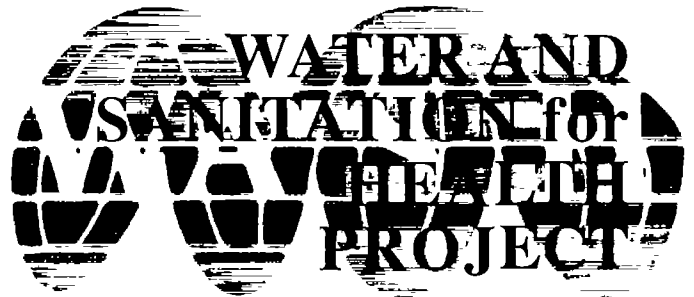


ALTERNATIVES FOR CAPITAL FINANCING OF WATER SUPPLY AND SANITATION

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WASH Technical Report No. 56

ALTERNATIVES FOR CAPITAL FINANCING OF WATER SUPPLY AND SANITATION

Prepared for the Office of Health,
Bureau for Science and Technology,
under WASH Task No. 072

by

James S. McCullough

July 1992

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RELATED WASH REPORTS

The Water and Sanitation for Health (WASH) Project is developing a series of publications dealing with financial management and cost recovery issues. Currently there are four reports in the series. Titles of these publications are as follows:

- Guidelines for Conducting a Financial Management Assessment of Water Authorities (WASH Technical Report No. 53), October 1991.
- Principles of Tariff Design for Water and Wastewater Services (WASH Field Report No. 348), October 1991.
- Guidelines for Cost Management in Water and Sanitation Institutions (WASH Technical Report No. 54), March 1992.
- Guidelines for Financial Planning of Water Utilities (WASH Field Report No. 370), July 1992.

The four reports provide an integrated package of financial and management assistance and have been prepared for audiences at varying skill levels within the financial discipline, at both the operational and administrative levels. The reports take a directive approach and can be used individually or together. WASH Technical Report No. 53 is an assessment and diagnostic tool used to appraise the current financial management situation of a water supply institution. Weaknesses identified in the initial assessment of such areas as cost management, tariff policy, and financial planning can be addressed by using the other WASH reports in the series.

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ACRONYMS

BOT	Build-Operate-Transfer
MDF	Municipal Development Fund
WS&S	Water Supply and Sanitation

ABOUT THE AUTHOR

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EXECUTIVE SUMMARY

One result of the "Water Decade" (1980-90) is that overall investment in water supply and sanitation (WS&S) services in developing countries has held up quite well, even as total public investment and foreign transfers have fallen. This good news, however, is tempered by the fact that WS&S investments have just managed to stay ahead of population growth, especially in urban areas. Furthermore, much of the added investment in the sector has been financed by loans from international donors, which have to be repaid. This increased reliance on loan financing over the past decade has transformed the sector by promoting new institutional structures that recover investment costs from WS&S consumers directly. A fundamental change brought on by this shift to a debt-financed, cost-recovery strategy is that the WS&S consumer behavior now dictates financial viability.

Transforming the WS&S financial structure is not going smoothly. There is ample evidence that major problems must be overcome in mobilizing increased amounts of investment capital and in improving cost recovery from WS&S service consumers. This paper examines the structure of WS&S financing: sector financing (mobilizing investment capital at the national level), and WS&S project financing (cost recovery of capital investment from service users). This report is to be used by host country officials and donor agency staff involved in setting national investment policy and designing mechanisms for financing WS&S services.

The study examines a number of issues in the overall fiscal and policy environments which are shaping the supply of financial resources for the WS&S sector. In general, these forces push the sector toward increased reliance on loan financing, which is channeled through local water authorities mandated to recover costs from service consumers.

International lending agencies (World Bank and regional development banks) have played a major role in this process. At the same time, it is becoming clear that the magnitude of the investment needs will require the sector to mobilize funds increasingly from domestic capital markets and from the private sector. The institutional structures to accomplish this are not yet in place, nor is it clear that the current strategy of debt-financed WS&S expansion will be successful. Early evidence suggests that the existing systems of debt management will need a good deal of adjustment to perform adequately.

This study provides a descriptive model of how capital investments currently flow through the WS&S sector. It discusses the main sources of investment capital, both foreign and domestic as well as private and public. The study also focuses on fiscal relations between the central government and WS&S delivery agencies, noting the issues that have arisen as debt financing has grown more important.

The study also describes the main types of cost-recovery mechanisms, including direct and indirect recovery mechanisms, from simple connection fees to betterment levies and impact

fees. The trade-off in recovering capital costs through either access charges or consumption-based charges is also discussed.

The final part of the paper addresses strategies that can be used to expand resources available for sector financing and for improving cost recovery. Sector financing strategies focus on the role of local governments in mobilizing capital, on increasing access to domestic capital markets, and in expanding the role of the private sector. With respect to the latter, the "build, operate, and transfer" mechanism is examined in some detail.

Improving capital cost recovery requires a management strategy that goes far beyond just selecting the most appropriate recovery mechanisms at the outset. This management strategy requires that WS&S service managers closely monitor the performance of the cost recovery itself, as well as the impact of that recovery on overall consumer demand. WS&S managers are fortunate in that they have a number of different cost-recovery mechanisms to choose from. However, it is also clear that few of these managers have had the information or training to use these mechanisms effectively. The purpose of this report is to help fill that gap.

1

BACKGROUND

1.1 Introduction

This paper describes and analyzes the alternatives for financing the capital costs of new construction and for rehabilitation of water supply and sanitation (WS&S) systems in developing countries. It is based on a "desktop survey" of the experience of some of the major donor agencies, particularly the World Bank and the Agency for International Development (AID), and is intended for host country officials and donor agency staff involved in the setting of national investment policy and the design of financing mechanisms for WS&S services.

The study draws a distinction between sector financing and project financing. Sector financing is concerned with the mobilization of funds at the national level (and between the public and private sectors) for investment in WS&S facilities. Project financing is concerned with the funding of individual projects and largely with issues of cost recovery. The first chapter examines the major trends in WS&S investment and public finance that affect investment decisions and the availability of capital. The second chapter describes the system of capital flows in the sector and the major alternatives for sector and project financing. The third chapter examines the strengths and weaknesses of the alternative approaches and identifies the institutional constraints on WS&S capital financing.

1.2 Demand for Capital Investment in the Sector

By the end of 1990, it is estimated that 42 percent of rural populations and 68 percent of urban populations in developing countries were served by satisfactory water sources, but only 15 percent of rural populations and 38 percent of urban populations had satisfactory sanitation services.

Coverage has improved modestly but consistently since 1980, as shown in Figure 1. The World Bank estimates that it could continue to improve to the year 2000, but only with a considerable increase in sector investment. The World Health Organization (WHO) estimates that about \$9 billion has been invested annually in the WS&S sector during the late 1980s, of which external donors have provided about one-third through grants and loans, and the World Bank has lent approximately \$900 million, or 10 percent.

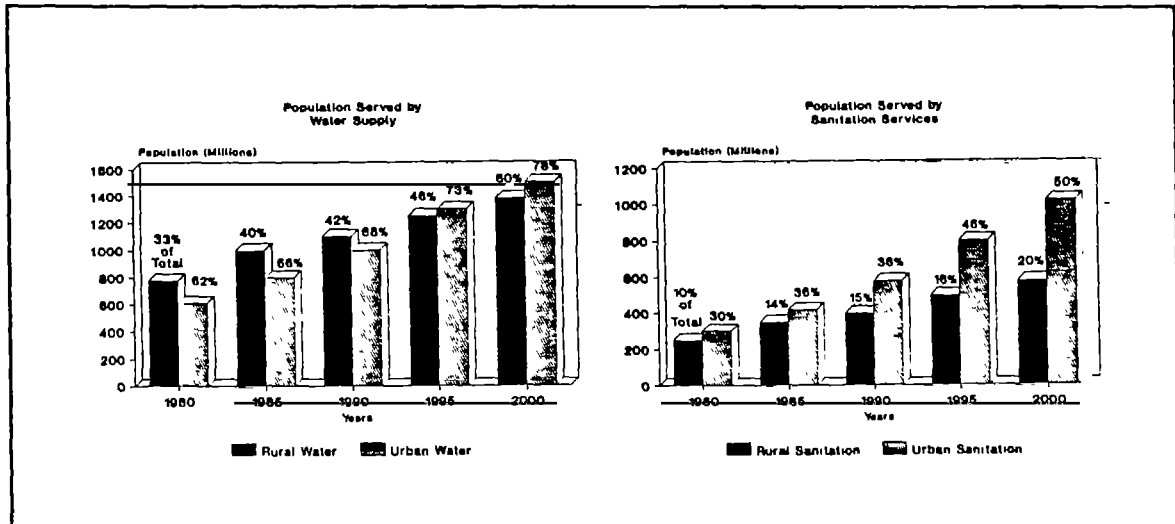


Figure 1. Current Coverage and Future Targets of WS&S Services in Developing Countries

The level of investment has held up quite well during the 1980s despite the generally poor financial climate and falling levels of public investment in developing countries. Figure 2 compares WS&S sector investment with total public sector expenditure and investment from 1985 through 1989. It is notable that WS&S sector investment has remained a stable 0.4 percent of GDP each year in the face of declining public investment.

