

**FINANCING WATER AND SANITATION SERVICES:
THE OLD AND NEW CHALLENGES***

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ABSTRACT

The water supply and sanitation sector faces two great challenges in developing countries.

The first challenge is to complete the “old agenda” of providing household services. Although considerable progress has been made, much remains to be done. A billion people still lack access to an adequate supply of water, and 1.7 billion do not have adequate sanitation facilities. Furthermore, the quality and reliability of existing services are often unacceptable. To compound the situation, the costs of providing services are rising substantially because of rapid urbanization, mismanagement of water resources and the low efficiency of many water supply organizations.

Over the past thirty years developing countries have allocated an increasing share of their gross domestic product (GDP) to public spending on the provision of water and sanitation services. It would appear that public spending on these household services has, contrary to common belief, been too high. There are three reasons for this. First, the low contribution of users has meant that supply agencies are not sufficiently accountable to users. Second, there resources have been used primarily to subsidize services to the middle class and the rich. Third, spending on household services has left few public resources available for wastewater treatment and management.

The second challenge is the “new agenda” of environmentally sustainable development. In some respects -- high costs and limited resources -- the situation confronting developing countries is similar to that faced by industrialized countries. But in other respects the task for developing countries is considerably more difficult: water in developing countries is much more seriously degraded and is deteriorating rapidly; far fewer financial resources are available for environmental protection; and institutional capacity is weaker.

Completing the old agenda and addressing the new agenda constitute a daunting challenge for developing countries. This paper describes some of the more imaginative and promising approaches to addressing these challenges at different levels, ranging from self-financed sewers in an informal settlement in Karachi, Pakistan, to the emergence of participatory river basin management in Brazil. From such promising experiences, two central elements can be discerned.

- *Institutions:* The promising institutional arrangements are ones in which the people who are affected are put in charge of the decisions regarding both the type of service and the resources to be spent. At the lowest level this means letting households choose the services they want and are willing to pay for. At the highest level it means that the stakeholders in a river basin decide what level of water quality they want and are willing to pay for. Consistent with this participatory thrust is the dictum that decisionmaking responsibility should be moved to the lowest appropriate level. Thus, for instance, river basin authorities should concentrate on managing and pollution externalities and let municipalities decide how to manage their water and

sewerage services more effectively. This inevitably means broader participation of the private sector and civil society.

- *Instruments:* The other central element is to make more extensive use of market-like instruments at all levels. At the household level this means much greater reliance on user charges for raising revenues and on the private sector for the provision of services. At the river basin level it means much greater use of abstraction charges, pollution charges and water markets for water resource management.

Formidable as these challenges are, there is hope that progress can be made, not least because of the remarkable consensus which is emerging among the many partners involved -- official and nonofficial -- concerning this new paradigm for environmentally sustainable and equitable development of the water and sanitation sector. The task now is to turn this vision into the reality of better services and a better environment for all people.

The “old” and “new” sector challenges

Water sector development is immediately relevant for billions of people in developing countries and for the quality of the environment in which they live. Financing such development in a responsive, efficient and sustainable way is a challenge we must meet successfully. The challenge is twofold. First, there is the “old agenda” of providing all people of the world with adequate water supply and sanitation services. Second, there is the challenge of the “new agenda”, which requires that much greater attention be paid to ensuring that the use of water resources is sustainable in terms of both quantity and quality.

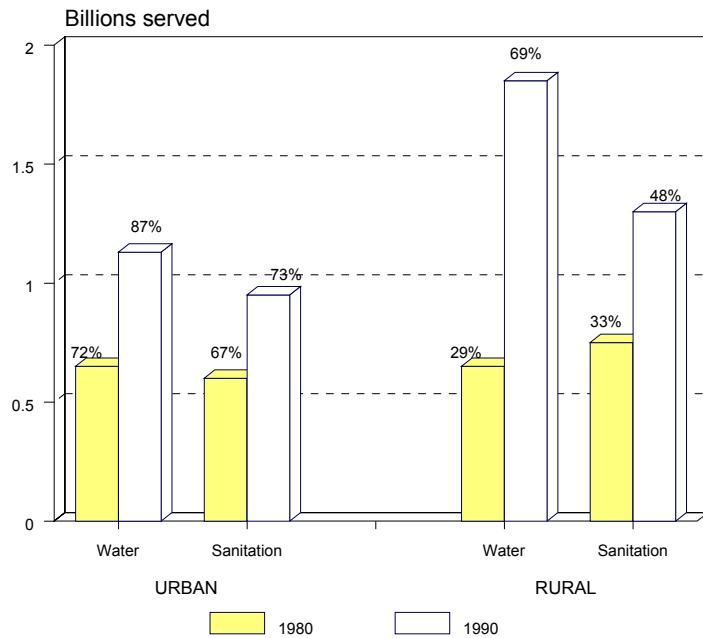
The “old agenda” -- the household service agenda:

The facts on water supply and sanitation coverage are presented in Figure 1. In interpreting these data it is instructive both to see the glass as half full and as half empty.

If we look at the glass as half full, we can take considerable satisfaction from the progress we have made in meeting this challenge -- over the course of the 1980s 1.6 billion additional people were provided with access to water of reasonable quality, the number of urban people with access to adequate water supply increased by about 80% in the 1980s, and the number of urban people with adequate sanitation facilities increased by about 50%.

If we look at the glass as half empty, we can see that the challenge is still enormous. There are still 1 billion people who do not have access to an adequate supply of water, and the 1.7 billion

Figure 1: Access to safe water and adequate sanitation in developing countries in 1980 and 1990



Source: World Bank, 1992d

who do not have adequate sanitation facilities. And in urban areas the number of people without access to adequate sanitation actually increased by about 70 million over the course of the 1980s.

The most obvious and poignant costs of these service shortfalls are those measured in terms of human suffering. And what we see with our eyes is confirmed by the numbers we collect. We have abundant evidence of the huge costs of not providing access -- in city after city in the developing world those who are not served often pay high costs, especially the poor in urban areas who often rely on vendors who typically charge \$2 to \$3 for a cubic meter of water, which is at 10 or more times the price which the served pay for water from a tap in their houses. And, as shown in Table 1, the health consequences are staggering -- an estimated 2 million deaths from diarrhea alone could be avoided each year if all people had access to satisfactory water supply and sanitation services.

Table 1: Effects of improved water and sanitation on sickness

Disease	Millions affected by illness	Median reduction attributable to improvement (percent)
Diarrhea	900*	22
Roundworm	900	28
Guinea worm	4	76
Schistosomiasis	200	73

* refers to number of episodes in a year

Source: World Bank 1992d

The emerging “new agenda”

While the “old” agenda, focused on household services still poses large financial, technical and institutional challenges, the “new” agenda -- of environmentally sustainable development -- has emerged forcefully and appropriately in recent years. In the context of this meeting this concern is manifest in terms of the quantity and quality of both surface and ground water.

