasing awareness in recent years that government provision of water supplies in developing countries has too often proved inadequate, especially in rural areas. This is particularly true in countries with centralized water authorities, poor rural infrastructures, and limited public funds. Even though water provision traditionally has been perceived as a public sector responsibility in most countries, developed and developing alike, there is increasing interest in permitting the private sector to offer this service.

In an era when development funds are shrinking, international donor agencies are focusing on reducing subsidies and relying more on cost recovery from beneficiaries through market mechanisms. This carries important implications for the private sector and stresses the need for critical reflections on the role of government.

In several developed countries, notably France and the USA, the private sector has a significant function in water supply. In developing countries the idea is relatively new and examples are few. But one form of private sector participation that has gained increasing acceptance is the involvement of local communities. Many governments expect that communities will at least be responsible for all O&M once the water system has been installed. In some cases communities assume tacit ownership by bearing construction and future replacement costs. The government typically provides designs and training for community projects. Successful examples of these are multiplying, but improvements are still needed in developing models which provide an optimum mix of community and government participation.

The private sector has always had some part in the public works type of potable water supply project. In many countries it has provided equipment and materials and such services as system design, well drilling, construction, and equipment repair. In several developing countries water is supplied under franchise or monopoly contract arrangements .

Case studies of several projects demonstrate that under certain conditions the private sector can provide water more efficiently and at lower cost. But with these notable successes there have also been many failures. Attempts to replace inefficient government services have not always led to predicted improvements and have sometimes left water users without recourse to either sector. In other cases services have been inequitably distributed, leaving poorer consumers without adequate supplies. Finding the right combination of technical, economic, social, and institutional factors that indicates when government services should be replaced by the private sector is a delicate process. Considerations of efficiency and effectiveness must be balanced with those of feasibility and equity. The guidelines provided here are intended to aid planners in determining when private sector intervention is most appropriate.

1.2 Purpose of Report

This report analyzes successful private sector roles in public water supply projects, with emphasis on rural water supply. It provides project officers and planners, project design teams, and evaluation teams with an overview of the potential for private sector involvement, and highlights the effective use of the private sector in achieving project goals. Water supply is subdivided into the three most common methods of delivery: gravity, handpump, and mechanically driven systems. Each of these has particular implications for the private sector. Rural sanitation and urban water supply and sanitation are not specially addressed in the report, although most of the general discussion applies equally to these sectors.

1.3 Definitions

The private sector is defined as that segment of the economy not formally owned, financed, and controlled by government. It includes all nonsubsidized cooperatives, nonprofit organizations such as indigenous private voluntary organizations (PVOs) and some community organizations, as well as privately owned and operated enterprises. It excludes parastatals and government agencies and ministries.

Privatization and private enterprise development are two separate aspects of private sector activity. Privatization, as understood by A.I.D., is "the transfer of a function, activity, or organization from the public to the private sector" (Implementing A.I.D. Privatization Objectives). The focus of privatization has been the divestiture of publicly held companies and parastatal organizations. Private enterprise development, on the other hand, refers to technical assistance and/or credit given to either individual entrepreneurs or companies already functioning in the private sector. Assistance which benefits private enterprise can also be provided collectively to an industry or a country through broader initiatives. This process leans towards strengthening existing enterprises rather than creating new ones by moving government activities in a block to the private sector.

The private sector is loosely divided into informal and formal sectors. In general, the informal sector is characterized by ease of entry, reliance on indigenous resources, family ownership, small-scale operation, labor intensive and adaptive use of technology, skills acquired outside the formal education system, and unregulated and competitive markets. Most urban and rural artisans fall within this category. The formal sector is characterized by official government recognition, hired labor, more complex skill requirements, and greater capitalization. Both have traditionally had roles to play in contracting for the provision of goods and services in public water supply projects.

Chapter 2

BACKGROUND TO PRIVATE SECTOR PARTICIPATION IN RURAL WATER SUPPLY

2.1 Control and Responsibility for Water Systems

The form of private sector participation is generally determined by who has control of and responsibility for water supplies. In the two most common arrangements, authority rests with either a public works agency or a local community. The public works model is characterized by:

- Regional or central control of water supplies by a government agency
- Responsibility for more than one system
- More complex arrangements of pumps, pipe networks, and water treatment
- Cost recovery through taxes or a subsidized fee

This structure is found more often in larger population centers but may also serve smaller villages. For example, in Botswana, the central government, through the Department of Water Affairs and district level maintenance units, operates and maintains more than 500 diesel engines, with storage tanks, pipe networks, and standpipes, in villages as small as 300 people, with little or no community participation.

The community model, more common for smaller rural water systems, is characterized by:

- Local control of service
- Beneficiaries who take an active part in supplying their own needs
- Responsibility for only one water supply system
- Simpler, less costly delivery arrangements
- Cost recovery through locally assessed fees

This structure is better suited to less capital-intensive technologies such as handpump and gravity systems. In many countries, community organizations and self-help groups provide the impetus for initiating water projects. They often

contribute some of the capital costs, assist in construction, collect fees, and take responsibility for O&M, with little or no government intervention. Depending on the nature of the community organization, it may be possible for the private sector to participate through contracts with technicians or mechanics.

Between these extremes, there are a number of ways that responsibility can be shared. One common arrangement is for the central government (often with donor assistance) to take responsibility for construction, and for the community to supply unskilled labor and to decide on some aspect such as the location of water points. After completion, the community takes responsibility for O&M, except for major repairs beyond the capability of local technicians. For example, in Thailand, the sanitary engineering division of the Ministry of Public Health is responsible for construction, training of community operators, and continuing support and supervision. The communities themselves meet recurrent O&M expenses, including minor pump repairs, through user fees.

Other forms of partnership among users, government agencies, and the private sector include franchising, management contracting, private cooperatives, and vouchers or grants. All of these forms should be examined for their potential to reduce costs and increase efficiency.

The type of ownership and responsibility determines the type of private sector contract opportunities available. Regional or central public works call for formal government contracts characterized by:

- Specifications that only the larger sector firms can meet
- Competitive bidding
- Requirements for specific services for a large group of systems or over a large geographical area
- The contractor's ability to provide a wide range of support services

Community-based water supply systems are more likely to depend on a local response from smaller firms and informal sector operatives. Opportunities for private sector involvement are characterized by:

- Arrangements with smaller firms or individual technicians
- Requirements for a limited range of services
- Direct noncompetitive contracts with user organizations

2.2 Reasons for Including the Private Sector

Water supply projects are usually conceived as a means of improving the quality of life and reducing the incidence of waterborne disease by providing a population with potable water. For example, in Malawi, the goal of a USAID project was "to improve the basic living conditions and health of Malawi's rural population." In Tunisia, it was "improved health and quality of life." In Haiti, it was to "improve the quality of life in the targeted communities and to strengthen community institutions to enable them to manage the water supply and sanitation systems constructed under the project." The focus always is to provide a sustainable water delivery system, not to promote private sector development or engage in privatization activities. It is appropriate that these should be secondary considerations.