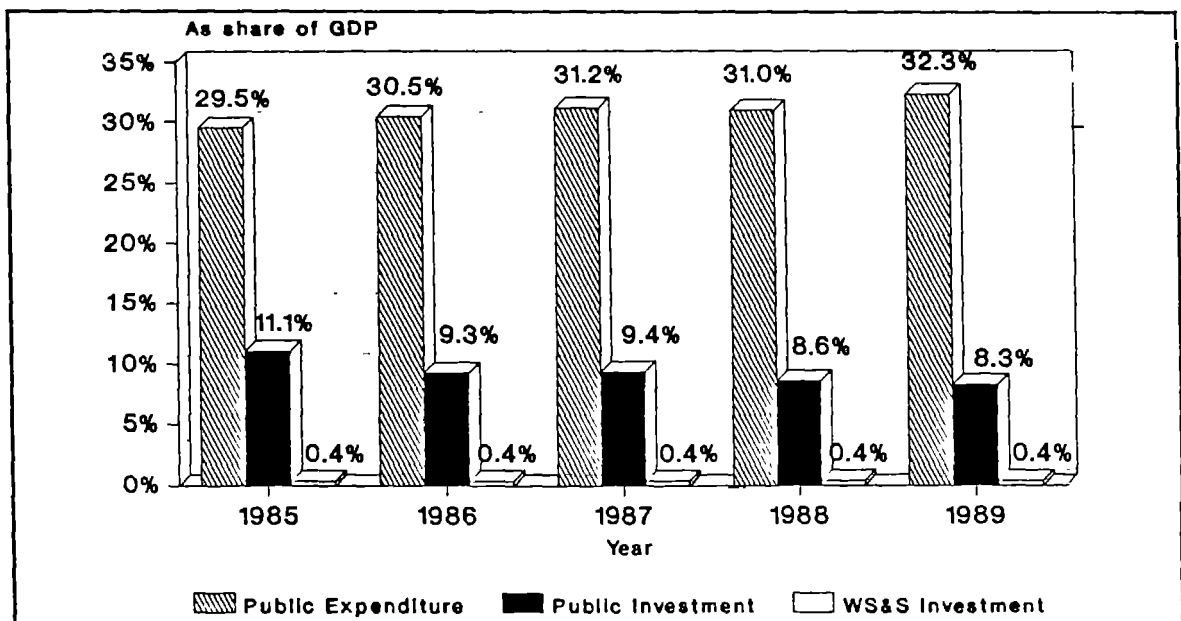


Figure 2. Public Expenditure and Investment and WS&S Investment in Developing Countries

WHO and the World Bank have estimated the costs for increasing WS&S coverage. Figure 3 shows the unit costs and population estimates used to calculate the investment required to maintain current coverage levels and to reach the improved coverage targets shown in Figure 1.

Figure 3 shows that the current annual level of investment of \$9 billion would have to be maintained to keep coverage at the current levels for the next 10 years. To expand coverage to the targets for 2000 will require an annual investment of \$15.2 billion—more than a 60 percent increase and roughly twice the present contribution of external donors.

	1990		Additional Population to be served 1991-2000			
	Population Served (million)	Cost/ Person (US\$1985)	Scenario A		Scenario B	
			At same coverage (million)	Cost (\$mil)	Target Coverage (million)	Cost (\$mil)
Urban						
• water	989 (68%)	120	411 (68%)	49,320	555 (75%)	66,660
• sanitation	550 (38%)	150	229 (38%)	34,350	475 (50%)	71,250
Rural						
• water	1,100 (42%)	40	55.0 (42%)	2,200	275 (50%)	11,000
• sanitation	392 (15%)	20	20.5 (15%)	410	158 (20%)	3,160
Annual Cost of Water and Sanitation (1991-2000)						
	Scenario A		Scenario B			
Urban	\$8.4 billion		\$13.8 billion			
Rural	\$0.26 billion		\$1.4 billion			
Source: World Bank, FY88 Annual Sector Review: Water Supply and Sanitation, November 1988						

Figure 3. Water Supply and Sanitation Investment Requirements in Developing Countries

Figure 3 shows that urban areas will require about 10 times the investment of rural areas, even though rural areas have a larger share of the population. This is explained by three factors: unit costs of WS&S investments, percentages of coverage, and population growth rates are much higher in urban areas.

The combined effect of these three factors is that, under current national investment policies, WS&S capital investment overwhelmingly is an urban issue.

1.3 Trends in Public Finance Affecting the WS&S Sector

National governments, beset by declining revenues resulting from sluggish economic growth in the 1980s, rising debt service requirements, and escalating operating budgets, have begun shifting the costs of WS&S facilities to the users. Although public expenditures as a percentage of GDP have risen steadily, total public investment has declined (see Figure 2). Central governments increasingly have substituted loans to the lower levels of government and WS&S authorities for central government grants to the WS&S sector. This shift is having a profound effect on intergovernmental fiscal relations as well as on national investment policy and the structure of WS&S delivery agencies.

Local governments historically have contributed very little to public resource mobilization in developing countries, relying on central government transfers for virtually all their capital investment funds and a large portion of their operating budgets as well. The fiscal constraints now facing central governments are turning attention to ways of strengthening the revenue generating potential of local authorities, particularly of urban governments which, as a group, have not used the taxing authority they have. Further, local governments are being given new sources of revenue to strengthen their fiscal capabilities, and central governments are placing more responsibility on localities to finance and provide an increasing range of public services. Much of the WS&S sector is being decentralized in this manner.

As central governments turn to loans to finance WS&S facilities, much of the financing will be channeled through a growing number of municipal development, or infrastructure, loan funds. The structure of these funds may range from simple disbursement accounts to full-fledged financial intermediaries (banks) which are being established specifically to manage the transition of urban infrastructure investment from grants to loans. Initially, most will merely channel donor loans and central government transfers. Ideally, they will also serve the function of teaching local governments and public enterprises how to borrow and how to manage debt. Ultimately, such institutions may also serve to raise domestic resources for urban public investment, by either directly entering the domestic capital markets or aiding local authorities to do so. The idea of municipal loan funds is not new and most countries have attempted some form of lending to local governments in the past. Most of these attempts have failed as local governments have fallen behind in repayment, decapitalizing the loan funds. The new efforts at urban lending are trying to avoid some of the failed practices of the past by operating in a more market-oriented environment. These new efforts are marked by closer integration with the national financial markets, limitations on subsidized credit, more attention to the long-term solvency of the loan funds, and better screening of projects and borrower credit-worthiness.

The multilaterals, led by the World Bank, are beginning to divert their lending away from directed, and especially subsidized, credit operations. A major review of World Bank lending practices has found that directed credit operations, such as agricultural credit, tend to impede the development of financial markets in borrower countries which, in turn, retards the capacity

to mobilize domestic savings for investment. A new emphasis on lending that will stimulate domestic financial markets, or at least not undercut the efficient functioning of these markets, could reduce WS&S investment levels, since much of the investment in the sector is both directed and subsidized. This trend will accelerate the shift toward WS&S investment in urban areas, which have a greater capacity for cost recovery and self-financing.

Much of the investment in WS&S systems has been undertaken on the assumption that these systems, especially water supply, would be financially self-sufficient. A recent review by the World Bank of a sample of projects it financed between 1965 and 1980 revealed that only slightly more than 10 percent were able to cover operation and maintenance (O&M) costs plus depreciation and interest charges from their revenues. Internal financial rates of return for many projects have been negative. On average, these rates were half of what was expected at appraisal. Poor financial performance was largely the result of four factors: high levels of unsold water; a lower number of customer connections than anticipated; lower sales per connection; and higher O&M costs. Ultimately, the central government must make up the shortfall for such poor financial performance, even if the funds were lent to autonomous WS&S agencies.