The quality of the aquatic environment is a global concern. The situation in cities in developing countries is especially acute. Even in middle-income countries sewage is rarely treated. Buenos Aires, for instance, treats only 2% of its sewage, a figure which is typical for the middle-income countries of Latin America. As shown in Figure 2, water quality is far worse in developing countries than in industrialized countries. Furthermore, while environmental quality in industrialized countries improved over the 1980s, it did not improve in middle-income countries, and declined sharply in low-income countries.

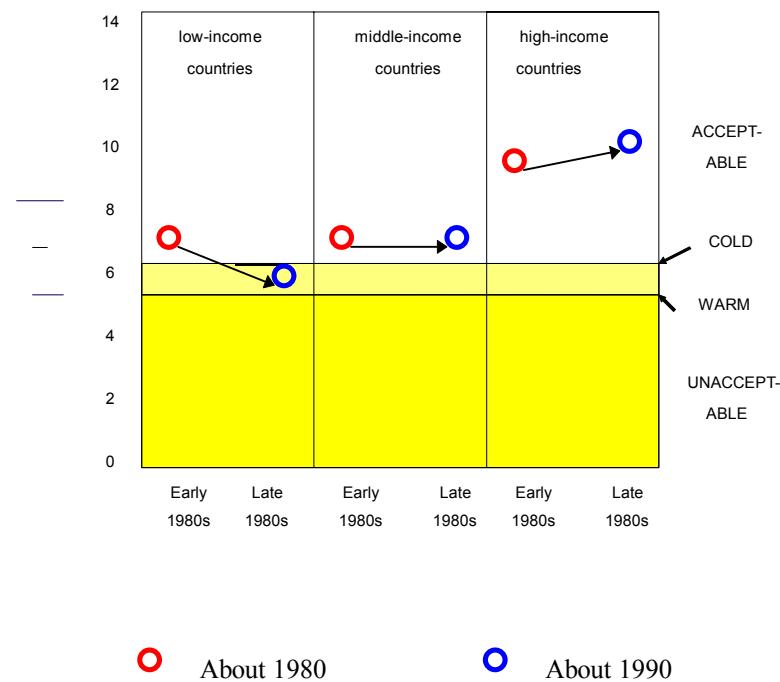
The costs of this degradation can be seen in many ways. The vast majority of rivers in and around cities and towns in developing countries are little more than open, stinking sewers. Not only do these degrade the aesthetic life of the city, but they constitute a reservoir for cholera and other water-related diseases. And as the “urban shadow” spreads concentrically around a city, expensive adaptations have to be made so that water supplies can remain safe. To take just one case, Shanghai had to move its water supply intake 40 kilometers upstream at a cost of \$300 million because of the degradation of river water quality around the city.

In this nexus of service and environmental issues, it is instructive to consider the sequence in which people demand water supply and sanitation services. Consider, for instance, a family which migrates into a shantytown. Their first environmental priority is to secure an adequate water supply at reasonable cost. This is followed shortly by the need to secure a private, convenient and sanitary place for defecation. Families show a high willingness to pay for these household or private services (in part because the

alternatives, as described earlier, are so unsatisfactory and so costly). It is natural and appropriate, therefore, that they put substantial pressure on local and national governments to provide such services. And it is, accordingly, natural and appropriate that the bulk of external assistance in the early stages of development goes to meeting the strong demand for these services. The very success in meeting these primary needs, however, gives rise to a second generation of demands, namely for removal of wastewater from the household, then the neighborhood and then the city. And, success in this important endeavor, too, gives rise to another problem, namely the protection of the environment from the degrading effects of large amounts of waste.

Figure 2: Median Dissolved oxygen levels in rivers in developing and developed countries

DO in mg/l



Source: World Bank 1992d

There are a number of implications emanating from this description. It means that the historic “bias” in favor of water (at the expense of sanitation and sewerage) is probably not only not wrong (as is currently often implied) but actually right! The historic experience of industrialized countries, and the contemporary experience of developing countries demonstrates clearly that it is only when the first challenge (service provision) has been substantially met that households and the societies aggregating them pay attention to the “higher-order” challenges of environmental protection. And it is thus neither surprising, nor incorrect, that the portfolio of external assistance agencies has focused heavily on the provision of water supply. For example, of World Bank lending

for water and sanitation over the past 30 years, only about 15% has been for sanitation and sewerage, with most of this spent on sewage collection and only a small fraction spent on treatment. Boxes 1 (on the Orangi Pilot Project in Karachi) and 2 (on the provision of sewerage services to the periphery of Sao Paulo, Brazil) demonstrate graphically how forcefully poor people demand environmental services, once the primary needs for water supply is met.

***Box 1: How and when poor people demand sanitation services, and how to meet these:
The case of the Orangi Pilot Project in Karachi***

In the early 1980s, Akhter Hameed Khan, a world-renowned community organizer, began working in the slums of Karachi. He asked what problem he could help resolve. People in this area had a relatively satisfactory supply of water but now faced "streets that were filled with excreta and waste water, making movement difficult and creating enormous health hazards". What did the people want, and how did they intend to get it, he asked. What they wanted was clear -- "people aspired to a traditional sewerage system... it would be difficult to get them to finance anything else." And how they would get it, too, was clear -- they would have Dr. Khan persuade the Karachi Development Authority (KDA) to provide it for free as it did (or so they perceived) to the richer areas of the city.

Dr. Khan then spent months going with representatives from the community petitioning the KDA to provide the service. Once it was clear that this would never happen, Dr. Khan was ready to work with the community in finding alternatives. (He would later describe this first step as the most important thing he did in Orangi -- liberating, as he put it, the people from the demobilizing myths of government promises.)

With a small amount of core external funding the Orangi Pilot Project (OPP) was started. The services that people wanted were clear; the task was to reduce the costs so that these were affordable and to develop organizations that could provide and operate the systems. On the technical side, the achievements of the OPP architects and engineers were remarkable and innovative. Coupled with an elimination of corruption, and the provision of labor by community members, the costs (in-house sanitary latrine and house sewer on the plot, and underground sewers in the lanes and streets) are less than \$100 per household.

The (related) organizational achievements are equally impressive. The OPP staff has played a catalytic role -- they explain the benefits of sanitation and the technical possibilities to residents and conduct research and provide technical assistance. The OPP staff never handled the community's money. (The total costs of OPP's operations amounted, even in the project's early years, to less than 15 percent of the amount invested by the community.) The households' responsibilities include financing their share of the costs, participating in construction, and election of a "lane manager" (who typically represents about fifteen households). The lane committees, in turn, elect members of neighborhood committees (typically around 600 houses) who manage the secondary sewers. The early successes achieved by the Project created a "snowball" effect, in part because of increases in the value of property where lanes had installed a sewerage system. As the power of the OPP-related organizations increased, so they were able to bring pressure on the municipality to provide municipal funds for the construction of secondary and primary sewers.