Nevertheless there are good reasons to include the private sector in public water supply projects. The likelihood of more efficient delivery at lower cost is one. Another is a more ready response to local needs, particularly if the formal or informal private sector entities operate within the local framework. The private sector can also step in when governments are unable to meet a demand for expansion because of fixed resources.

Maintenance is less likely to be deferred under private management, whereas government organizations tend to defer maintenance until major breakdowns occur. Rigid civil service regulations, the indifference of government employees, and limited maintenance budgets frequently explain this sluggish response. Private organizations can act quickly and are not usually hampered by red tape.

But the private sector is not always the best answer. In some cases public agencies are surprisingly efficient and leave little room for improvement. In others, the private sector, encumbered with old or inappropriate equipment, poor management, and undercapitalization, are unlikely to offer improved efficiencies. Somalia is a case in point. Private sector potential for increased efficiency and reduced costs needs to be carefully examined, therefore, before any commitment to private sector participation is made.

2.3 Resistance to Including the Private Sector

Resistance to private sector participation may come from the government and from private firms as well.

Among public services, water supply is one in which the private sector has been least involved. The regulation of water resources and water delivery have traditionally been considered the domain of government. Water may be the single most important indication of government beneficence in rural areas and, as such, a significant element in social and political stability. Highly visible private sector involvement could be construed as evidence of the unwillingness or inability of government to provide this essential service.

Governments are often concerned about the manpower implications of increasing private sector activity. Moving certain functions from the public to the

private sector may leave a surplus of personnel. If this is so and the government feels a responsibility to retain staff already in place, often for practical or political reasons, limited savings will result from the transfer. For example, in Botswana, a decision was made to contract out the installation of new water storage tanks. As a result, the existing tank erection crews were underutilized and the potential cost savings were not fully realized. Another reason for government resistance could be the higher initial cost for contracting if retraining of staff is required.

Technical agencies in developing countries often have difficulty attracting and keeping qualified professionals when more enticing opportunities are available outside government. Encouraging private activity will only increase these opportunities and help private firms to hire the most qualified government professionals. In addition, expanding the private sector role places a greater burden on government to find experienced management staff to monitor private activity, while at the same time lower-level technician and labor jobs become expendable.

Although at first it might seem strange that the private sector would be reluctant to seize business opportunities offered by the government, there are several good reasons why this might be so. The work may require a commitment to significant capital expenditures, as, for instance, with groundwater exploration and drilling, where drilling rigs can easily cost over $250,000 each. This has two implications--private firms must be able to raise the funds, which means that credit or venture capital as well as the necessary foreign exchange must be available, and, perhaps more important, must be convinced that the expenditure is worthwhile. They must have confidence in the stability of the government and in the policies that provide these business opportunities, and be assured that these opportunities will provide an acceptable return. If the agency responsible for the water sector contracts work to private firms only when emergencies arise, they will be less likely to show any interest in a long-term investment, though they may be willing to seek a short-term profit.

On a practical level, private companies will tend to shun public contracts if they believe that business practices will not be fair and open and that they will not be paid promptly for services rendered. They may also be concerned if they are denied equal access to resources while being held to rigid standards of performance. For example, if governments retain control of fuel supplies because of their strategic importance, private companies may have difficulty providing services when fuel is short or unavailable. Another fear for companies providing public services is the threat of nationalization, if these services are of a sensitive nature.

2.4 Regulatory and Policy Environment

The regulatory and policy environment can greatly influence private sector activity, either encouraging or inhibiting involvement in areas perceived as for the public good. Some elements relate to private sector activity in

general, others are specific to the water sector. Among those favorable to the private sector in general are:

- Pricing policies that enable cost to be recovery and offer a fair return on investment
- Open and fair contracting practices that promote competitive bidding
- Access to credit and foreign exchange for business expansion and the purchase of necessary goods and materials
- Legal procedures that ensure prompt and fair enforcement of contractual obligations
- Tax structures conducive to investment and the expectation of a fair return
- Industry licensing and regulation that provide the necessary safeguards without hindering competition
- Import controls that allow equal access to the goods and services required to operate a business

Public policy factors specific to the water sector that can affect private participation include:

- Laws that mandate public sector responsibility for water supply
- Traditions or policies on the sale of water
- Cumbersome regulations or expensive permits

Although laws mandating public sector responsibility for water may be restrictive, there may be room for private activity, particularly in contracting for specific services. In some countries water is considered a public good and the sale of water is nominally illegal. More commonly, water is provided at little or no charge at public standpipes. These policies discourage the intervention of entrepreneurs, particularly vendors and private well owners who provide water for a fee. They make cost recovery more difficult, and imply a subsidy to the sector and the absence of opportunity for direct private sector involvement. Regulations and policies limiting well construction and drilling to the public sector, or restrictive practices for obtaining the necessary permits, also work against private enterprise. A careful assessment of the policy and regulatory environment is therefore necessary when considering the potential contribution of private business.

Chapter 3

MECHANISMS FOR INVOLVEMENT OF THE PRIVATE SECTOR

Increased private sector involvement will require the transfer of some functions, activities, and organizations from the public sector. The critical importance of water makes it unlikely and perhaps unwise for governments to relinquish all regulatory control. There are five major mechanisms, short of full divestiture, for increasing private sector participation:

- Monopoly franchises
- Management contracts
- Contracts from public agencies
- Vouchers and grants
- Consumer cooperatives

These mechanisms, along with examples in the United States and Europe, are briefly discussed in the following section.

3.1 Monopoly Franchises

Franchising is a comprehensive form of private sector involvement. The franchise company raises its own capital, owns and operates equipment, and provides the service under contract for a fee to the public sector. A public body monitors performance and regulates the fee structure. This mechanism is common for refuse removal and electrical utilities in the U.S. Franchising need not be a monopoly. Urban taxi services and fast food chains are examples of franchises operating in a competitive market. But provision of water, particularly when pipe networks are involved, is usually considered a natural monopoly.

The advantages of franchising in water delivery are:

- Savings to government from not having to provide funds for capital expenditures
- Continued control of the service through regulation and a tariff structure
- Potential for increased efficiency and reduced cost

Some disadvantages are:

- Possible high costs for users because the tariff structure must reflect the full cost of delivery
- The requirement that private firms assume all financial risk
- Locked-in, long-term contracts (up to 30 years) to allow for recovery of capital investment costs
- Unsuitability for widely dispersed rural systems because of the inability of rural populations to pay the inevitably high cost of delivery
- The possibility of nationalization if the business fails

Examples of water provided under monopoly franchise are found in the U.S. (notably in parts of Hawaii and California) and in several cities in developing countries (Santiago, Chile; Guatemala City, Guatemala; and Casablanca and Tangiers, Morocco). In most cases, the formation of private franchise supply services would require divestiture of the existing responsible government or parastatal agency, except in periurban areas where no service exists.

3.2 Management Contracts

Some public services are operated under a contract that turns management over to a contractor but maintains government ownership of capital assets. Government research facilities in the U.S. usually fall in this category. The approach allows government to change contractors without having to replace all capital equipment. Municipal bus services are an example of a service which can be operated under management contracting.