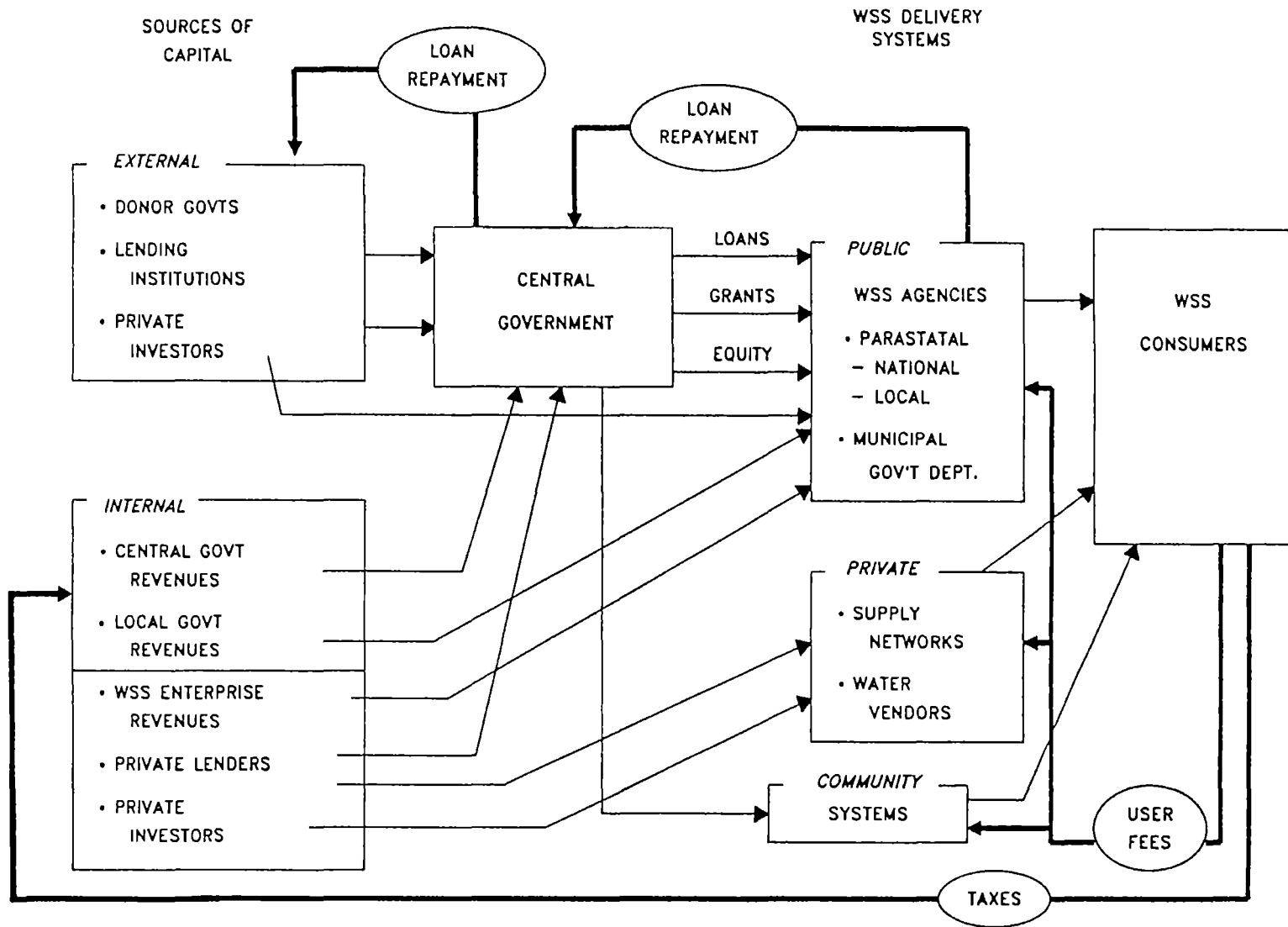
Availability of financial resources for the WS&S sector are closely linked to international credit flows. The total outstanding debt across all developing countries almost doubled throughout the 1980s. Although development assistance increased through the 1980s, the net flow from all lending operations (defined as disbursements minus principal repayment) declined from \$77 billion in 1981 to \$16 billion in 1987. The net transfers (defined as disbursements minus principal and interest repayments) declined from \$35 billion in 1981 to -\$38 billion in 1987. This decline has been due largely to a sharp decrease in private sources of lending, which accounted for \$53 billion of the net flows to developing countries in 1981. In 1987, private sources accounted for -\$2 billion, as repayments exceeded disbursements. The reverse in net transfers (which ultimately has to occur at some later date as loans and investments are repaid) has come much sooner than anticipated and before many countries have been able to grow their way out of debt. It is not clear if and when private lending is likely to resume on a scale approaching that of the past.

Part of the decline in private lending to developing countries can be explained from the demand side—too high interest rates. Real (inflation adjusted) interest rates have remained high since the early 1980s and currently stand at about 5 percent, considerably higher than the postwar average of 1 percent. As the World Bank points out, high real interest rates reduce the ratio of outstanding debt to exports that a country can sustain, accelerating the net transfers to lenders from borrower nations. Even a country like Thailand which borrowed at relatively low rates from the Japanese has seen its foreign debt obligations almost double as the yen appreciated rapidly against the baht in the mid 1980s. In the current environment, foreign borrowing by developing countries will likely be restricted to investments that contribute directly to economic growth in the short run and can generate foreign exchange earnings.

Since WS&S investments do not generate foreign exchange directly, there will be considerable pressure to look increasingly to domestic sources of capital to expand these investments.

Some countries have already moved quickly to reduce dependence on external sources of financing, relying increasingly on domestic borrowing and direct foreign investment. However, many developing countries have relied too much on external borrowing while their own financial systems have remained relatively underdeveloped. In Latin America, for example, external debt at the end of 1986 exceeded domestic bank liabilities on average by 2.5 times, whereas the reverse has been true for India and Thailand—in 1987 India's domestic liabilities exceeded long-term external debt by 2.5 times, and the ratio for Thailand was about 2. The maturing of a country's financial system is a prerequisite to mobilizing domestic resources for investment.

Figure 4. Schematic Diagram of Components of Capital Financing System



2

THE STRUCTURE OF WS&S CAPITAL INVESTMENT

2.1 Elements of the Capital Investment System

Figure 4 depicts the major components of the WS&S capital financing system generally found in developing countries. Since each country has evolved its own particular structure, often quite complex, no single diagram can truly model every system with precision. However, Figure 4 does provide a useful schematic of how capital financing of WS&S services works in general.

Virtually all external capital, and all internal capital except revenues generated by WS&S agencies and local government funds, are channeled through the central government. Capital investment funds are either expended directly by the central government (construction of WS&S facilities) or passed through to WS&S operating authorities. Three types of WS&S agencies are shown: public, private, and community. Beneficiaries pay for capital investment through user fees (tariffs, connection charges, and special assessments) as well as through taxes. In cases where the central government has loaned funds to lower-level agencies, there is a local currency repayment; where it has borrowed externally, there is also a foreign currency repayment.

There are no reliable aggregate data on the contributions of the different sources to WS&S sector investment. Sector studies are almost always limited to the public WS&S sector, but they do reveal that the distribution of financing sources can change dramatically according to the size and type of WS&S systems involved. Figure 5 shows a comparison of WS&S investment sources for Colombia for the decade 1978 to 1987. Large city WS&S systems in Colombia have relied on their own cash generation much more than smaller city systems. Conversely, small towns and cities have tended to rely on national government direct investment. It is notable that the WS&S sector overall in Colombia has hardly relied on domestic borrowing and local government contributions.

2.2 External Sources of Capital

External sources have provided about one-third of the investment in the WS&S sector during the last decade, and about 85 percent of this has come from bilateral and multilateral institutions. The World Bank is the single largest source, contributing about \$900 million or 30 percent of the total external funding. Figure 6 presents the major external sources of capital.

Source	Total Sector	Largest Cities (percentage)	Small Cities/Towns
External Borrowing	45	50	40
National Government	30	7	45
Local Government	10	8	10
WS&S Agency Revenues	15	35	5
Total	100	100	100

Source: World Bank, Staff Appraisal Report: Water Supply and Sewerage Sector Project, 1988

Figure 5. Distribution of WS&S Investments in Colombia by Source, 1978-87

1. Donor Governments (Bilateral)
 - Grants
 - Loans
2. Multilateral Lending Institutions
 - Loans at Market Rates
 - Low-interest Loans (partially funded by donor governments)
3. Private Bank Loans
4. Private Direct Investment
 - Build-Operate-Transfer (BOT) Contracts
 - Joint Venture

Figure 6. External Sources of Capital for the WS&S Sector

The bulk of funds are in the form of loans, further subdivided into loans at market rates and subsidized loans. Multilateral lending institutions generally confine their subsidized loans to low-income countries; bilateral agencies are somewhat less restricted. Bilaterals also may combine their loans with grant funds, making the total package more attractive. Some of the bilaterals

provide not only loans but loan guarantees such as those under the AID Housing Guaranty Program. Under this program, funds are lent by private U.S. commercial banks to the borrower governments, with principal and interest repayment guaranteed by the U.S. government.

The loans at market rates are favorable because, with their excellent record of loan repayment and very high credit ratings, the multilaterals are able to raise funds in the global capital markets at relatively low rates. The loan subsidy programs are made possible by donor governments that underwrite the issuance of low-interest or interest-free loans to low-income countries.

Private bank lending has declined dramatically in recent years, much of it confined to debt rescheduling or limited to countries showing good economic growth and sound debt management. Private foreign investment, which apart from some significant participation by firms in the management of water supply authorities and the attendant investment in equipment also has been very limited. However, as private participation in the sector has increased in recent years, emphasis is being placed on two mechanisms:

- The build-operate-transfer (BOT) approach under which a firm builds and operates a system under a long-term contract and agrees to sell the facilities to the government at the end of the contract
- Joint venture with a local firm which either holds management contracts to operate WS&S facilities or invests directly in them

The primary obstacles to foreign investment are the uncertainty of receiving adequate financial returns and of repatriating profits. The BOT approach, by relying on long-term contracts and some control over tariffs, does away with some of this uncertainty. (It is discussed in more detail in Chapter 3.)

Direct foreign private investment is viewed by some as a preferred alternative to foreign borrowing to increase the net transfers going to developing countries, especially in light of the sharp decline in private lending during the 1980s. This is based on two factors:

- The level of direct foreign investment in developing countries has remained fairly stable during the 1980s even as private lending has dried up
- Direct investment places more responsibility on the investor to select sound projects and to exercise more management oversight—a consideration largely absent when loans are made to governments

The relatively little direct investment of foreign capital in WS&S systems in developing countries is explained largely by the poor risk/reward structure of such investments—the high risks of loss of capital and foreign exchange transactions are not offset by a high profit potential. By contrast, investments in WS&S companies in the developed countries, especially in the United States and Europe, provide a balanced low risk and moderate reward.

2.3 Internal Sources of Capital

Although there is a global estimate that developing country governments raise about \$6 billion a year from internal sources for investment in the WS&S sector, there is no information on the breakdown of that total by individual sources. Figure 7 lists the major internal sources of capital financing for the WS&S sector. Most of the funds are raised by *central governments* through taxes, loan repayments from local governments and WS&S agencies, and local borrowing (through issuance of bonds).