The Orangi Pilot Project has led to the provision of sewerage to over 600,000 poor people in Karachi and to attempts by at least one progressive municipal development

authority in Pakistan to follow the OPP method and, in the words of Arif Hasan "to have government behave like an NGO." Even in Karachi, the mayor has now formally accepted the principle of "internal" development by the residents and "external" development (including the trunk sewers and treatment) by the municipality.

The experience of Orangi demonstrates graphically how peoples' demands move naturally from the provision of water to removal of waste from their houses, then their blocks and finally their neighborhood and town.

***Box 2: How and when poor people demand sanitation services, and how to meet these:
The case of the favelas of Sao Paulo***

In the 1980s the city of Sao Paulo, Brazil, made extraordinary progress in providing all of its residents with water supply and sanitation services. In 1980 just 32% of favelas (low-income, informal settlements) had a piped water supply, and less than 1% had a sewerage system. By 1990 the respective figures were 99% and 15%!

SABESP, the state water utility serving Sao Paulo, is a sophisticated technical water supply organization. Until the emergence of democracy in Brazil, SABESP had defined its role narrowly and technocratically. Specifically it did not consider provision of services to the favelas to be its responsibility, since it was not able to do this according to its prescribed technical standards, and because the favelas were not "legal". Before the legitimization of political activity in Brazil in the early 1980s, SABESP successfully resisted pressures to provide services to the favelas. While SABESP was resisting this pressure, a small municipal agency (COBES) experimented with new technical and institutional ways of providing water and sanitation services to the poor. On the technical side this did not involve provision of "second-class" service, but of reducing the cost of providing in-house services by using plastic pipe and servicing of narrow roads where access was limited. On the institutional side it meant the community assuming significant responsibility for community relations, and for supervising the work of the contractors.

As the military regime withdrew and was replaced by democratic politics, the pressures on SABESP to serve the favelas increased. Pressure from the communities on SABESP were channeled through the municipal agencies, responsive officials and politicians (including the mayor and governor). Since COBES had shown how it was, in fact, possible to serve the favelas, SABESP had no option but to respond.

In the context of the present discussion, the lessons from Sao Paulo are:

- (a) that once the poor have water services, then a strong demand for sanitation services emerges organically;
- (b) that where institutions are responsive and innovative, major gains can be made in the provision of these services at full cost to poor people.

The Financing Challenge

Developing countries thus face the formidable, double-barreled challenge of completing the “old agenda” and making progress on the “new agenda”. In this section we examine these challenges from a financing perspective, by asking three questions:

- what do services cost and how is this changing?
- should public spending be increased? and
- what are the central elements in a financially-sustainable approach to these challenges?

Question 1: What do services cost and how are the costs changing?

The old agenda:

Real costs of water supply and sanitation services are changing due to a number of factors. First are demographic and economic factors. As the population of developing countries becomes more urbanized, per capita costs rise. This is partly because a number of the low-cost, on-site urban sanitation technologies (see Table 2) become infeasible in dense urban settlements, and partly because the aspirations of urban people -- as demonstrated in the Orangi and Sao Paulo cases -- is for a high level of service.

Table 2: Typical per capita costs for different levels of service

	<i>RURAL</i>			<i>URBAN</i>		
	Low	Intermediate	High			
Water supply	~\$10 ¹	~\$100 ²	~\$200 ³			
Sanitation	~\$10 ⁴	~\$25 ⁵	~\$350 ⁶			

¹ Handpump, or standpost

² Public standpost

³ Piped water, house connection

⁴ Pour-flush or ventilated improved pit latrines

⁵ Pour-flush or ventilated improved pit latrines

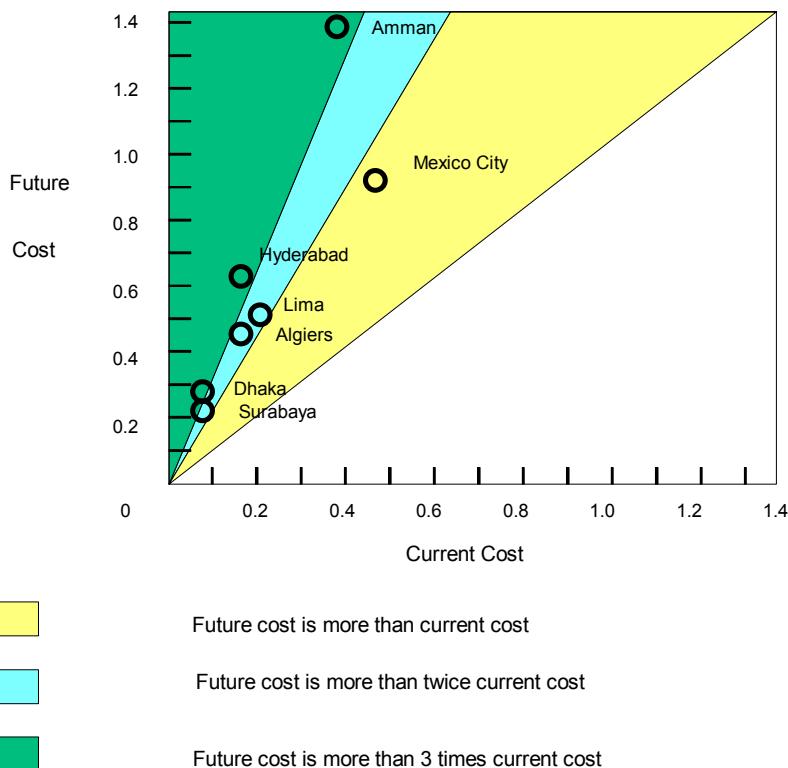
⁶ Piped sewerage with treatment

Source: World bank, 1992d

Second are resource factors. Twenty-two countries today have renewable water resources of less than 1,000 cubic meters per capita, a level commonly taken to indicate severe water scarcity, and an additional eighteen countries have less than 2,000 cubic meters per capita. Elsewhere water scarcity is less of a problem at the national level, but is nevertheless severe in certain regions, at certain times of the year and during periods of drought. The effects of these “natural” factors are seriously exacerbated by the widespread mismanagement of water resources, with scarcity induced by the provision of large quantities of water at no or low cost for low-value agricultural uses. Costs are also affected by the fact that cities have logically first sought water where it is easiest and cheapest to obtain. Finally, as cities grow so the “pollution shadows” around the cities often engulf existing water intakes, necessitating expensive relocation of intakes, as

illustrated by the Shanghai case described earlier. The compound effect of these factors is, as illustrated in Figure 3, a large increase in the costs of capturing and transporting water of adequate quality to cities and towns throughout the world.