The advantages of management contracting in water supply are:

- Government planning, design, and construction to assure service coverage
- Potential for increased efficiency and reduced cost in the critical phase of O&M
- Continued control of the service through regulation and the tariff structure
- Shorter-term contracts since capital items are not financed by the contractor

- More comprehensive collection of user fees to fund the contract

Some disadvantages, as with franchising, include:

- Possible high costs for users if the tariff structure reflects the full cost of delivery
- Unsuitability for widely dispersed rural systems

Management contracting for water supply is not common in the U.S. but is practiced in Europe, particularly in France, and in some developing countries like Vanuatu and Côte d'Ivoire, which provides one of the best-known examples. A contract known as *affermage* with the *Societé de Distribution d'Eau de la Côte d'Ivoire (SODECI)* requires the government to develop water sources and install water distribution systems. SODECI, with its own working capital, must operate and maintain the systems, provide water at a fixed rate to customers, and collect fees. The fee structure is negotiated to cover SODECI's operating costs, an allowance for government recovery of capital costs, and a profit for shareholders.

3.3 Contracts from Public Agencies

The most common form of public agency/private sector collaboration is a contract for specific services. The public agency announces the goods or services to be purchased and invites private firms to bid, usually awarding the contract on the basis of cost and timely performance. USAID contracts with private sector firms to provide technical assistance fall into this category. Government responsibilities include drawing up the specifications of work to be performed, monitoring the quality of work, and approving payment for work completed.

This mechanism has several advantages.

- Contracting can be used to overcome specific deficiencies in government operations.
- Many firms can compete, presumably ensuring more cost-effective services.
- Contracts are limited in time and scope.
- Contract monitoring is not difficult if the goods or services are clearly identified.
- Contracting may stimulate the private sector to increase services and availability of commodities.

But there are also significant disadvantages.

- Multiple contracts can be burdensome and difficult for government agencies to manage.
- Several firms capable of responding to contract requirements may be needed to cover range of needs and provide construction.
- The full benefit of private sector efficiency and cost reduction may be lost in smaller contracts.
- If services are contracted for only sporadically, private sector firms are less likely to be interested.

Contracting is quite common in the water sector. For example, materials are supplied on contract in Bolivia, Ecuador, and Thailand. Well drilling contracts are let in Togo, Botswana, and Honduras. Local manufacture of PVC pipe, hand pumps, and other materials is expanding in several countries, such as Kenya, in response to government contracting. Throughout the developing world plumbing, pump installation and repair services are universally available through the private sector.

3.4 Vouchers and Grants

In cases where the government does not want to be directly involved in providing goods or services but wants to be sure these are distributed equitably, it may resort to a voucher or grant system. The government selects a private company to furnish goods or services to the public at below market cost, thereby subsidizing costs. In the U.S., Medicare, the food stamp program, and bus passes for the elderly are examples of this approach.

It has two main advantages.

- The government takes responsibility for providing service with no risk.
- The vouchers or grants can be tailored to correct equity imbalances for particular groups of users.

The disadvantages are:

- These programs can be difficult and costly to administer.
- Funding must be available to cover the real cost of the services, including any administrative costs.

There are no known instances of this system in the provision of water in developing countries, although it offers the advantage of assisting private companies to enter the market where insufficient competition exists.

3.5 Consumer Cooperatives

Cooperatives are a way to organize local participation in the provision of services. They are self-governing and designed to serve the interests of their members. Governments can help by providing management assistance, grants, or credit. Cooperative groups are active in the United States in insurance, housing, and retail sales.

The advantages of cooperative groups are:

- They can be organized with little government intervention.
- They are responsive to consumers' needs.

The disadvantages are:

- Limited experience with water systems
- Limited government control of services
- Capitalization and funding difficulties

Community participation approaches to water supplies often rely on cooperative groups. Whether these are formal cooperatives or merely informal village committees depends on a number of factors, including: the existence of a formal constitution; the ownership of equipment; the absence of a government subsidy; payment for services; and the distribution of profits among members.

The distinction between private enterprise and municipal activity is not always clear, and it is important to examine each community group to determine if it should be classified as a private or public sector organization. Formally constituted water cooperatives exist in Latin America and the Near East. There are many in rural areas of the United States that are privately developed and managed under state licensing agreements. The National Rural Water Association is an umbrella organization that channels assistance to its members for construction, financing, and management of water systems. The World Bank has studied its approach to determine if it is replicable in developing countries and has found several promising attributes.

3.6 Summary of Private Sector Role

Appropriate responses to the need for more efficient, less costly, sustainable water supply systems will depend on the country, the economy, the social structure, and the technology being used. These responses may include strengthening public sector agencies or involving the private sector. Private sector involvement may require government or donor initiatives to promote competition, improve the quality of private sector work, and familiarize private firms with government contracting procedures. The appropriate structure for private sector roles will depend on the:

- Financial resources of the public and private sectors
- Current performance and capability of the public and private sectors
- Potential for cost recovery

The potential roles for private sector involvement in rural water supply are summarized in Table 1.

Table 1

The Potential for Private Sector Involvement in Rural Water Supply Systems

	Good	Possible	Poor
National Water Sector Policy			x
Water Resource Regulation and Planning			x
Construction Standards			x
Capital Investment		x	
Set Tariff Level		x	
Training		x	
Education		x	
Site Selection		x	
Well and Distribution System Siting	x		
Technical Design of pump, pipes, etc.	x		
Construction Supervision	x		
Well Construction/Drilling	x		
Provision of Materials	x		
Fabrication of Materials	x		
Skilled Labor Components	x		
Unskilled Labor Components	x		
Operation	x		
Preventive Maintenance	x		
Repair	x		
Tariff Collection		x	

Notes: The appropriate form for the inclusion of the private sector will depend on the policy and regulatory environment. In most cases contracts for specific services are the first steps toward more substantial private sector involvement.

The following chapters discuss both traditional and innovative approaches to private sector participation in water supply projects. Only the most common types of systems used in rural projects are considered. These are gravity, handpump, and mechanically driven systems.

Chapter 4

GRAVITY SYSTEMS

4.1 Characteristics

In hilly or mountainous areas, it is often possible to provide water by gravity from a source above a town or village through a pipe network and communal standpipes or private connections (also called yard taps or patio connections). The civil works include an intake structure or spring box and may also include a sedimentation tank, pressure break tanks, and a sand filter or water treatment facility. In addition, there are often one or more storage tanks. Maintenance requires caring for the water treatment facility, keeping the spring or water intake clean and in good condition, replacing pipes, and repairing washouts as they occur. This type of system lends itself to community participation in both installation and maintenance because of its simplicity and limited cost. Where possible, it is usually the first and best option.