1. Central Government
 - National Taxes
 - Loan Repayments
 - Bond Issues
2. Local Government
 - Earmarked Taxes
 - Transfers from Current Operating Budget
3. Water Enterprise Revenues from User Fees
4. Domestic Capital Market
 - Pension Funds and Insurance Companies
 - Individual Bond Buyers
5. Private Sector Investment in Privately Owned WS&S Facilities

Figure 7. Domestic Sources of Capital Investment in the WS&S Sector

Local governments provide some funding for the sector, most commonly through earmarked taxes and transfers of surplus funds from the current operating budget to the local capital budget. In Jordan, for example, the municipal sewerage systems are financed by a surcharge on the property tax.

Much of the local government revenue in developing countries actually comes from the central government in the form of grants and shared taxes. Consequently, it is often difficult to trace

the true local government contribution to capital investment in infrastructure services such as WS&S. In many of the Francophone countries (especially Tunisia, Morocco, and Cote d'Ivoire), local governments transfer surpluses in their operating budgets at the end of the fiscal year to their capital budgets for the next fiscal year. If there are deficits in the operating budgets, the central government makes them up with "equilibrating" grants.

The *domestic private sector* participates by either lending funds to the central government or investing in privately owned WS&S facilities. Most of the direct private investment is considered to be informal because it is not made by publicly sanctioned institutions, and is generally for private water pumping and distribution systems, private waste treatment for both households and firms, and equipment used by private firms and individuals for water vending and sewage removal.

It is difficult to estimate the true value of these investments although it is undoubtedly quite large (see box).

Serving Half of Bangkok's Water Supply Needs

The formal water supply agency for Bangkok, Thailand, is the Metropolitan Water Authority (MWA). The MWA currently serves only 50 percent of the households in the greater Bangkok area mainly because it has been unable to extend new lines fast enough to cover the rapidly growing residential areas that ring Bangkok. Almost all of the remaining households are served by private suppliers.

The main method of private supply is a small-scale pumped well and piped distribution system serving a housing development. The system is installed and operated by the developer with the capital cost included in the selling price of the lots. The owners pay monthly for operating costs which usually amount to little more than the cost of electricity for pumping. The monthly costs are quite low (on average about one-fifth of the MWA tariffs) and discourage hooking up to the MWA system when it becomes available. In addition, since the homeowners have already paid for the well, pump, and distribution system, they are not eager to pay additional hookup fees to the MWA.

Private WS&S services are necessitated by the unreliability of the public systems. For example, in Nigeria, research by Lee and Anas (1989) shows that over 60 percent of manufacturing firms with more than 100 employees have their own water supply. Their research also pointed up the fact that small-scale enterprises are much more dependent on the vagaries of the public systems.

In addition to direct investment, the domestic private sector finances WS&S facilities through the purchase of bonds. There are very few instances where water authorities themselves issue bonds; rather, the central government issues general bonds which may or may not be

earmarked for WS&S investment. In many countries the proceeds from bond issues are commingled with general revenues (taxes, user fees, etc.), so that it is impossible to ascribe funds for the WS&S sector to a particular source.

Almost all the funds raised from the domestic capital markets are through general obligation bonds rather than revenue bonds. General obligation bonds are backed by the full faith and credit of the issuing government, while revenue bonds are backed by the revenue stream of the project for which they are issued.

Pension funds and insurance companies are emerging as important sources of investment capital in developing countries. To date, however, their financing of infrastructure projects such as WS&S systems is indirect and largely through the purchase of central government bonds. In some countries, the investment opportunities for these funds are highly restricted, and may be limited to the purchase of central government bonds, or lending to national mortgage banks for housing finance. Even where restrictions are few, pension funds and insurance companies still tend to make fairly conservative investments—usually in real estate such as shopping and office complexes.

Although developing country governments are moving toward greater reliance on borrowing by local authorities to finance infrastructure projects, the access to credit is tightly controlled. In many countries, local governments and public enterprises are not permitted to borrow except from the central government, and even where such a restriction does not exist, lenders will usually not lend without central government guarantees. There are some rare cases where local authorities may have direct access to the domestic credit market, usually through local banks. However, these cases almost always involve a central government guarantee for the loan and are frequently part of a package assembled by the central government for financing a major infrastructure construction program, usually with external donor loans.

Developing country central governments often prefer to rely on foreign rather than domestic borrowing to finance WS&S projects. There are three ready explanations for this:

- Nominal interest rates for external loans are almost always less than governments would have to pay on domestic credit markets. Although exchange risks may make the relative cost of foreign borrowing higher, these risks are often not considered. In many cases this risk is not borne by the project anyway.
- Borrower governments receive a good deal of assistance in project planning, design, and financial packaging from the external lending institutions, especially the multilateral banks. There is no countervailing force on the domestic lending side—at best, the ministry of finance, sometimes with a boost from the IMF, may decide that external borrowing is not warranted.

- Borrower governments need the foreign currency provided by external loans, either for imports or for debt service.

Nominal interest rates for foreign loans are lower than domestic interest rates for two main reasons; domestic rates contain an implicit factor for future currency depreciation and corresponding higher inflation; and the domestic financial markets generally have to pay a risk premium to attract depositors and investors since they are not well developed and may not be considered very safe. By contrast, the rates paid by the World Bank and the regional development banks for funds raised in the international capital markets are quite low, given the record of safety of these institutions.

The perception that foreign borrowing is cheaper has been altered as some developing countries have had to struggle with currency revaluations. For example, Thailand borrowed heavily from Japan from 1975-85 at very low interest rates to finance expansion of public enterprises (water supply, transportation, telecommunications, electricity). With the revaluation of the yen in the mid 1980s, Thailand has seen its external debt almost double even though it placed a cap on foreign borrowing since 1985.

To cope with exchange rate risks, some WS&S facilities financed with foreign borrowing have attempted to pass these risks on to the beneficiaries. In the Philippines, for example, the tariff charged by the Metropolitan Waterworks and Sewerage System of metro Manila includes compensation for exchange rate adjustments, which increases automatically as the foreign debt service per ton of water sold increases. In 1989, this compensation amounted to an average of 10 percent of the total tariff.

The issue of foreign currency exchange affects foreign borrowing for the WS&S sector in two ways. First, only a fraction of the borrowed funds may be expended on foreign currency costs (equipment, materials and contractors), leaving the government with surplus foreign currency to meet other foreign exchange needs. Second, the cost recovery from the WS&S investment will be in local currency, so that the central government will have to obtain foreign currency from some other sector or additional loans when the time comes to repay the loan. This means that the national public investment strategy must be concerned with both the timing of cash flow (foreign and domestic currency) as well as the gross investment allocations.

As central governments shift to loan funding of WS&S facilities, the loan interest rate policy becomes a critical issue. Most central governments in the past provided subsidized loans for WS&S services in the belief that these services constituted a public good. This policy has come under attack on three counts:

- Subsidies tend to favor the rich over the poor since they are used to finance higher service coverage in the better-off urban areas

- Subsidies distort the operations and inhibit the development of domestic financial markets
- Shrinking foreign credit is forcing governments to go to domestic credit markets where nominal interest rates are higher, making the subsidies more expensive

As central governments look to domestic credit markets as a source of capital for the WS&S sector, there is some prospect for municipal development, or infrastructure, funds to serve as financial intermediaries. Although these funds have been established to provide loan financing for infrastructure projects, they do not, as presently operated, mobilize savings but merely channel funds originating with the central government or external loans and grants. While they can be used to mobilize funds in the future, they now serve mainly as conduits and not true intermediaries.

2.4 Fiscal Relations between Central Governments and WS&S Delivery Institutions

Capital investment funds for the WS&S sector are channeled almost entirely through central governments which expend them in one of four ways:

- Direct investment in WS&S facilities, usually through a public works or water resources ministry
- Equity contribution to a WS&S supply institution, either a national or local WS&S authority or a local government
- Grants to a WS&S supply institution
- Loans to a WS&S supply institution.

In the past, capital investment in the sector generally has been direct, with a the central government ministry constructing the facilities. Over the last two decades, however, there has been a steady trend toward the creation of autonomous WS&S supply institutions, with transfers from the central government handled as equity investment, outright grants, and loans, and in the last decade, a preference for loan financing alone. This has been both for practical reasons (the need to generate more resources) and for equity reasons (the users should pay for the facilities.) In some countries the shift has been dramatic. In Indonesia, for example, the current Five Year Plan (1989-94) anticipates that more than 40 percent of infrastructure investments in urban areas will come from loans, up from less than 20 percent in the previous Five Year Plan (see box).

Indonesia: Shifting the Burden of WS&S Costs

The Government of Indonesia has embarked on an ambitious program to shift the burden of financing WS&S systems from the central government to the systems' beneficiaries. The program involves the establishment of local water authorities initially under direct control of the Ministry of Public Works. During the startup phase, the MPW builds the infrastructure (direct investment) and constitutes the water authority staff. Extensive training and technical assistance are provided during this phase. The water authority recovers an increasing share of its costs through user fees, including connection fees and water charges. Once the authority reaches a "break even" point (defined as recovering sufficient revenue to meet current operating and maintenance costs), the authority shifts status to that of a local autonomous water supply authority under a local board, headed by the mayor of the local government. From that point forward, the water authority is financially independent from the central government. All new capital investment must be financed by the authority, usually through loans. While the local authorities are responsible for handling their own affairs, the MPW does maintain a performance information system to which all authorities report once a month. The information system contains data on a number of key financial and technical indicators and is closely monitored by MPW staff at the provincial and national levels.