Figure 3: How the costs of supplying water is increasing



Source: World Bank, 1992d

Widespread inefficiency in supplying water and sanitation services is a major factor in the high cost of sector services, as documented in a recent comprehensive review of World Bank experience in the water and sanitation sector. The review, which examined more than 120 sector projects over twenty-three years concludes that only in only four countries--Singapore, Korea, Tunisia and Botswana--have public water and sewerage utilities reached acceptable levels of performance.

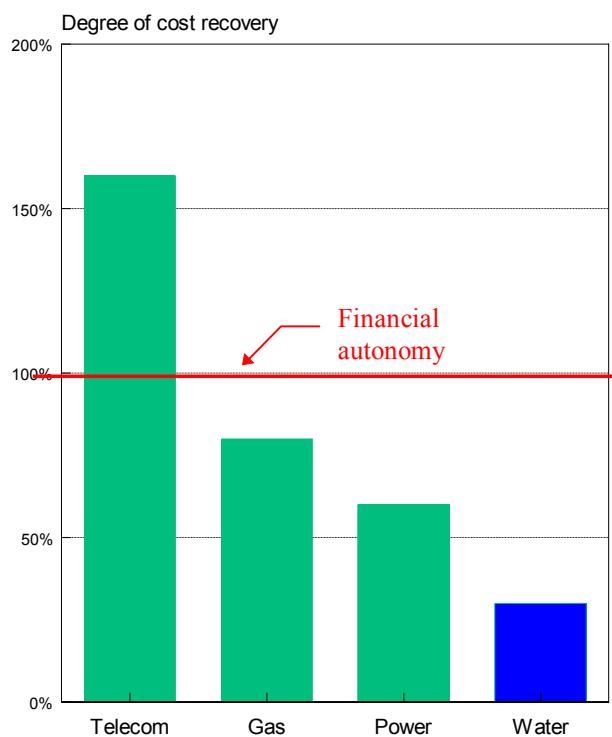
A few examples illustrate how serious the situation is:

- In Caracas and Mexico City an estimated 30 percent of connections are not registered.
- Unaccounted-for-water, which is 8 percent in Singapore, is 58 percent in Manila and around 40 percent in most Latin American cities. For Latin America as a whole, such water losses cost between \$1 and \$1.5 billion in revenue foregone every year.

- The number of employees per 1,000 water connections is between 2 and 3 in Western Europe, around 4 in a well run developing country utility (Santiago in Chile), but between 10 and 20 in most Latin American utilities.

Financial performance of water and sewerage agencies is equally poor and, as shown in Figure 4, much worse than for other infrastructure sectors. A recent World Bank review showed that public utilities in developing countries seldom recovered their costs from users. The shortfalls have to be met by large infusions of public money. In Brazil between the mid-1970s and mid-1980s, about \$1 billion of public cash was invested in the water sector annually. The annual federal subsidy for water and sewerage services to Mexico City amounts to over \$1 billion a year or 0.6 percent of GDP. The overall picture is clear -- most public water utilities in developing countries are high-cost, low-quality producers of services.

Figure 4: Degree of cost recovery in infrastructure sectors



Source: World Bank, 1994

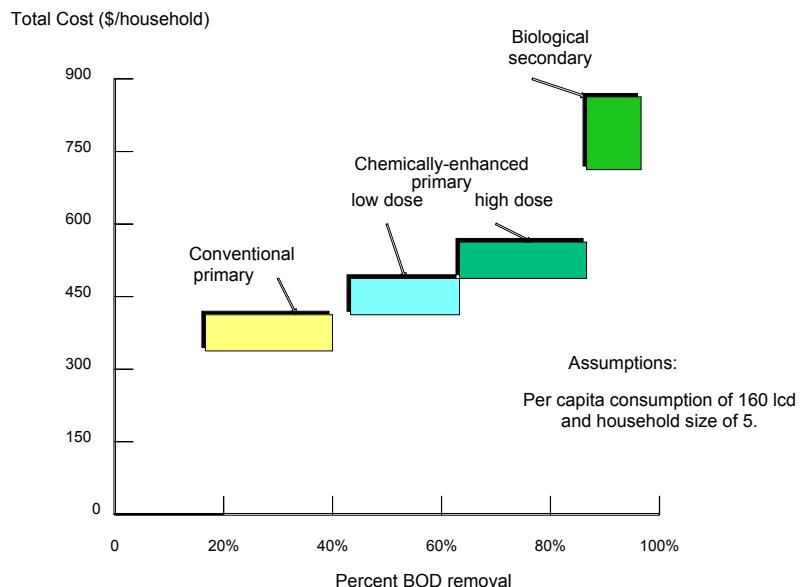
The performance of most rural water supply agencies has generally been similarly poor. A common approach has been for governments to limit the services to low-cost technologies (such as improved pit latrines and handpumps). While the development of low-cost, robust technologies of this sort is vital, a key mistake made in many programs has been to restrict the choices available to people. This paternalistic approach has

proved to be counterproductive, fundamentally because the services offered have not corresponded to those which people -- including poor people -- want and are willing to pay for. In many instances this has led to a “low-level equilibrium trap”, in which people are not willing to pay for what they conceive of as an unsatisfactory service, which means that resources for the operation and maintenance of the service are not generated, and the quality of service declines still further. The lessons are clear. From a demand perspective this means that people must be trusted to choose, from a menu which includes a variety of service levels, those services which they want and are willing to pay for. From a supply perspective this means that rigorous attention must be paid to providing households with a particular level of service at the lowest possible cost.

The new agenda

Collecting and treating sewage is a very expensive business. Typical costs for collecting sewage from a household are of the order \$1,000. Treatment costs (see Figure 5 below) typically increase this to about \$1,500, just for primary treatment. For higher levels of treatment (as is mandated now in industrialized countries, as shown on Figure 5, costs are much higher still.

Figure 5: The costs of sewage treatment



Source: US National Research Council, 1994

In the aggregate the costs of meeting the new agenda can become huge. To cite just one example, it is estimated that the United Kingdom will have to invest about \$60 billion in wastewater treatment over the next decade, in large part in order to meet the new

European water quality standards. This amounts to about \$1,000 per capita, or about 0.6% of GDP over that period on wastewater treatment alone!