4.2 Ownership and Responsibility

The public works component is normally limited to construction and, in some cases, to maintenance of pipe networks. A common project approach has been for international private voluntary organizations (PVOs) to work with local community groups, church organizations, or local PVOs to provide funding and technical assistance. It is clear that community participation is an important ingredient for success, even if the participation of the central government is significant. Ultimate ownership of the system may be retained by the government or turned over to the community being served. Ongoing O&M is almost always the responsibility of the village through water development committees. A labor contribution is normally required for construction, and the collection of user fees or periodic assessments are an integral part of funding, particularly to cover the local share of O&M costs.

Many gravity water supply programs (e.g., in Malaysia, Nepal, and Malawi) have substantial government participation. In Malawi, the planning activities were undertaken by the rural water section (RWS) in the Ministry of Works and Supplies. This included scheduling, design, and procurement. RWS staff supervised pipeline construction, which used self-help labor to supplement skilled labor. Local volunteer repair teams under the general direction of RWS take care of routine O&M. They can carry out minor repairs, such as replacing broken taps and PVC pipe, without supervision. RWS has the technical and financial responsibility for major maintenance and repair, including pipeline replacement and repair of intake structures. Ownership of the systems remains with the government. The private sector has made significant contributions through government contracts. These include contracts for the construction of water tanks and treatment works to local builders, and for materials like PVC pipe purchased from local sources. These contributions have helped reduce capital costs and procurement time.

At the other extreme, there has been minimal government intervention in a series of Catholic Relief Services (CRS) projects in Latin America. The CRS approach incorporates local PVOs as "project holders." Project holders take responsibility for the completion of projects, with funding, guidance, and supervision provided by CRS. They assist in community organization, system design, construction, and O&M. The villages through formal village organizations are given ownership of the completed systems. The formal and informal private sectors have both contributed to completion of these projects--as project holders and as contractors. For example, in Ecuador, CRS contracted for studies and designs. The community, through a *junta* (committee) for water and sanitation, was involved with planning, construction, and O&M. Locally made slip-joint PVC pipes and water meters were purchased and used in construction. Local skilled labor was hired for construction, and trained community members partially or fully employed by the *junta* perform O&M tasks. Direct government involvement was limited to approving the designs.

In almost all cases, the community is responsible for most O&M, regardless of who owns the system. If the government retains ownership, as in Malawi, government agencies should assist in maintenance and repair tasks beyond the capacity of villagers. The community provides the funds to fulfill its O&M obligations by collecting payments for water delivered or assessing households a flat fee. Communities are free, within the constraints of the funds available, to contract with private companies or skilled villagers to perform O&M and repair tasks.

4.3 Private Sector Roles

Gravity systems normally can meet the limited requirements of rural villages, although in some areas they supply the needs of large cities as well. Community participation in construction and O&M is important. Users are not able to make large cash contributions. Divestiture, franchising, and management contracting have no place in these systems. Contracting with private firms is inconsistent with the self-help element of most construction. The major role for the private sector has been contracting for professional services in survey and design, skilled labor and materials during construction, and spare parts and materials for maintenance and repair.

In the Dominican Republic and in Ecuador, CRS contracted with local engineers to provide system designs according to criteria spelled out by CRS and the relevant government agency. In the USAID/CRS project in Honduras, each community agreed to follow CRS construction guidelines; receive organization, health, and O&M training; and supply skilled and unskilled manpower and locally available material. It also agreed to meet 5 to 10 percent of the cost of nonlocal materials and all O&M costs. A *patrano*, or village committee, hired masons and organized the collection of funds and the supply of unskilled labor. All community members are trained to maintain the system, and some villages rotate the maintenance duties among themselves. The communities paid the surveyor and his assistant as part of their contribution to the cost of the system, gaining useful experience in hiring and paying for services.

Most gravity supply programs contract with either formal or informal private firms to provide plumbers, masons for the construction of concrete structures (intake systems, storage tanks, and treatment works), and occasionally carpenters to build forms.

Hiring local skilled labor for various civil works components is a common feature of gravity systems. In Indonesia, a USAID/CARE project built several rural water supply systems that depended on strong community involvement. Instead of hiring larger private sector contractors to build large reservoirs, the project used local skilled masons to build smaller ones throughout the service area, thus increasing local participation and providing jobs for local craftsmen.

Most projects purchase materials locally if possible. This includes PVC piping, fittings, and glue, which are made in many developing countries. Imported items (also purchased locally in many cases) include gate valves and taps. Locally manufactured water meters (licensed from a foreign firm) were used in Ecuador. Locally fabricated PVC pipes and fittings have been used in Ecuador, Honduras, and Malawi. In Peru, a USAID/CARE project implemented during the late 1970s used PVC pipes imported from the United States. Problems arose when several villages experienced pipeline failures and locally manufactured replacements did not fit the imported pipes. Local procurement would have obviated these problems and, incidentally, supported a local private enterprise.

A novel and successful use of the private sector was the contracting for the health education component of the water supply project in Honduras to Education Comunitaria Sociedad Anonima (EDUCSA), a local PVO. EDUCSA provided "promoters" to conduct surveys, assisted in organization, and offered instruction in water and health. This arrangement not only supported local private enterprise but reduced project costs and took advantage of local understanding of social structure and health education. The promoters were conscientious and well-liked in the villages and made significant contributions to community activities, particularly if they had been involved during the early planning stages.

A program for community construction of water supply systems is underway in Bolivia. The A.I.D. Bureau for Private Enterprise lent the Bank of Bolivia $2 million at 10 percent interest under terms that allowed the funds to be given to savings and loan associations for loans to communities wishing to install water and sanitation devices. This program was initiated in 1983 but, because of hyperinflation in the Bolivian economy, there was little activity until 1987, when the inflation rate decreased. In a little over a year, most of the funds have been lent to eight projects. This approach to community water supply is dependent on a community's ability to meet part of the project cost in cash or in kind and to repay the loan. Projects whose capital development requirements can be met by labor contributions or relatively low-cost local contracts for all required services are the most appropriate.

Private enterprise does not have a large role in the maintenance of gravity systems. Generally villagers perform this task themselves, and those repairs beyond them are considered the responsibility of the government. However, contractors may have some opportunity to participate in making these larger repairs.

Chapter 5

HANDPUMP SYSTEMS

5.1 Characteristics

In areas where the water table is relatively close to the surface (less than 50 meters below) and the water requirement is moderate (villages of 250 people or fewer), handpumps are often the best choice. The main components of the system besides the handpumps are drilled or dug wells in a shallow aquifer. A village may have one or more wells, each equipped with a handpump. Users must come to the handpump to collect water. No pipe network or public water storage tanks are installed normally.

5.2 Ownership and Responsibility

Drilled wells equipped with handpumps have become the most common means to provide potable water to smaller rural communities, and efforts have been made to include regional and central organizations in installation and O&M. Projects work closely with host government agencies in site selection, construction, and installation, and include communities and community organizations in planning, health education, and maintenance and repair. Often donor organizations will contract or themselves perform the necessary siting and drilling. Community participation helps to ensure that simple maintenance and repairs are performed regularly at the local level. Where local skills and equipment are deficient, an area or regional organization must help. This organization may be a government public works agency, a private company, or a PVO.