Unfortunately, debt repayment performance generally has not matched policy objectives. As noted earlier, only 11 percent of the WS&S projects examined recently by the World Bank have met their financial targets, which means that most cannot meet their debt repayment obligations to the central government. In these circumstances, central governments are forced to reschedule the loans or write them off, usually by simply converting them to equity. Central governments often are not aware of the true scope of the financial difficulties of local authorities, since the authorities themselves may not monitor financial performance and seldom report their fiscal condition to the central authorities. It is usually only when loan repayments become due, normally after several years' grace, that the problem is recognized.

2.5 Cost Recovery Mechanisms

There are a number of cost recovery mechanisms for recapturing WS&S capital investments from the beneficiaries. The choice depends on the extent to which the costs can be allocated to individual, or groups of, service users. Figure 8 shows a three-part classification scheme based on this allocation principle. This is an important distinction since different cost recovery mechanisms are aimed at the different groupings of beneficiaries.

Type of Cost	Characteristics of Beneficiaries	Examples
1. System-wide	Integral part of WS&S system; cannot be allocated to specific individuals or neighborhoods.	Water sources; treatment plant; main trunk lines.
2. Area-wide	Serves limited area of users which cannot be further allocated.	Secondary water or sewer lines; area pumping stations.
3. Individual household/firm	Only serves individual users; no joint use.	Household water line connections.

Figure 8. Classification of WS&S Capital Costs by Allocation of Benefits

Certain costs such as connecting lines from mains to individual houses are clearly assignable to individual users. Other costs such as reservoirs and treatment plants are clearly system-wide. Area-wide costs pertain to groups of beneficiaries that are clearly identifiable but cannot be further subdivided. The capital costs of extending a water or sewer network into a new residential area would fall into this category, since the extension would benefit all landowners in the area even if all of them did not connect to the system initially.

An important consideration in recovering system-wide costs is that investment typically is "lumpy" and results in excess capacity at periodic points. Figure 9 illustrates the relationship between capital investments that add new capacity and the demand for that capacity. Since new capacity typically is added in blocks, recovering the cost from existing customers may not be equitable because they are asked to pay for capacity that they do not use and that is being added in anticipation of future growth. This issue is treated further in the discussion of impact fees later in this section.

Overestimating capacity is another issue with respect to the demand/capacity relationship. WS&S agencies in developing countries consistently tend to overestimate capacity requirements vis-a-vis the amount of water that can be sold. A World Bank study of its water supply loans from 1965-80 estimated that capacity overshoot effective demand by about 20 percent overall. This appears to be the result of a combination of factors, including a lower number of customer connections and lower-than-expected consumption in the face of tariff increases. Many WS&S authority managers have little training in demand analysis or demand management. However, the inability to manage demand drives up the unit price of water, since the higher costs have to be recovered from a smaller customer base.

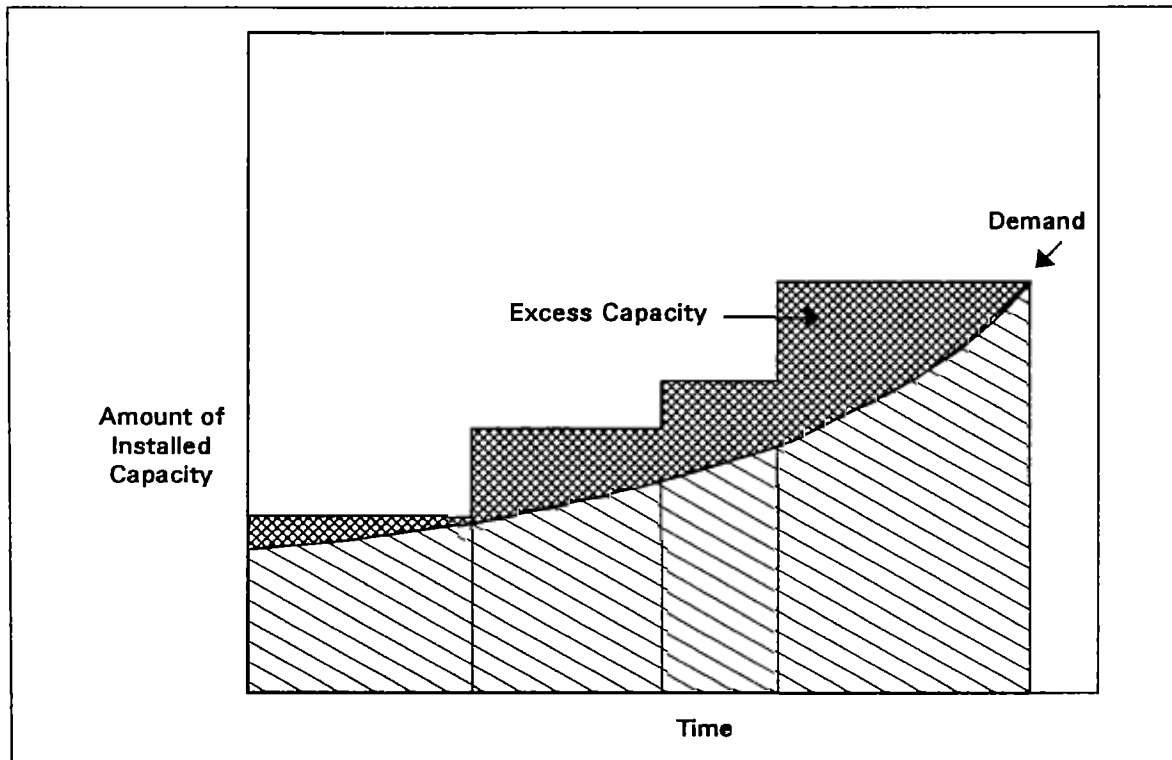


Figure 9. Capacity and Demand Utilization of WS&S Facilities

There are a number of alternative mechanisms for recovering capital costs from WS&S beneficiaries. Figure 10 presents a matrix showing the mechanisms for cost recovery arrayed against the three categories of benefit allocation. It divides the different alternatives into direct and indirect mechanisms, depending on whether the recovery mechanism is a separate and recognizable charge for the capital investment costs or whether the charge is recovered indirectly. The different capital cost-recovery mechanisms are often used in combination. It is common to find systemwide costs recovered through a component of the per-use charge, while direct charges are levied to recover the costs of extending lines into new areas and providing household connections.

The choice of cost recovery mechanisms can greatly affect the willingness of potential users to join the system, and, in turn, the overall demand for the service and the total system revenues. In particular, high connection fees have been found to discourage customer hookups (see box). Since WS&S programs are plagued by over optimistic projections of customer connections and revenues, more attention should be paid to the effect of these cost recovery choices on consumer demand.

2.5.1 Direct Mechanisms

The connection fee is intended to cover the cost of connecting an individual household to the water supply or sewerage network. It can be either a standardized amount or the actual cost. Payment can be made either in a lump sum or in installments.

Mechanism	Household	Area-Wide	System-Wide
<u>Direct</u>			
● Connection Fee	X		
● Actual Cost Assessment	X	X	
● Special Assessment	X		
● Betterment Levy	X		
● Impact Fee	X	X	
<u>Indirect</u>			
● Incorporated in Tariff	X	X	X
● Property Tax Surcharge	X	X	X
● Capitalized in Land Values	X	X	

Figure 10. WS&S Capital Investment Recovery Mechanisms

Increasing Connection Rates in the Philippines

In Cagayan de Oro City in the Philippines, the local water district fell far short of its projected connections during the first three years of operation. At the outset, the local water authority planned to recover the costs of household connections via a flat connection charge. The initial connection fee of 1000 pesos (about \$125) was too high for most prospective customers, many of whom had alternative access to well water and, during the rainy season, plentiful rainfall. The water authority dropped the connection fee altogether, providing free service connections. The capital costs of connections was put into the tariff rate base. To further reduce the cost to the customer, the authority provided the first 30 meters of tap line from the house to the main at no cost.

The actual cost assessment method charges the consumer the actual cost of the connection and, in some cases, of extending service into the area. As the term implies, the amount recovered varies with actual experienced cost. Sometimes this method is used for extending WS&S and other infrastructure services into neighborhoods where a neighborhood organization accepts responsibility for paying the capital cost of the new service. The neighborhood organization in turn assesses members at a uniform rate, on an actual cost basis, or the ability to pay.

A variation of this is termed the negotiated amount method. Under this variation, the WS&S authority or local government negotiates with individuals or neighborhood groups to pay a portion of the capital costs—either a certain percentage or a fixed amount. The fixed amount can be set for each household or for the group, and can be arrived at by the WS&S authority or the users. For example, in the Nepalese town of Banepa, the local town council provides grants of about \$25 per household (mainly in the form of building materials) toward construction of latrines built by the homeowners according to town specifications.

The special assessment method is used when a WS&S system expansion is planned and all landowners within the special assessment area will benefit by having access to the system. Special assessments are used most commonly in developed countries and normally require that a majority of the landowners approve the establishment of the special assessment district. The method divides the total cost of the capital expansion on the basis of some ready measure, usually either road frontage or acreage. All landowners are then assessed the levy whether or not they ever connect to the system.

The betterment levy is a variation of the special assessment in which the common measure (frontage or acreage) is replaced by a specific allocation of benefits to each land parcel. The betterment afforded to each parcel is measured and the cost is allocated on that basis. Clearly, this is considerably more complex than the straight special assessment, and for that reason has not been widely adopted except in Colombia, where it is used for all types of urban infrastructure investments.