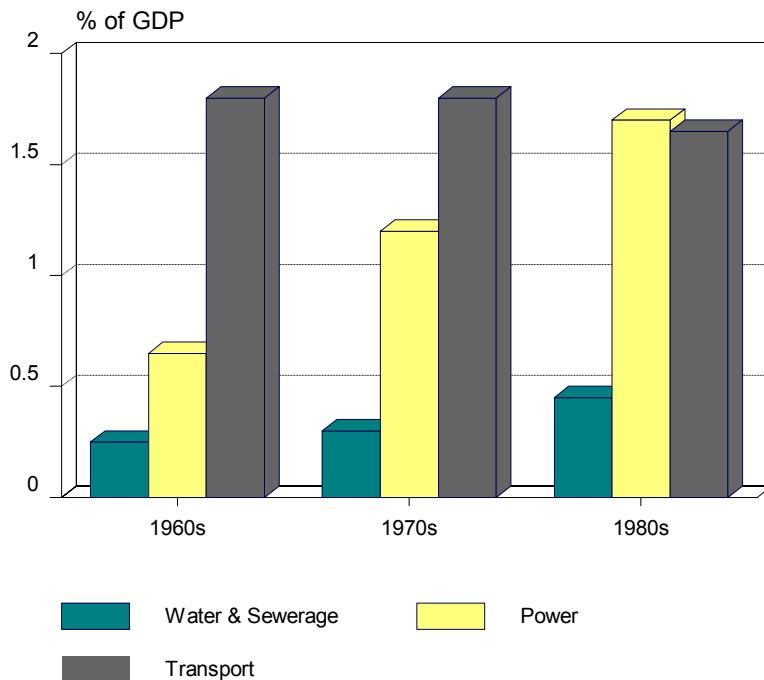
Compounding this already formidable picture is the fact that sewerage services in developing countries have been managed with even less efficiency than water services. In Accra, Ghana, for instance, only 130 connections were made to a sewerage system designed to serve 2,000 connections. And in Mexico it is estimated that less than 10% of sewage treatment plants are operated satisfactorily.

Question 2: Should public spending be increased?

Public spending on the sector has increased substantially

Two recent assessments by the World Bank provide a clear overview of public financing for the water and sanitation sector in developing countries over the past three decades. As shown in Figure 6 below, the proportion of Gross Domestic Product (GDP) invested in water supply and sanitation rose from about 0.25% in the 1960s to about 0.45% in the 1980s. Furthermore, although it was widely believed that the allocation to the sector fell during the difficult years of the late 1980s, a World Bank analysis of information from Public Investment Reviews in 29 countries showed that while public investment had, indeed, declined in this period (from 10.9% of GDP in 1985 to 8.7% of GDP in 1988), over this same period, investment in water and sanitation held virtually constant at about 0.4% of GDP.

Figure 6: Public investment in infrastructure in developing countries over three decades



Source: World Bank data

The large “hidden” water economy:

Especially where formal institutions perform least adequately, a very large “underground” industry has arisen for meeting those needs which are not adequately served by formal utilities.

Consider the following examples. In Jakarta, Indonesia, only 14 per cent of the 8 million people living in the city receive piped water directly. About 32 per cent purchase water from street vendors, and the remaining 54 per cent rely on private wells. In Jakarta, furthermore, there are over 800,000 septic tanks, installed by local contractors, fully financed by households themselves, and maintained by a vibrant and competitive service industry. In cities throughout the developing world, the reliability of the formal water supply service is unsatisfactory, and so households build in-house storage tanks, install booster pumps (which can draw contaminated groundwater into the water distribution system) and sink wells. In Tegucigalpa, Honduras, for example, the amount spent on such investments would be enough to double the number of deep wells providing water to the city. The size of this “hidden” water economy often dwarfs the size of the visible water economy. In Onitsha, Nigeria, for instance, revenues collected by water vendors are about ten times the revenues collected by the formal water utility!

And in rural areas, too, the “hidden” water economy is often huge. In Pakistan, for instance, over 3 million families have wells fitted with pumps, many of which are motorized. These are paid for in full by the families, and all equipment provided and serviced by a vibrant local private sector industry.

The degree of distortion involved in ignoring the informal provision and financing of services varies greatly by level of development (as is obvious from the examples discussed). For prosperous urban areas, formal services are the norm; for low-income countries the formal services may be totally dwarfed by the informal, especially in rural areas but even in some cities. What is critical is the realization that this “hidden” water and sanitation economy is extremely important in terms of both coverage and service. The nonformal sector offers many opportunities for providing services in an accountable, flexible way. When this is not possible because of economies of scale, then service by the informal sector offers a major source of supplementary financing which can be redirected if formal services can become more responsive to consumers’ demands in an efficient and accountable way.

The existence of this “hidden water and sanitation economy” has important implications for service provision. First, it shows that there is a high demand for services which has not been met successfully by the formal sector. Second, although some of these services are provided efficiently by the informal sector (such as tubewells in Pakistan), in other cases (such as water vending in the urban periphery) the costs of service are exorbitant, in large part because the informal providers cannot take advantage of the large economies of scale involved in transmitting water by pipe rather than by person or vehicle.

The specific implication for the formal sector is profound and clear -- there is an enormous reservoir of resources which can be drawn into the formal sector at reduced costs for all. This can happen when the formal sector is able to provide the services that consumers want in a responsive, accountable way.

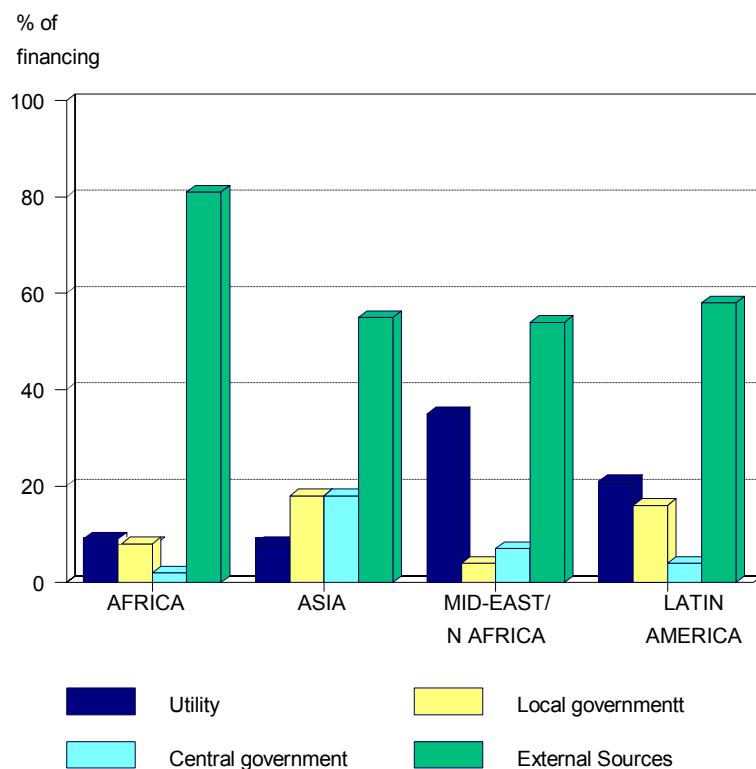
Perhaps public expenditure on the “old agenda” has been too high?

Performance and sustainability of water and sanitation services depends not only on the level of financing for these services, but the sources of such financing. Experience shows unequivocally that services are efficient and accountable to the degree that users are closely involved in providing financing for the services. Or, stated another way, deficiencies in financing arrangements are a major source of the poor sector performance described earlier.