The village level operation and maintenance (VLOM) approach to handpump projects requires a handpump that can be maintained and repaired at the village level with basic tools and with skills that can be taught easily. To date, no true VLOM handpump suitable for moderate-to-deep installation has been developed. The Afridev handpump is currently considered closest to this ideal.

In Sudan, UNICEF is supporting handpump projects in cooperation with the Sudanese National Rural Water Corporation (NRWC), a government agency. UNICEF provides the equipment and technical assistance to NRWC, which implements the projects, assumes ownership of the equipment, and is ultimately responsible for its operation. The fabrication of the India Mark II (the chosen standard) within the country is being explored.

Maintenance of the equipment is arranged in a three-tier system. Each handpump in a village is in the charge of a caretaker, who can turn to local men and women trained in pump care and simple repairs. At the next level, an area pump mechanic who is able to perform more complex repairs looks after 10-30 pumps, and obtains the spares he needs from NRWC workshops. Above him is a mobile NRWC maintenance team for repairs he cannot handle. However, funding and logistical difficulties frequently slow the response from the NRWC mobile teams, and there is concern about the future availability of spare parts. In these

circumstances, there is a growing interest in the use of private mechanics and private entrepreneurs for maintenance and repair.

The USAID/CRS project in the Dominican Republic, mentioned in the last chapter, also had a component in which about 50 locally made handpumps were installed in two of the five project areas. These pumps were 75 percent cheaper than the ones made in Santo Domingo, the capital. Communities participated in the digging of wells, contributed to project costs, and assumed ownership of the equipment. Contributions for spare parts are rarely collected in advance, but there is a readiness to pay when the projects need money. Maintenance is carried out by local pump operators supported by a technician available through the project holder, a local PVO.

This system, which vests ownership in the village, makes for proper maintenance of the pumps. The village relies on nearby shops to supply spare parts and on local technicians to repair the pumps, providing opportunities for small businesses and individuals.

5.3 Private Sector Roles

Private sector management contracting for rural handpumps has been attempted only in Côte d'Ivoire. From 1973 to 1987, SODECI (see Chapter 3) provided maintenance and repair under contract to the government and had its contract expanded to include the maintenance of about 250 rural and urban handpump systems. The villagers were required to pay a fee for this service, but SODECI had a difficult time collecting because the villagers were not convinced that the service they were receiving was worth the money.

The Côte d'Ivoire experience suggests that it is easier to collect fees when pumps break down than when they are operating smoothly. The unsubsidized cost for a central organization, private or public, to maintain handpump systems is high, because of transportation and overhead expenses that must be met from the limited revenue generated by the small volumes of water pumped. In 1987, the government released SODECI from this part of the contract and took over the maintenance of handpumps itself. At this time, it does not appear that the government is doing any better than SODECI. The difficulty with monopoly franchises or management contracts is that they depend on cost recovery to meet operational costs.

Under certain conditions, local community organizations are in effect private consumer cooperatives, as when a formal structure exists and no direct subsidy is paid to meet the needs of members. To the degree that they contract for various requirements of design construction and maintenance and repair, they stimulate private sector activity. The example from the Dominican Republic cited earlier falls into the category of a community organization acting as a private cooperative. The community owns the equipment and is responsible for all maintenance and repair.

There are clearly many contracting opportunities for both the formal and the informal private sectors in handpump programs. These include:

- Siting, drilling, and constructing wells
- Fabricating handpumps and spares
- Selling and installing of equipment
- Maintenance and repair

These services have normally been obtained through direct contracts for specific goods or tasks. However, there are innovative arrangements, such as contracting on a contingency basis for services as needed, that should be considered.

Well construction and drilling is one area where contract services offer significant savings in time and cost. Dug wells are often constructed with village self-help labor, usually with guidance from government or project personnel. In the Sudan, a Swedish project has found that contractors have significantly hastened well completion. Rather than a lot of unskilled laborers working sporadically, a small experienced group works steadily from start to finish. In Burkina Faso, and other countries where experience is important because of the potential danger in construction, there are artisanal cooperatives skilled in the construction of hand-dug wells.

Hand drilling is often suitable for wells that will be equipped with handpumps. It does not require extensive capital equipment and can be a cost-effective means of providing shallow wells. However, drilled well construction, especially in hard rock zones, requires a suitable drilling rig and highly skilled drillers. Equipment cost can be a significant barrier to entry into the field. Even small cable tool rigs cost $20,000. But in many countries private drilling companies already exist, some with quality drilling equipment and good drillers. For example, in Botswana there are two companies operating several rotary rigs, with a total of about 10 private drilling contractors. In such countries, private contracting of drilling operations can be cost-effective.

In Togo, USAID's Rural Water Supply and Sanitation Project contracted drilling operations to the private sector firm of Griffin-Intrafor, Inc., cutting drilling costs by about one-third, and well siting to a French firm, *Bureau de Recherches Geologique et Minières*. Villagers contributed to a maintenance fund, purchased cement for well aprons, procured sand for construction, supplied manual labor, and provided lodging for project workers. They have collected fees and maintain a bank account for future repairs. Fund-raising for maintenance has been successful enough that the reserve exceeds the average balance recommended.

A recent project evaluation in Burkina Faso reveals that the private sector there can provide high-quality drilled wells at 40 percent less than the government. But it recommends that government should continue to be involved with well drilling to serve as competition for the private sector, maintain the

flexibility to handle emergency situations and jobs in which the private sector is not interested, and utilize equipment already paid for.

Private sector drilling prices are not always cheaper. When CARE wanted to contract for drilling services in the North Kordofan region in Sudan, it found government costs to be lower. Government rigs are based in the region, whereas the private firms are all based in Khartoum. The transportation and set-up costs for the private firms made them a more expensive choice in this case.

The World Bank and UNDP have made substantial investments in promoting low-cost simple technologies which communities can maintain with their own resources. Current trends in handpump projects monitored by the World Bank favor those based on a consideration of local financial resources, increased community participation in maintenance management, and the exploration of in-country fabrication.

Fabrication of handpumps and handpump spares has been undertaken in a number of countries, including Zimbabwe (Blair pump), India (India Mark II), the Dominican Republic (Battelle/A.I.D. pump, a direct acting pump, and a Mark II derivative), Indonesia (a USAID project design and the Bandung), Thailand (Korat and Lucky among others), and Bangladesh (Tara and Rower). Many of these ventures were subsidized by donors during the initial stages. In a few cases, most notably with the Mark II in India, they are now thriving industries.

The primary advantage of local manufacture of handpumps is to remove dependence on outside supply sources and thereby assure the availability of pumps to meet real domestic needs. Local manufacture may allow standardization on one pump and ease the problem of repair and spare parts availability. Domestically produced pumps may be cheaper than imported ones, although the import price of India Mark II pumps in quantity is very competitive and reflects their popularity throughout the world. Also, locally built pumps can be purchased with local currency and reduce the export of hard currency.