All these methods have dealt with recovering costs associated with individual or area-wide benefits. None has dealt with recovering system-wide costs or the fair allocation of past system-wide costs to future users. Impact fees have been developed to address these two issues.

The concept of impact fees arose from the need to finance infrastructure expansion in rapidly growing U.S. communities, and the reluctance of present residents to incur debt to serve future homeowners. An impact fee, also referred to as a system development charge or facility charge, is a levy on new customers of a WS&S system to pay for capital costs already incurred. In effect, the new customers buy into the system and are charged an entrance fee.

There are two main types of impact fees, the buy-in charge and the incremental cost charge. The buy-in charge is based on the premise that new customers should pay the same as existing

customers have paid toward the invested capital funds. The incremental cost charge sets the entrance fee at the amount it would cost to replace the system capacity used by each new customer. These methods are discussed in more detail in Chapter 3.

2.5.2 Indirect Cost Recovery Mechanisms

Indirect cost recovery mechanisms are often employed in conjunction with direct mechanisms. The most common of these is the inclusion of capital costs in the tariff rate base. It is used normally only for water services in developing countries since water can be readily metered. Sewerage tariffs, when they are used at all, are generally based on water consumption. The tariff includes the recovery of system-wide costs, and sometimes part or all of the connection fee, especially when this fee would discourage customers from connecting to the system (see the Philippines example above).

The complex issues arising from the inclusion of capital costs in tariff formulation cannot be examined in detail in this paper. However, three should be noted. The first is that the greater the costs recovered through the tariff, the greater the likely decline in water sales. Therefore, there is a trade-off between recovering capital costs through connection fees, which can discourage customer connections, and recovering capital costs in the tariff, which depresses consumption. Both affect overall demand, but in different ways.

The second issue is that the valuation of WS&S capital assets used to compute capital cost recovery is greatly affected by inflation. Using simple depreciation, based on actual cost, to calculate the value of capital assets being consumed undervalues those assets in an inflationary economy. Therefore, it is important to approximate the replacement cost, not just the original cost, of capital assets.

The third issue in including capital costs in the rate base is that the burden of cost recovery will vary according to rates of consumption. This differs from the direct recovery mechanisms, which are all based on access to the service, not on the amount consumed.

The property tax surcharge is most commonly used when the WS&S services are provided by the local government with tax jurisdiction, not by a separate authority. A surcharge on each property owner's tax bill is levied for a set number of years determined by the amount to be recovered. It is not unlike the special assessment, except that it is linked to the assessed value of the property and is not a flat per acreage charge. The tax surcharge is considered to be progressive since it varies with the value of real estate. (In fact, it is more complicated because it also varies with the form of tax base valuation used.) This method also depends on the performance of the property tax system, which in most developing countries is not very efficient.

Cost recovery through capitalization in the land value is found most commonly in two applications: the requirement for private developers to provide a specified level of infrastructure before they are permitted to subdivide or sell land, and the land readjustment system used extensively in Asia, notably in Korea. Both of these incorporate the provision of infrastructure as a prerequisite in the land development process, so that only "serviced" land is allowed onto the market. Obviously, they can be used only with undeveloped land and are not applicable to built-up areas. In addition, since they usually pertain to the area being developed, only the costs of on-site infrastructure are covered.

The land readjustment system, sometimes called land consolidation or land pooling, is a procedure in which urban fringe land, normally agricultural land, is converted to urban use by providing physical infrastructure and subdividing the land into building plots. The distinctive feature of this approach is that the costs of providing infrastructure are recovered by withholding a portion of the serviced land for sale on the open market. The owners of the land receive a fraction of their original acreage determined by a complex formula under which the value of serviced land returned to each landowner is commensurate with his stake in the original land pool. The land readjustment process normally is carried out by a municipal government or, less frequently, by private developers.

The major difference between land readjustment and special assessments or betterment levies is that the implementing agency accepts land in lieu of cash and the risk of a drop in value at the time of sale. Theoretically, the agency would gain a windfall profit if the value of the land rose. However, in most applications (including Korea), the agency is prevented from realizing profits in land readjustment schemes.

Land readjustment is simple in concept but complicated in application. The readjustment formula must take account of the value of the original land and the differing values of the resultant land parcels. What makes the system work so well in Korea is that the value of serviced land is so much greater that landowners always come out ahead financially. In some cases, up to 50 percent of the land is withheld in Korean readjustment schemes. Some of the land reduction is caused by the dedication of streets and common areas such as parks and schools.

Most of the cost-recovery mechanisms can be used in combination. It is important to consider the impact of different combinations on both willingness to connect and the level of consumption. Since the customer base and the level of consumption are factors which can be "managed" by pricing policies, it is important for local WS&S authorities to retain some flexibility in both price setting and cost-recovery options. This issue is discussed in more detail below under Section 3.2, "Cost Recovery Strategies."

3

CAPITAL FINANCING STRATEGIES

3.1 Sector Financing Strategies

The WS&S sector in developing countries has been able to maintain a fairly stable level of investment during the 1980s even as total public investment as a percentage of GDP has declined. This has been partly the result of continuing support by external donors as well as national policies that have given the sector a high priority.

If WS&S service coverage is to keep on expanding, however, in line with past progress and proposed national targets, considerably more funds will have to be committed to the sector—approximately 60 percent more for the period 1991-2000 than during the past decade. Not much of this increase can be expected from external sources. There is some prospect of greater foreign private investment, but this starts from a minuscule base and will not provide major amounts of capital. Most of any increased sector funding will have to be generated internally.

Much of the current capital investment is in the form of loan financing to local WS&S authorities and local governments, and is part of the larger fiscal decentralization movement in developing countries intended to transfer the burden of public service financing from the central government to local governments and beneficiaries. However, early evidence indicates that the debt management capabilities of these lower-level authorities are not yet adequate and capital cost recovery is poor. Since the central government is the ultimate guarantor of these loans, it is at risk of assuming the financial obligations of local authorities unable to recover their investment costs.

Central governments need ways to mobilize additional sources of finance and at the same time to spread the risk. They can do this by shifting more responsibility to local governments for mobilizing resources and guaranteeing risks, and to the private sector for investment decisions and provision of capital.

3.1.1 Shifting Responsibility to Local Government

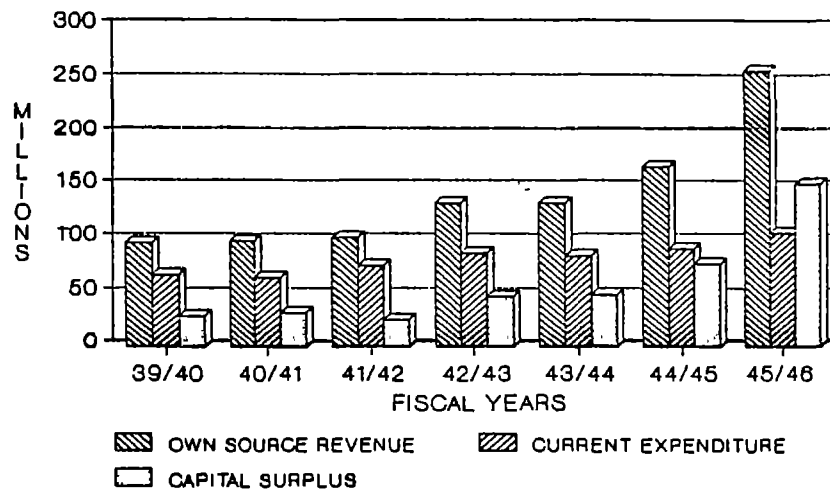
As noted in Chapters 1 and 2, local governments in developing countries typically play minor roles in resource mobilization and have underutilized revenue capacity. Part of the fiscal decentralization strategy is to tap this underused potential. A number of countries have demonstrated that local governments, particularly urban governments, can dramatically

improve their revenue generation within the existing tax legislation and administrative mandates (see box). Since urban areas in developing countries now receive more than 90 percent of WS&S investments, this is a logical target of opportunity.

Increasing Municipal Revenues in Nepal

In 1985, His Majesty's Government of Nepal embarked on a project to strengthen the finances of municipal governments through training and technical assistance in revenue collection. It was determined early in the project that the increased revenues most of them could raise would eliminate the need for increasing subsidies from the central government, and would provide funds for investment in infrastructure projects. The project has also tried to determine whether municipal governments are able to satisfy the conditions of a municipal loan program, that is, to raise and manage enough local revenues to service debt in addition to current operating expenditures. The program has achieved success in greatly increasing levels of local revenue collection while maintaining reasonable growth in current operating expenditures, and has seen a rapid growth in funds available for investment, termed the "capital surplus" in the graph below.

AGGREGATE FINANCIAL PERFORMANCE
29 TOWN PANCHAYATS (total amounts)
 (in constant Rupees at 45/46 prices)



MSTP PROJECT

In addition to increasing the pool of investment funds, local governments can also assume more of the risk of those investments. At present, since local governments tend to be dependent on central government support for much of their operating and capital budgets, any

risk they accept is ultimately borne by the central government. However, attempts are being made to truly allocate risks to the local governments by "collateralizing" funds under local government control.

For example, in Jordan the municipal governments use their allocation of national shared taxes as collateral for loans from the Cities and Villages Development Bank, which handles the transfers for the central government and deducts the loan repayments before passing on the balance to the local governments. Even though these funds originate from the central government, the central government has shifted the risk and limited its own exposure.