A World Bank analysis has assessed in detail the sources of financing for water and sanitation projects assisted by the World Bank. Internal cash generation in efficient, financially-sustainable utilities is high -- 67% in a World Bank-assisted water and sewerage project in Valparaiso, for example. However, as shown in Figure 7, there are wide regional differences in the relationship between financing and users. Africa has the longest way to go, with utilities and local government providing only 17% of investment financing. In the other three regions the proportion of financing mobilized by utilities

themselves and from local government is higher. In Asia the supply institutions themselves generate relatively little financing, with domestic financing from central and local government in about equal shares. In the Middle East and North Africa utilities themselves generate most of the domestic financing in World Bank-assisted projects, whereas in Latin America the contributions of the utility and local government are similar. Unsatisfactory as these figures are, it appears that things are getting worse: Internal cash generation financed 34 per cent of costs in World Bank-financed projects in 1988, 22 per cent in 1989, 18 per cent in 1990 and just 10 per cent in 1991.

Figure 7: Sources of financing in World Bank-assisted Water and Sanitation Projects



Source: World Bank 1991a and 1991b

Question 3: What are the keys to developing a financially sustainable sector?

An important backdrop to this discussion is the radical rethinking which has taken, and is taking, place in all aspects of economic development policy and natural resource policy. In this context, it is instructive to characterize and contrast an "old view" of sector policy (and the related financing challenges) which derives from the central planning model which dominated development thinking between the 1950s and the 1980s; and a "new view" that is emerging as a result of the central place now occupied by efforts to

introduce more “market-friendly” policies, and by concerns of environmental sustainability.

The old view assumes that government has the primary responsibility for financing, managing and operating services. It is the government’s task to define the services to be provided, to subsidize these services (especially for the poor) and to develop public organizations for service delivery. External support agencies are to assist this effort by providing the resource transfers necessary for service provision.

A remarkable consensus has been emerging in recent years started to emerge in recent years on policies (including financial) for managing water resources and for delivering water supply and sanitation services on an efficient, equitable and sustainable basis. At the heart of this consensus are two, closely related, “guiding principles” enunciated at the 1992 Dublin International Conference on Water and the Environment, which preceded the UN Conference on Environment and Development (the “Earth Summit”) the same year:

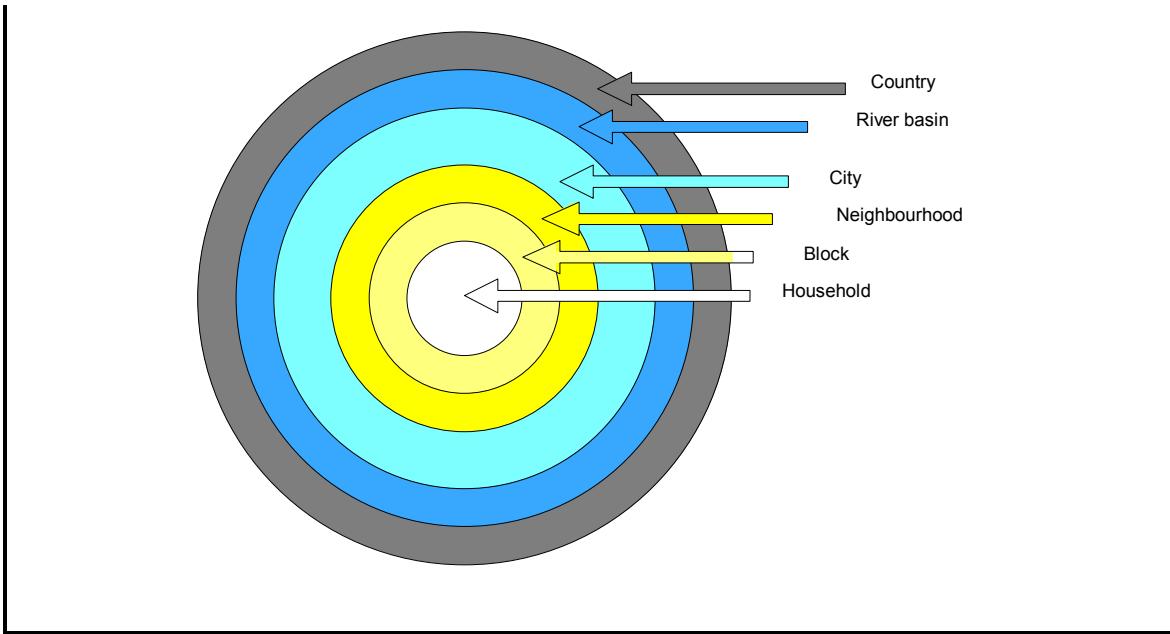
- water has an economic value in all its competing uses and should be recognized as an economic good; and
- water development and management should be based on a participatory approach, involving users, planners and policy makers at all levels, with decisions taken at the lowest appropriate level.

These principles are now being widely adopted (for instance in the World Bank’s Water Resources Management Policy Paper and by the Development Assistance Committee of the OECD). The great challenges now facing the sector are articulation of the details implicit in these general principles and the translation of the Dublin principles into practice on the ground.

The new consensus gives prime importance to one central principle (long familiar to students of public finance) which should underlie the financing of water resources management and water supply and sanitation services. This principle is that efficiency and equity both require that private financing should be used for financing private goods and public resources be used only for financing public goods. Implicit in the principle is a belief that social units themselves -- ranging, in this case, from households to river basin agencies -- are in the best position to weigh the costs and benefits of different levels of investment of resources for benefits that accrue to that level of social organization.

The vital issue in application of this principle to the water sector is the definition of the decision unit and the definition of what is internal (private) and external (public) to that unit. And here it is useful to think of the different levels at which such units may be defined, as illustrated in Figure 8 below.

Figure 8: Levels of decision-making on water and sanitation



To illustrate the implications of the “decision-making rosette” (Figure 8), it is instructive to consider how water supply and sanitation services should be financed.

How water supply services should be financed

The economic costs of providing water include (a) the financial costs of abstracting, transporting, storing, treating and distributing the water and (b) the economic cost of water as an input. The latter cost arises because when water is taken, for example, from a stream for use in a city, then other potential users of that water are denied the possibility of using the water. The value of the most valuable opportunity foregone because of this water (known technically as the “scarcity value” or “opportunity cost”) constitutes a legitimate element of the total production cost of water. In the most appropriate forms of water resources management (discussed later) charges are levied on users for this privilege. (As an empirical matter, the financial costs of water supplies to urban consumers and industries usually greatly exceed the opportunity costs. For low-value, high volume uses -- specifically irrigated agriculture -- this relationship is frequently just the opposite -- opportunity costs comprise a considerable fraction of total costs, especially in situations of water scarcity.)