A decision to start local fabrication, however, should be weighed carefully, and preceded by studies to determine whether there is a market to sustain such a business. The level of the industrial base and quality control are important considerations. Quality control is needed to assure the pump's reputation, an important factor in establishing long-term markets. The decision to manufacture handpumps should be evaluated primarily from an enterprise development viewpoint but with careful recognition of its effect on the water supply sector.

The private sector has a role in the sale of handpump materials and equipment, both locally produced items, such as cement and piping, and imported items, such as pump heads and spare parts. The success of the maintenance program in Togo depends on a store in each region carrying the pump spare parts. In areas of the Dominican Republic where the Santo Domingo pump is used, parts are available through central warehouses. A better approach would be to supply local stores, many of which are poorly capitalized, with parts to be sold on consignment.

Although handpump projects generally have relied on government agencies or project personnel for installation, this is an area where the private sector could be more active. In Pakistan, Thailand, and a number of other countries,

handpumps have been installed and maintained for private individuals by entrepreneurs. There are thousands of handpumps in the Punjab province of Pakistan alone. This type of spontaneous handpump activity is helped by incomes high enough for individual purchase, a shallow water table permitting the use of suction pumps which can be transported easily and installed without heavy tools or equipment, and low-to-moderate usage so that simple less robust pumps are acceptable. Lifting tackle and a truck would be required for the installation of many deep-well handpumps. Entrepreneurial firms in many countries already have this equipment and could do the job on contract.

The weakest part of most handpump projects has been maintenance and repair. Villagers trained to perform minor maintenance tasks often have difficulty obtaining spare parts and many repairs are beyond their capability. Area or regional government support is often not available because of a lack of transportation, understaffing, lack of spares, or the priority of other work. Increasingly projects are looking to the private sector to assist in maintenance. In Togo, pump maintenance was organized on a two-tier system, with two villagers in each village doing basic repairs and a government technician supposedly available for more complicated problems. But government technicians have frequently been slow to respond, and it has been recommended that a third tier be introduced to provide a regional private sector artisan paid by the village committee to attend to much of the work that government technicians cannot now handle.

In Burkina Faso, the water component of the USAID-funded Rural Water Supply Project was implemented by the *Direction des Puits, Forages et Hydrologie*. Well drilling and handpump installation (Moyno pump) were completed by government crews. Hand-dug wells, when appropriate, were constructed with the aid of the community. Initially, the government's rural engineering division was to have been responsible for pump maintenance with the assistance of artisan repairmen in the project area. This system has not proved altogether successful and a new approach utilizing local technicians has been recommended.

Handpump projects worldwide are contracting for materials and services and are increasing the use of the private sector for drilling wherever this is possible. But private sector maintenance, although a promising approach, is still in its infancy in most countries.

Chapter 6

MECHANICALLY DRIVEN SYSTEMS

6.1 Characteristics

Larger village and municipal water supply systems in many developing countries depend on diesel or electrically driven pumps. Mechanically driven systems normally are installed when the water requirement is more than handpump or gravity systems can supply, or greater power is needed to raise the water at its source. Water volumes greater than 12 cubic meters per day or raising water from depths of more than 30 meters generally require the use of mechanically driven systems. Water is pumped to an elevated storage tank and flows through a pipeline to taps, either standpipes or individual connections. A full-time operator must start and stop the engine, add fuel and lubricant as needed, and monitor performance. Electric motors can be controlled by tank float switches and may not need full-time attention. Well-trained operators, a higher level of maintenance, and a wider range of spare parts are necessary than for either handpump or gravity-fed systems.

6.2 Ownership and Responsibility

The cost and complexity of mechanically driven systems place them in the realm of public works. However, the community can participate by selecting the location of public standpipes, providing labor during installation and housing for workers from outside the village, appointing a pump operator, and assuming some or all of the operation, maintenance, and repair costs.

Some countries require little or no community participation. The government of Botswana has committed itself to providing water in rural areas without charge. The department of water affairs sites and drills wells, installs a pipe network with storage tank and public standpipes, and then turns O&M over to the district authorities. The district water maintenance units have the skilled technicians, vehicles, spare parts, and funding to operate and maintain the systems. System operators are trained and paid by the government. Water at public standpipes is free, and little or no contribution in cash or kind is required. This approach has been tried in many other countries with considerably less success. The design and construction phases can be completed with project funds and technical assistance, but long-term O&M often is less than adequate.

During the years following independence, from the mid-1960s to the mid-1970s, Sudan tried to meet rural needs by installing numerous diesel-driven systems. The government retained ownership and the responsibility for O&M and repair, and users paid fees based on consumption. Many of these systems have fallen into disrepair largely because of problems with funding, transportation, and spare parts. Several villages are now collecting fees over and above the government tariff to pay for engine and pump operation and repair. They provide transportation and, often, spare parts for government repairmen. Community participation has come about by necessity.

Private cooperatives usually have the resources to meet the relatively high cost of mechanical systems and drilled wells. In Kenya, they manage without government support. The initial designs are often inadequate, but private entrepreneurs participate in system upgrading, repair, and replacement of parts to make these systems quite reliable. Funds for O&M are assessed directly to members. This type of arrangement is not uncommon in many countries for irrigation or stock watering. The owners of the system sell water to households and are responsible for all aspects of design, installation, and O&M.

6.3 Private Sector Roles

Opportunities for the private sector are more numerous and varied in mechanical pumping systems. Monopoly franchising in Morocco and Chile, management contracting in Côte d'Ivoire and Vanuatu, and consumer cooperatives in Bolivia and several other countries are examples of successful private sector participation. In some cases, the private sector has taken direct responsibility for water supply systems. SODECI in Côte d'Ivoire offers the best example of management contracting. Water tariffs are higher than in many other developing countries because of the full-cost recovery provision, but the systems are well designed, equipped, and maintained. The factors that have contributed to SODECI's success are:

- Separation of capital investments from operations, making it easier to evaluate performance
- Full recovery of costs from users
- Government access to SODECI costs during tariff reviews
- Freedom to hire and fire staff and compensate them as it sees fit to maintain a high-quality operation.

Abidjan's favorable location near low-cost groundwater sources makes full cost recovery possible. Other nearby capital cities such as Ouagadougou, which depend on expensive and distant surface water developments, cannot expect full cost recovery and must rely on subsidies.

Côte d'Ivoire's *affermage* system is now being introduced in Guinea with support from the World Bank, although there is some local inertia which opposes change. The restructuring of the water supply sector will create two separate entities: a state entity which will be responsible for sector development and will install and own the systems; and a water management company jointly held by government and the private sector which will operate and maintain them as the *affermage* contractor. The regulatory and legal documents have included revision of legal statutes defining the role of the government, a shareholders' agreement between the government and the private firm that make up the water management company, the lease contract between government and the water management company, and the management contract between the water management company and the private sector

firm which will undertake the work. The institutional revisions and contracting agreements have taken about five years to complete. The fee structure will be gradually adjusted over the next ten years to achieve full cost recovery.