A second example is provided by Colombia, which established the Financial Fund for Urban Development to make loans to municipal governments. The fund requires that local governments provide part of its capital, and the amount borrowed by any locality is limited to a multiple of the capital deposited by that locality. In this way, the municipal governments share the risks of the fund.

Urban governments will play an increasingly larger role in WS&S investments because of the growing role of municipal development funds (MDFs) as financial intermediaries in the sector. Progressively more funding will be channeled through these institutions as national governments try to build institutional structures to manage fiscal decentralization. At the same time, as the multilateral banks press for lessening the flow of directed credit, MDFs will emerge as a transitional form that can assist local authorities in learning how to manage debt, provide an institutional structure for mobilizing additional credit, especially on the domestic capital markets, and insulate the central government from direct lending to local authorities.

Insulating the central government from direct lending is viewed as critical by many experts in the field. The poor record of most local government lending programs in developing countries has been traced to the fact that neither the central government as lender nor the local government as borrower took its obligations seriously. The newer MDFs try to establish a more correct and distant relationship between lender and borrower. For example, the Colombian fund does not lend directly to local governments but rediscounts loans originated by local commercial banks.

The increasing use of MDFs gives local governments a greater choice of investment options and reduces the control of the central government over investment decisions. In many countries, the central government can still make loans for certain types of projects more attractive by providing lower interest rates. For example, a number of MDFs provide loans at below-market rates for social infrastructure which includes WS&S services. Under pressure from the multilateral lenders, this practice is likely to decline.

3.1.2 Shifting Responsibility to the Private Sector

The extent of the private sector's participation in WS&S services is not well known because much of it is informal. However, as noted earlier, this role is probably quite large in most developing countries. The problem is that the private sector has usually been viewed as an inferior provider of WS&S services in instances where the public sector has fallen short, but there are three areas that offer the private sector opportunities for formal participation: the build-operate-transfer arrangement, direct investment in WS&S systems, and providing investment capital through purchase of bonds or other financial instruments.

3.1.2.1 The Build-Operate-Transfer Arrangement

The build-operate-transfer (BOT) arrangement, mainly for new infrastructure projects being implemented under private sector ownership and financing, establishes a new private sector company that owns, finances, constructs, and operates a project for a defined period. The company's shares are transferred to the host government authority at the end of the agreed BOT operating term.

Most BOT projects have been large public utility projects in the power and transportation sectors. Recent trends have used the BOT arrangement to expand utilities or to capitalize specific operations within government-owned utilities. The typical BOT set-up described below is modeled on a public utility.

The BOT approach attracts private sector risk capital because it is able to control and operate the project company in the formative stages. The international fungibility of BOT risk capital is unknown. Equity and loan capital may in any event be attracted to certain low-risk developing countries through joint ventures even if BOT opportunities are not available. Further, BOT projects traditionally have required large investments, and the amount of risk capital attracted for capital works has also been large. In the current environment of low private sector lending to developing countries, the BOT approach has the potential to attract a large amount and a wide range of international capital resources directly to the public utilities.

BOT agreements may also circumvent debt service restrictions on individual countries as well as release government capital resources for alternative projects.

BOT Organization

The BOT operation starts with a new project company in which, typically, private investors have a majority ownership and the host government agency a minority ownership. The private ownership is provided by the project sponsors. As the BOT model has evolved in developing

countries, these project sponsors are mainly private international companies with a commercial interest in the construction and/or operation of the project. They tend to be construction contractors, equipment suppliers, and in the case of energy projects, fuel suppliers.

In public utilities, the host government ownership may be through the national, regional, or municipal utility agency, or through a government-owned financial institution (development bank), or a combination of these. As the capital requirements for public utility investments typically have been large, there is also the need to bring in portfolio investors, such as international financial institutions, to provide equity.

In addition to equity investment, a BOT project usually has some debt financing. Such loans typically are provided by a combination of export credits, suppliers' credits, commercial bank loans, and institutional loans. An important attribute of the BOT model is that loans are made to the new project company, not to the national government or state utility. From this arrangement, which is at the heart of the BOT structure, arises the issue of loan security. Loan security is usually managed by an escrow arrangement under which project revenues from the utility's sales flow through an agent for the lenders. The agent ensures debt service payment and captures the remaining cash generation in the early years for loan reserves as security for future revenue shortfalls. Further, a contingency financing agreement provided by a government financial institution is sometimes required to support the new project company's loan service obligations.

To complete the BOT, the project company enters into a number of other contracts for plant operations, suppliers, etc. One of the most important is the sales agreement, which guarantees purchase of the output of the new company by the state-owned utility on terms that permit the company to meet its obligations to its suppliers, lenders, and shareholders. This is where the issue of tariffs and control over tariff setting arises. A number of other issues are addressed in the sales agreement including currency of payment, mix between fixed and operating cost-recovery pricing, inflation, etc.

The BOT financing structure has been labeled a limited recourse structure, which means there is no direct unconditional guarantor for servicing of the project loans. The lenders' only recourse for nonpayment by the project company is in the contractual documents. The underlying principle for the success of a limited recourse arrangement is in allocating project responsibilities and rewards among the participants in such a way that all are satisfied with the future development. Obviously, the role and vested interest of the foreign contractors/operators are paramount, and it is they who are the prime motive forces behind such deals.

The final step in the BOT arrangement is the transfer of the privately held shares of the project company to the government or government institution at the end of the agreed BOT period. Typically, an installment payment mechanism is built into the utility pricing, together with an agreed year-by-year return on investment.

BOT Examples

BOT financing began in California with the split up and privatization of power utilities. Bechtel Financing Services was a leader in providing financial management and expertise in this new type of structure. The power sector has taken the lead in BOT projects, which currently exist in Indonesia, Pakistan, China, and Turkey. The transportation sector also has BOT financing. Several toll roads in Turkey, and port projects in Turkey and Malaysia have been operated under BOT arrangements.

In the water sector, Malaysia has a large BOT project covering 174 rural water supply systems. Biwater PLC is the construction and supply project sponsor providing direct loan financing. Morgan Grenfell heads an international consortium of equity partners. The new project company is Antah-Biwater. The project started in 1988.

Although BOT is an attractive concept for mobilizing private sector capital and management expertise, it has made slow progress in the WS&S sector in developing countries. Firstly, BOT schemes rely on full cost recovery plus profits, which means that they typically require tariffs considerably higher than customers are used to paying under highly subsidized schemes. Secondly, BOT schemes require some certainty about the market environment, especially protection from subsidized competition and political interference. Given the long payback period for a WS&S facility, such uncertainty makes WS&S BOT schemes inherently unattractive. Many of the efforts now underway in developing countries to promote BOTs in the water sector focus on reducing uncertainty. This has led to rather lengthy negotiations between BOT consortia and host governments over government guarantees, "take-or-pay" contracts and tariff setting regulation. It has proved to be neither a quick nor simple process.

3.1.2.2 Direct Investment in WS&S Systems

In addition to the BOT approach, which is a limited-term commitment, there are four main categories of private investment in WS&S systems:

- Ownership of an entire water supply or sanitation system
- Ownership of a component of the system, such as a treatment plant, operated on a franchise or contract basis
- Ownership and leasing of equipment, such as vehicles
- Investment of capital as an extension of a management contract

Ownership of an entire system is most common with small water systems such as those serving residential housing developments (see the example of Bangkok in Chapter 2). There are also a few examples of private water systems on a municipal scale. In Santiago, Chile, two private companies supply water to about 10 percent of city residents. Both have territorial concessions and meet all the capital investment and operating costs of their respective systems. The tariffs are approved by the ministry of public works and contain both a fixed monthly access charge and a usage charge per cubic meter. In Guatemala City, a private water system also serves about 10 percent of the population.

Private WS&S systems normally are at a competitive disadvantage with public systems since they have to recover all their costs as well as pay taxes and make a reasonable return on investment. Public systems often are subsidized with direct grants, low-cost loans, use of public land and staff time, usually do not pay taxes, and often operate at a loss. Against such competition, it would be unusual if private companies were to be found at all. Clearly, private enterprises cannot adequately compete in the sector until public enterprises are placed on a non-subsidized, full-cost recovery basis.

The main opportunities will continue to be found in areas where the private sector can offer a quality of service that the public sector cannot match. It is noteworthy that the larger of the two private companies operating in Santiago began as a concession to serve the upper-income district of Los Condes. Targets of private sector opportunity are users willing to pay for high-quality services—high-income residential suburban areas, industrial estates, and tourist enclaves and hotels.

The drawback to this type of targeting is that it removes the most profitable customers from the public WS&S systems. Public WS&S authorities often try to use cross-subsidization in their tariff policies, charging higher prices to upper-income and industrial/commercial users to offset reduced rates to low-income users. By allowing private companies to serve these target groups, the public utility is also giving up its higher revenue customers.

The second type of direct investment in WS&S facilities is private ownership of WS&S system components such as treatment plants. This approach is used most often where a major installation is required and the service output of the installation can be measured. Typically, a public authority will enter into a contract with a private company or group of investors to finance and build the facility. The public authority contracts to purchase a specified level of service at set prices over a defined period.

In Monterrey, Mexico, the public WS&S authority, Servicios de Agua y Drenaje de Monterrey, took the lead in establishing a new company with private capital participation to build and operate a wastewater treatment plant. In addition to revenues from wastewater treatment, the plant also profits from the sale of treated effluent for industrial uses.