What of the benefit side? The provision of water supply to households has several different benefits. Households themselves value a convenient, reliable and abundant water supply because of time savings and amenity benefits and, to a varying degree, because of the health benefits it confers on them. Because these “private” benefits constitute the bulk of the overall benefits of a household water supply, the public finance allocation principles dictates that most of the costs of such supplies should be borne by householders themselves. When this is the case households make appropriate decisions

on the type of service they want (for example, a communal tap, a yard tap or multiple taps in the household). The corollary is that, because this is principally a “private good”, most of the financing for the provision of water supply services should be provided through user charges sufficient to cover both the economic costs of inputs (including both the direct financial cost of inputs such as capital and labor and the opportunity cost of water as an input.)

How sanitation, sewerage and wastewater management should be financed

The benefits from improved sanitation, and therefore the appropriate financing arrangements, are more complex. At the lowest level, households place high value on sanitation services which provide them with a private, convenient and odor-free facility which removes excreta and wastewater from the property or confines it appropriately within the property. However there are clearly benefits which accrue at a more aggregate level and are therefore “externalities” from the point of view of the household. At the next level, the block, this means that households in a particular block collectively value services which remove excreta from the block as a whole. At the next level, that of the neighborhood, services which remove excreta and wastewater from the neighborhood, or which render these wastes innocuous through treatment, are valued. Similarly at the level of the city, the removal and/or treatment of wastes from the environs of the city are valued. Cities, however, do not exist in a vacuum -- the wastes discharged from one city may pollute the water supply of a neighboring city. Accordingly, groups of cities (and farms and industries and others) in a river basin perceive a collective benefit from environmental improvement. And finally, because the health and well-being of a nation as a whole may be affected by environmental degradation in one particular river basin, there are sometimes additional national benefits from wastewater management in a particular basin.

The fundamental axiom of public financing prescribes that costs should be assigned to different levels in this hierarchy according to the benefits accruing at different levels. This would suggest that the financing of sanitation, sewerage, and wastewater treatment be approximately as follows:

- households pay the bulk of the costs incurred in providing on-plot facilities (bathrooms, toilets, on-lot sewerage connections);
- the residents of a block collectively pay the additional cost incurred in collecting the wastes from individual houses and transporting these to the boundary of the block;
- the residents of a neighborhood collectively pay the additional cost incurred in collecting the wastes from blocks and transporting these to the boundary of the neighborhood (or treating the neighborhood wastes);
- the residents of a city collectively pay the additional cost incurred in collecting the wastes from blocks and transporting these to the boundary of the city (or treating the city wastes);
- the stakeholders in a river basin -- cities, farmers, industries and environmentalists -- collectively assess the value of different levels of water quality within a basin, decide

on what level of quality they wish to pay for, and on the distribution of responsibility for paying for the necessary treatment and water quality management activities.

In practice, of course, there are complicating factors to be taken into account (including transactions costs of collection of revenues at different levels, and the interconnectedness of several of the benefits). What is striking, nevertheless, is that the most innovative and appropriate forms of sector financing (and service provision) follow the above logic to a remarkable degree.

Box 1 (earlier in this paper) presents the case of the financing of sewerage services in an informal urban settlement in Karachi, Pakistan. In this case households pay the costs of their on-lot services, blocks pay the cost of the tertiary sewers, blocks pool their resources to pay for the neighborhood (secondary) sewers, and the city (via the Municipal Development Authority) pays for the trunk sewers. This evocative “feeder/trunk” distinction is now being applied on a much larger scale to the provision of urban services in Pakistan.

The arrangements for the financing of condominium sewers by the urban poor in Brazil (Box 3) follows remarkably similar lines -- households pay for the on-lot costs, blocks pay for the block sewers (and decide what level of service they want from these), with the water company or municipality paying for the trunk sewers.

Even when the appropriate financing and institutional principles are followed, however, very difficult issues arise with respect to financing of wastewater treatment facilities. In industrialized countries it is possible to discern two models which have been used.

In many industrialized countries the approach followed has been to set universal standards and then to raise the funds necessary for financing the required investments. As is becoming increasingly evident, such an approach is turning out to be financially infeasible, even in the richest countries of the world. In the United Kingdom, the target date for compliance with the water quality standards of the European Community is being reviewed as customers' bills rise astronomically to pay the huge costs (over \$60 billion this decade) involved. In Germany, it is estimated that it will require about \$300 billion of investment to meet existing European Union standards. At current annual investment rates of about \$7 billion per year, this will take forty years to achieve! And in the United States federal authorities have been forced to reconsider the unpopular “unfunded mandates”. A particularly pertinent case is the refusal of cities on the Pacific coast to spend the resources (\$3 billion in the case of San Diego alone) required for secondary treatment of sewage. The National Academy of Sciences of the United States has advocated rescinding the “secondary treatment everywhere” mandate and developing an approach in which the costs and benefits are both taken into account in the management of sewage in coastal areas.

In a few countries a different model has been developed. In these countries, institutional arrangements have been put into place which (a) ensure broad participation in the setting of standards, and in making the tradeoffs between cost and water quality; (b) ensure that

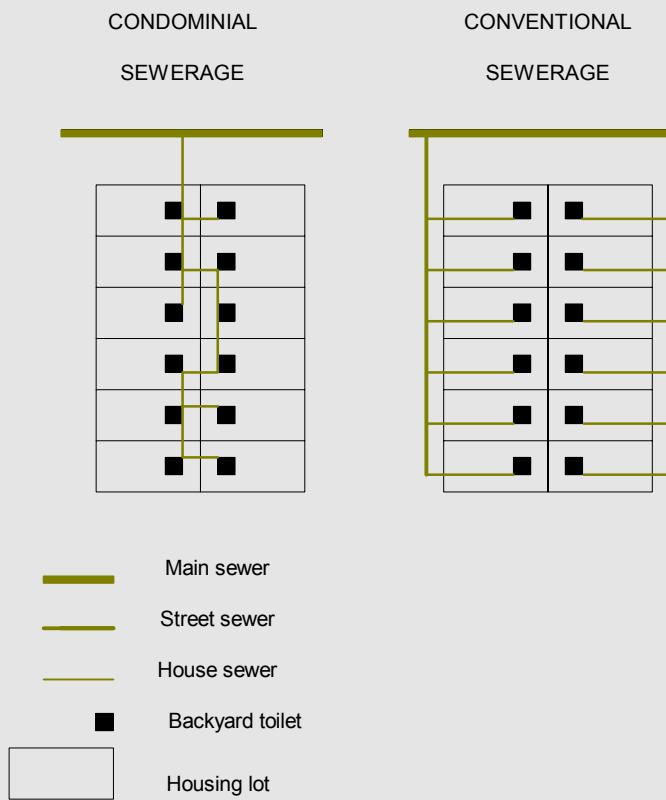
available resources are spent on those investments which yield the highest environmental return and (c) use economic instruments to encourage users and polluters to reduce the adverse environmental impact of their activities.