Privately owned monopoly franchise water supply companies operate in several countries including the United States. In these cases, public sector agencies monitor water quality and set tariffs. The *Empresa de Agua Potable Lo Castillo Ltda.* and *Empresa de Agua Potable Manqueue* in Santiago, Chile, have exclusive rights to their water sources and invest their own funds in pumps, piping, water treatment, meters, and all other system components. *Lo Castillo*, established in 1943, maintains 43,000 connections. *Manqueue*, established in 1981, is much smaller, with just over 300. Tariffs are set by the Ministry of Public Works and water quality is monitored for both companies. In Guatemala City, the *Compania de Agua Mariscal*, which has been in business for more than 50 years, operates the system as a monopoly franchise. This type of franchise also exists in the Tangiers and Casablanca areas in Morocco. Introducing it would mean the divestiture of part or all of the government agency now supplying service and, in most cases, significant increases in tariffs to cover costs. It may be worth considering in urban fringe areas that do not have service.

Water cooperatives are found in many developing countries. In Santa Cruz, Bolivia, a municipal company was converted to the Sanuapac Cooperative to overcome purported government inefficiencies. The cooperative serves a population of more than 350,000 with a staff of 250. Some services, such as pipe installation and meter reading, are subcontracted to other private firms as a cost-saving measure.

Private sector responsibility for water supply is usually found in the more urban areas of countries with a strong private sector. Larger franchise or management contracts require high levels of technical and management capability and often significant capital investment. But there are also likely to be opportunities for contracting in:

- Site selection and drilling
- Fabrication and sale of equipment
- System design
- Construction and installation
- Operation and maintenance

Site selection and drilling for mechanically driven water systems are, in principle, the same as for handpumps. Important differences are that high-yielding sources must be identified, sites need not be close to users, and well depths may be much greater than 50 meters (the maximum level for acceptable handpump operation). More complex siting methods and more versatile drilling rigs and techniques may be needed. Many countries have developed the capacity to undertake siting and drilling within the appropriate government agency, but companies with these capabilities do exist, for example, in Sudan, Tunisia,

Thailand, and the Philippines. Contracting with private firms for both siting and drilling was a cost-effective solution in Togo.

Fabrication of engines requires a well-developed manufacturing capability. India builds an acceptable copy of the well-known Lister water-cooled engine at a fraction of the Lister price. A number of countries with foundry capability make surface-mounted centrifugal pumps. But care must be taken in recommending this equipment because of the immense importance of quality and the difficulty of maintaining quality control, especially of cast iron components. Easier to recommend are the water storage tanks of cement block, poured concrete, and ferrocement, and now even of fiberglass and steel, that many countries make.

Local procurement of equipment, whether manufactured in the country or overseas, contributes to the long-term success of water supply projects by ensuring that replacements and spare parts from local agents of the manufacturers will always be available. Unfortunately, USAID source requirements do not always facilitate this. In Thailand, for example, a USAID-funded project in the late 1960s and early 1970s used Onan diesel engines imported direct from the U.S. manufacturer. A later World Bank evaluation of the project reported that: "The Onan engines proved to be a disaster. They broke down and spare parts were difficult to obtain. Many have since been replaced with Japanese or British engines." Procurement from a local agent probably would have prevented this. In Tunisia, Genie Rural is constrained by law from procuring equipment from a manufacturer that does not have a local representative. Pipes, valves, taps, cement, and reinforcing steel are available in most developing countries. But even if some items must be imported, purchasing from local agents through a bid process should reduce costs and ensure a continuing source of supply.

Professional services in water system design may also be available. In Botswana, most rural systems were designed by the department of water affairs. However, the department has contracted with local engineering firms to redesign a number of larger systems in need of expansion. This has eased scheduling problems within the department and eliminated the need to increase staffing levels.

Construction and installation are usually restricted to government crews, and greater involvement of the private sector may be difficult if these crews cannot be utilized in other ways. However, opportunities do occur when the construction schedule is heavy. In the Yemen Arab Republic, where 100 new water systems had to be completed, the rural water supply division had 24 private contractors working under its supervision.

O&M is perhaps the most crucial factor in the long-term success of mechanically driven water systems. The more comprehensive O&M franchising and management contracting approaches have been used successfully in some countries, but they are not common and usually require patient effort to persuade governments to make the policy and regulatory changes necessary to establish them. More common is contracting for specific services, such as engine overhaul, which also could be used for preventive maintenance or fuel delivery.

Chapter 7

CONCLUSIONS AND RECOMMENDATIONS

The recommendations for private sector involvement in public water supply fall into four categories--general recommendations and recommendations for each of the three water delivery technologies considered.

7.1 General Recommendations

A careful examination of the public policy, legal, and regulatory environment in each country should precede any consideration of the role of the private sector. In addition, its capacity and its willingness to participate must be determined. These investigations should begin early in the life of the project so that, where necessary, appropriate steps for effective private sector involvement can be taken. These may include setting aside resources to fund training programs for private firms, or to create a policy environment in which increased private sector involvement is acceptable.

The private sector has been effective in the past. Project design and implementation should recognize these contributions, increase focus on plans for successful collaboration between private firms and public agencies, and evaluate the performance of each. More attention must be paid to quantifying the cost and efficiency of these contributions.

Donor-assisted projects provide the opportunity to include private sector services. This is especially true of PVO projects, which have greater latitude than projects working directly with government agencies and have almost always included some private sector contribution, often through the informal sector at the community level, where it is likely to be most effective. Projects involving the government take the public works approach of necessity and are less amenable to private sector solutions. It is in this area that there is more resistance to the private sector. The type of project, the implementing organization, and the degree to which the host government participates dictate the project's relationship with the private sector. PVO projects should be encouraged to be more formal in their relationships with the private sector. Projects within the government structure should work towards private sector inclusion when efficiency and cost considerations justify it.

7.2 Gravity Systems

The USAID approach of utilizing U.S.-based PVOs for construction of gravity systems is conducive to community participation and appropriate for the technology. It is recommended that these projects explore contracting for survey work, masonry, plumbing, and provision of materials. Evaluation of contractors and contract mechanisms should be built into project designs.

Alternative approaches to community financing, such as the loan program in Bolivia, should be examined for their potential. They provide funds and allow communities to make their own arrangements with the private sector. Careful evaluation of the local environment is a prerequisite. These approaches are untried, and sufficient monitoring and evaluation components must be included to identify potential problems and define conditions for success.

7.3 Handpump Systems

Most handpump programs to date include both a government role and a high degree of community participation. Contracting with the private sector to provide siting, well construction, and installation of the pump itself should be considered as an alternative to government provision of these services. But an examination of public and private sector capacity and costs should be conducted before a commitment to contract mechanisms is made.

There is growing interest in private maintenance and repair of handpumps because of concern about the public sector's inability to do this effectively. As a result, the idea of cost recovery at the local level and of community participation in maintenance and repair is gaining attention. The opportunity for area technicians and artisans to provide maintenance and repair should be examined, and where appropriate, they should be supported with training and the basic tools.