This approach allows the private sector to put forward innovative solutions, particularly when it is required to meet a performance standard (e.g., amount of wastewater treated) rather than provide a specific type of facility. For example, in the state of Niedersachsen in the Federal Republic of Germany, local WS&S authorities typically ask for private company bids to provide wastewater treatment for specified numbers of users. It is left to the bidders to recommend the technical solutions, financing arrangements, and fees to be paid by the authority. A survey of seven local authorities in Niedersachsen found that this approach produced costs that were, on average, 24 percent below the original authority estimates, mainly because of innovative technical solutions proposed by the winning bidders.

The third type of private sector investment is in equipment leasing. This approach, which can be extended to buildings as well as equipment, is gaining popularity in U.S. local governments. These localities have turned to leasing to ease the constraints on local revenue growth imposed by local taxpayer revolts, which limit both property tax revenue growth and the ability to issue new bonds. Leasing has additional appeal in the U.S., where it provides federal and state tax advantages to the lessor and in turn lowers the price the lessee needs to be charged.

Under a leasing arrangement, the private investor/owner purchases equipment and leases it to the local authority under long-term contract. While leasing to local public authorities is not common in developing countries, there are some notable exceptions. For example, the Bangkok Metropolitan Transit Authority leases a sizeable proportion of its bus fleet from private owners. It was forced into this arrangement by a lack of funds for new capital investment.

In the WS&S sector, leasing is most suitable for equipment such as a vehicle fleet, that has a moderate service life and can be reclaimed and put to other uses if the lease is terminated. An additional advantage of leasing is that the lessor can be made responsible for maintenance, reducing the burden on the public authority.

The fourth category of private investment is the provision of capital as an extension of an existing management contract. This is a special case in which a private firm already managing a WS&S system under contract invests its own capital for system expansion. The best example of this is found in Cote d'Ivoire, where the municipal water systems are managed under contract by the Societe d'Eau de la Cote d'Ivoire (SODECI), 47 percent of which is owned by its French parent company and 53 percent by Ivoirian interests (49 percent by private investors, 4 percent by the state). Until recently, all capital investment has been provided by the central government, with SODECI working under an *affermage* contract that gives it complete responsibility for management of the water systems, including the collection of tariffs set through contractual mechanisms.

SODECI has now begun to make small capital investments, primarily through extending lines into new areas which will increase the number of customers and total water sales. While this approach has not yet encompassed major facility investment, it does open the way for such investment in the future.

3.1.2.3 Raising Investment Capital from Domestic Lenders

Domestic financial markets, even in the more advanced developing countries, have been virtually untapped as a source of investment capital for WS&S systems or for any type of infrastructure projects with the exception of toll roads. Even government pension funds and insurance companies, which control an increasing amount of capital, have not generally been tapped for infrastructure investments.

There are a number of reasons for this lack of investment of domestic private capital:

- There are few institutional structures for mobilizing domestic savings for infrastructure investments
- Most local authorities are restricted by national legislation from obtaining credit except through the central government
- Most local authorities, especially local governments, have limited revenue-raising authority and hence limited ability to service debt
- Local authorities generally do not have assets which can be used as collateral—many do not have title to land and there are few ready buyers for infrastructure facilities in case of default
- Most local authorities have poor financial management capabilities
- Oversight of financial management at the local level is often poor (i.e., lack of regular auditing and financial reporting)
- Few lenders are willing to commit funds for the long period required to amortize a major WS&S facility (up to 30 years).

This combination of factors has made local authorities poor risks for lending even if there are convenient mechanisms for it. In order to open this source of investment capital to local authorities, a number of changes must be made:

- Local authorities must have larger and more stable sources of income; since loans must be secured by cash flow rather than assets, stability of income is paramount
- Local authorities must have better financial management and there must be mechanisms for monitoring that management

- Local authorities must develop experience in debt management in order to establish a history of credit worthiness
- There must be ways to spread the risk to lenders, at least initially. This could involve some level of central (and local) government guarantee, insurance, or collateralization of local authority revenues (i.e., a claim on dedicated grant funds or earmarked taxes)
- There must be an institutional structure that makes it convenient to enter and exit a local authority bond market, and some form of secondary market so that individuals can limit the length of time their funds are tied up.

These conditions will require considerable time and effort on several different levels. It is not clear if local WS&S authorities in developing countries will ever have direct and open access to capital markets as they do in the United States. If such is the aim, there will have to be an evolutionary process with Municipal Development Funds likely playing a critical role. The evolutionary process would comprise three stages.

In the first stage, the MDF will raise funds by issuing government-backed bonds and will make loans to local authorities and train them to manage debt. In the second stage, the MDF will help certain local authorities that have demonstrated sound debt management and have strong financial positions to enter the financial markets directly but with some form of guarantee or risk insurance. The MDF might also provide some limited form of secondary market. During this stage, the MDF will have served, to some extent, as a proving ground for local authorities. In the third stage, selected local authorities will have established their credit worthiness and will have access to an expanding domestic bond market without MDF support. The secondary market will have been established apart from the MDF, which will continue in its tutorial role but will become an increasingly minor player in the mobilization of investment capital.

It should be evident that the above scenario can only develop as fast as the overall system of long-term credit develops within a given country. One of the obstacles retarding the growth of business development and urban infrastructure investments in developing countries is the lack of long-term lending of any sort.

3.2 Cost Recovery Strategies

The different capital cost recovery methods have been described in some detail in section 2.5. Three considerations are important in evaluating the alternative mechanisms: equity, revenue potential, and ease of administration.

3.2.1 Equity

Equity is based on two principles: the "benefit principle" which means that users of a service should pay in proportion to the benefit they derive from it; and the "ability to pay" principle which means that users should pay in proportion to their financial ability.

Four main issues of equity have been raised in the discussion of alternative cost recovery mechanisms. The first is whether to recover system-wide costs through access charges (special assessments, betterment levies, impact fees) or through consumption charges (i.e., part of the tariff). Access charges are based on availability of the service to a parcel of land, and spread capital costs more evenly among users. Consumption charges recover capital costs in direct proportion to the amount consumed, with more variation among users in the amounts paid.

The second issue of equity is who should pay for the capital cost of excess capacity installed in anticipation of future growth—the question addressed by the impact fee. If tariff-based capital cost recovery is used, the longer a consumer is in the system, the higher proportion of capital costs that consumer pays.

The third equity issue concerns special assessments and property tax surcharges—namely, the right to charge for access to a service that may not be used.

A fourth equity issue involves the use of subsidies in capital investment. In many developing countries, central governments subsidize WS&S service through grants or low-interest loans for construction. Such subsidies do not target the poor but tend to serve all users in proportion to the amount of the services they use.

3.2.2 Revenue Potential

Each of the cost recovery methods is designed to raise revenue. Each also can have a major impact on demand and on the total revenue generated by the services. Connection fees, if too high, can discourage potential customers from hooking onto the system. Alternatively, including a large proportion of capital cost recovery in the tariff increases the price per unit of consumption. This depresses consumption. Given this trade-off between connection fees and consumption based charges, the alternatives that do not affect demand become more appealing, i.e., special assessments and property tax surcharges.

Property tax surcharges have several disadvantages from a revenue potential standpoint. They depend on the buoyancy and yield of the underlying property tax systems. In most countries, the property tax is not buoyant and yields typically are quite low because of poor collection rates and low valuations. Therefore, unless the property tax systems are substantially upgraded, their use as a vehicle for WS&S capital cost recovery is limited.

3.2.3 Ease of Administration

The most convenient of the cost recovery mechanisms to apply is the tariff-based recovery since it utilizes a charging mechanism already in place. The problem arises with calculating the appropriate level of cost recovery. As noted above, the WS&S authority must be able to value capital assets with some accuracy; indeed, it should be able to calculate current replacement value as well. This requires a level of financial management not found in most local WS&S authorities.

Special assessments, betterment levies, and impact fees require, in ascending order, more complex administration. They can be costly as well since they require data on land parcel characteristics to establish the basis of the charge as well as capital cost breakdowns. Betterment levies and impact fees can also require considerable negotiation with landowners since the amounts of the assessments can vary widely from one landowner to the next.

The land readjustment process is also administratively complex. However, it has the advantage that all infrastructure services can be dealt with in combination so the administrative costs are spread across several services. One of the administrative complexities of land readjustment is that the administering agency must get into the real estate development business. It must assemble, develop, and sell land. For this reason, most places where it has been used have established separate agencies to manage the operations. Because of the overhead costs involved, it is only practicable on a fairly large scale.

Land readjustment raises an important issue not dealt with by any of the other methods of cost recovery—the process recovers cost from the added value produced by infrastructure and not just from individuals, making it self-financing and not necessarily burdensome to individual households. All the other mechanisms require either lump sum or installment payments. The land readjustment system is financed by recapturing value created by the addition of infrastructure. Although the amount of payment extracted can be quite large (up to 50 percent of the land is taken in Korea), it is also perceived as less painful since the beneficiaries do not actually pay in cash.

3.2.4 Conclusion

It should be clear at this point that there is no best way to recover capital costs of WS&S services. There are advantages and disadvantages to each method, and a number of considerations must be weighed in terms of equity, administrative costs, and revenue potential. Given the possible impacts on demand and the financial viability of WS&S authorities, one recommendation is that a combination of approaches be considered and that flexibility be maintained. Since none of the variables that affect the financial viability of WS&S agencies (demand, willingness to pay, costs, etc.) are static, flexibility should remain an overriding principle.

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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.