7.4 Mechanically Driven Systems

Most mechanically driven systems are of the public works type with extensive government involvement. But even here the private sector has been used effectively through contracting arrangements. In implementing these contracts, it is recommended that the gains in cost and efficiency should be evaluated. Specific areas to be examined are well siting and drilling, fabrication of components such as storage tanks, construction of water supply systems, and overhaul of equipment. Projects should focus on identifying opportunities for contracting, instructing host government agencies in the preparation of bid documents and contracts, and training staff in contract supervision and monitoring.

In some cases there may be franchising or management contracting opportunities. Conditions that favor these are the potential for full cost recovery, a strong private sector, and government willingness to restructure water sector institutions for increased efficiency. But it may take a number of years to firmly establish the private sector in these areas.

REFERENCES

REFERENCES

Baum, Warren C. and Stokes M. Tolbert. 1985. Investing in Development: Lessons of World Bank Experience. Oxford University Press for The World Bank, Washington, DC.

Briscoe, J. 1987. "The Use of Public Resources for Water Supply and Sanitation Projects in Developing Countries." Aqua, No. 3, pp. 137-143.

EPA. 1987. Contract Operation and Maintenance: The Answer for Your Town? Office of Municipal Pollution Control/Planning and Analysis Division.

Lauria, Donald T. 1986. Non Conventional Solutions for Water Supply to Barrios Marginales in Tegucigalpa, Honduras. Report to the Pan American Health Organization. Dept. of Environmental Sciences and Engineering, School of Public Health, University of North Carolina, Chapel Hill, NC.

Manual for Rural Water Supply. 1985. SKAT, Swiss Center for Appropriate Technology and ATOL, Aangepaste Technologie Cntwikkelinqslanden. Zurich.

Neck, Philip A., ed. 1977. Small Enterprise Development: Policies and Programmes. Management Development Series No. 14. International Labor Office, Geneva.

Nolan, Amy J. 1986. A Growing Role for the Private sector in the Provision of Public Services in Third World Cities. A.I.D. Bureau for Private Enterprise, Office of Housing and Urban Programs.

Palestinian Cooperatives on the West Bank and Gaza. n.d. Findings from a study tour by U.S. cooperative representatives.

"Privatisation: Everybody's Doing It, Differently." 1985. The Economist, Dec. 21. London.

Roth, Gabriel. 1987. The Private Provision of Public Services in Developing Countries. Oxford University Press for The World Bank, Washington, DC.

_____. 1986. Privatization of Public Services. Paper for A.I.D. International Conference on Privatization, Feb. 17-19, 1986. World Bank, Washington, DC.

_____. 1985. "The Role of the Private Sector in Providing Water in Less Developed Countries. Natural Resources Forum, July. World Bank, Washington, DC.

Sika, Moses. 1987. "Problems and Potential Solution Related to Improved Water Pumping/Water Lifting in Kenya." Conference on Improved Water Pumping/Water Lifting, Apr. 5-10, Gaborone, Botswana.

U.S. Agency for International Development. 1982. Bureau for Private Enterprise Policy Paper. Washington, DC.

_____. 1982. Community Water Supply in Developing Countries: Lessons from Experience. A.I.D. Program Evaluation Report No. 7, Washington, DC.

_____. 1986. Implementing A.I.D. Privatization Objectives. PD-14, Washington, DC.

_____. 1981. Korean Potable Water System Project: Lessons from Experience. A.I.D. Project Impact Evaluation Report No. 20, Washington, DC.

_____. 1981. Peru: CARE OPG Water Health Services Project. A.I.D. Project Impact Evaluation Report No. 24, Washington, DC.

_____. 1980. The Potable Water Project in Rural Thailand. A.I.D. Project Impact Evaluation Report No. 3, Washington, DC.

_____. 1987. Privatization: A Technical Assessment. Bureau for Program and Policy Coordination. Washington, DC.

_____. 1987. Problems and Potential Solutions Related to Water Pumping/Lifting in Ghana. Conference on Water Pumping/Water Lifting in Africa. Apr. 5-10.

_____. 1980. Tunisia: CARE Water Projects. A.I.D. Project Impact Evaluation Report No. 10. Washington, DC.

Waldstein, Alfred S., John H. Ashworth, and James T. Thomson. 1986. Privatization of Operation and Maintenance of Rural Water Supply Systems. Activity Report. Associates in Rural Development, Inc.

WASH. 1987. Country Case Study: The Dominican Republic. Unpublished.

_____. 1984. Evaluation of the Technical and Community Participation Approach of CARE Assisted Rural Water Supply Projects in Indonesia. Field Report No. 107. A.I.D., Washington, DC.

_____. Field Test of the WASH O&M Cost Estimating Handbook (draft). Activity 419. Ivory Coast.

_____. 1986. Final Evaluation USAID/Burkina Faso Rural Water Supply Project. Field Report No. 191. A.I.D., Washington, DC.

_____. 1987. Final Evaluation of the USAID/Catholic Relief Services Water and Sanitation Program in Ecuador, Peru, Guatemala, Honduras and the Dominican Republic. Field Report No. 201. A.I.D., Washington, DC.

_____. 1988. Final Evaluation of the USAID/Togo Rural Water Supply and Sanitation Project. Field Report No. 228. A.I.D., Washington, DC.

_____. 1984. Guidelines for the Development of Rural and Urban Fringe Water Supply and Sanitation Projects. Working Paper No. 33. USAID, Washington, DC.

_____. 1986. Malawi Self-Help Rural Water Supply Program: Final Evaluation. Field Report No. 186. USAID, Washington, DC.

_____. 1987. Midterm Evaluation of the USAID/CARE Community Water Systems Development Project in the Republic of Haiti. Field Report No. 205. A.I.D., Washington, DC.

_____. 1987. New Participatory Frameworks for the Design and Management of Sustainable Water Supply and Sanitation Projects. Technical Report No. 52. PROWWESS Report No. 50. A.I.D., Washington, DC.

_____. 1987. Privatization Study of the Village Water Supply and Sanitation (VWSS) Project, Lesotho. Field Report No. 215. A.I.D., Washington, DC.

_____. 1985. Proposed Water Supply and Sanitation Strategies for the Ministry of Public Health in Thailand's Sixth Five-Year Plan, 1987-1991. Field Report No. 153. A.I.D., Washington, DC.

_____. 1986. Small Rural Water Systems Project in the Yemen Arab Republic: A Midterm Evaluation. Field Report No. 197. A.I.D., Washington, DC.

_____. 1984. A Study of the Community Promotion Component of the Rural Sanitation Project in Bolivia. Field Report No. 121. A.I.D., Washington, DC.

_____. 1986. Training of Trainers in Malawi's Health Education and Sanitation Promotion Program (Phase Two). Field Report No. 185. A.I.D., Washington, DC.

Water Supply and Sanitation Sector Review. 1987. World Bank Project, Republic of Sudan.

World Bank. 1978. Employment and Development of Small Enterprises. Sector Policy Paper. World Bank, Washington, DC.

_____. 1987. Rural Water Supply and Sanitation: Time for a Change. World Bank, Washington, DC.

Zaroff, Barbara and Daniel A. Okun. 1984. "Water Vending in Developing Countries." Aqua, No. 5, pp. 289-295.