Box 3: The condominial sewerage system in Brazil

The "condominial" system is the brain-child of Jose Carlos de Melo, a socially committed engineer from Recife. The name "condominial" was given for two reasons. First, a block of houses was treated like a horizontal apartment building -- or "condominial" in Portuguese (see Figure 9 below). Second, "Condominial" was a popular Brazilian soap opera and associated with the best in urban life! As is evident in Figure 9 below, the result is a radically different layout (with a shorter grid of smaller and shallower "feeder" sewers running through the backyards and with the effects of shallower connections to the mains rippling through the system). These innovations cut construction costs to between 20 percent and 30 percent of those of a conventional system.

Figure 9: Schematic layouts of condominial and conventional sewerage systems



The more fundamental and radical innovation, however, is the active involvement of the population in choosing their level of service, and in operating and maintaining the "feeder" infrastructure. The key elements are that families can choose: (i) to continue with their current sanitation system; (ii) to connect to a conventional water-borne system; or (iii) to connect to a "condominial" system. If a family chooses to connect to a condominial system, it has to pay a connection charge (financed by the water company) of, say X cruzados, and a monthly tariff of Y cruzados. If on the other hand, it wants a

conventional connection, it has to pay an initial cost of about 3X and a monthly tariff of 3Y (reflecting the different capital and operating costs). Families are free to continue with their current system (which usually means a holding tank discharging into an open street drain). In most cases, however those families who initially choose not to connect eventually end up connecting. Either they succumb to heavy pressure from their neighbors. Or they find the build-up of wastewater in and around their houses intolerable once the (connected) neighbors fill in the rest of the open drain.

(continued)

Individual households are responsible for maintaining the feeder sewers, with the formal agency tending to the trunk mains only. This increases the communities' sense of responsibility for the system. Also, the misuse of any portion of the feeder system (by, say, putting solid waste down the toilet) soon shows up in a blockage in the neighbor's portion of the sewer. This means rapid, direct and informed feedback to the misuser! This virtually eliminates the need to "educate" the users of the system in the do's and don'ts, and results in fewer blockages than in conventional systems. Finally, because of the greatly reduced responsibility of the utility, its operating costs are sharply reduced.

The condominium system is now providing service to hundreds of thousands of urban people in Northeast Brazil and is being replicated on a large scale throughout the country, in part with funding from the World Bank-assisted PROSANEAR project. The danger, however, is that the clever engineering is seen as "the system". Where the community and organizational aspects have been missing, the technology has worked poorly (as in Joinville, Santa Catarina) or not at all (as in the Baixada Fluminense in Rio de Janeiro).

These principles were first applied immediately before the First World War to the management of the Ruhr River Basin in Germany's industrial heartland and have provided a sound basis for the management of this river throughout this century. Learning from the experience of their German neighbors, France developed a national river basin management system based on the Ruhrverband principles and have been applying it since the early 1960s. Box 4 below describes the principles of these river basin financing and management models and shows how resources for wastewater treatment and water quality management are raised from users and polluters in a basin, and how stakeholders -- including the users and polluters, as well as citizens' groups -- are involved in deciding the level of resources which will be raised and the consequent level of environmental quality they wish to "purchase". This system, which obviously embodies the central principles codified in the Dublin Statement, has proved to be extraordinarily efficient, robust and flexible in meeting the financing needs of the densely industrialized Ruhr Valley for 80 years, and the whole of France since the early 1960s.

(The Ruhrverband provides an instructive example of the incompatibility of very high, imposed standards and participatory basin management. Whereas twenty years ago a major function of the "water parliament" in the Ruhrverband was to balance costs and benefits, today that function has become irrelevant. In the words of the technical director of the Ruhrverband, "they no longer have much to discuss -- now they simply have to sign the checks!"")

There is growing evidence that if such participatory agencies were developed, people in developing countries would be willing to pay substantial amounts for environmental improvement. In the state of Espírito Santo in Brazil, a household survey showed that families were willing to pay 1.4 times the cost of sewage collection systems, but 2.3 times the (higher) cost of a sewage collection **and treatment** system. In the Rio Doce Valley, an industrialized basin of nearly 3 million people in Southeast Brazil, a French-type river basin authority is in the process of being developed. Stakeholders have indicated that they are willing to pay about \$1 billion over a five-year period for environmental improvement. And in the Philippines recent surveys show that households are often prepared to make substantial payments for investments which will improve the quality of lakes and rivers.

For developing countries the implications of the experience of industrialized countries are crystal clear. Even rich countries manage to treat only a part of their sewage -- only 52% of sewage is treated in France and only 66% in Canada. Given the very low starting points in developing countries-- only 2% of wastewater is treated in Latin America, for example -- and the vital importance of improving the quality of the aquatic environment, what is needed is a process which will simultaneously make the best use of available resources, and provide incentives to polluters to reduce the loads they impose on surface and ground waters.

Box 4: Water resource financing through river basin agencies in Germany and France:

The Ruhrverband:

The Ruhr Area, which has a population of about 5 million, contains the densest agglomeration of industrial and housing estates in Germany. The Ruhrverband is a self-governing public body which has managed water in the Ruhr Basin for eighty years. There are 985 users and polluters of water (including communities, districts, and trade and industrial enterprises) which are "Associates" of the Ruhrverband. The highest decision-making body of the Ruhrverband is the assembly of associates, which has the fundamental task of setting the budget (of about \$400 million annually), fixing standards and deciding on the charges to be levied on users and polluters. The Ruhrverband itself is responsible for the "trunk infrastructure" (the design, construction and operation of reservoirs and waste treatment facilities), while the communities are responsible for the "feeder infrastructure" (the collection of wastewater).

The French River Basin Financing Agencies:

In the 1950s it became evident that France needed a new water resources management structure capable of successfully managing the emerging problems of water quality and quantity. The French modeled their system closely on the principles of the Ruhrverband, but applied these principles on a national basis. Each of the six river basins in France is governed by a Basin Committee (also known as a "Water Parliament") which comprises

between 60 and 110 persons who represent all stakeholders -- national, regional and local government, industrial and agricultural interests and citizens. The Basin Committee is supported by a technical and financial "Basin Agency". The fundamental technical tasks of the Basin Agency are to determine (a) how any particular level of financial resources should be spent (where should treatment plants be located; what level of treatment should be undertaken, etc.) so that environmental benefits are maximized and (b) what level of environmental quality any particular level of financial resources can "buy". On the basis of this information, the Water Parliament decides on (a) the desirable vector of costs and environmental quality for their (basin) society, and (b) how this will be financed (relying heavily on charges levied on users and polluters). The fundamental financial task of the Basin Agency is to administer the collection and distribution of these revenues.

In the French system (in contrast to the Ruhrverband) most of the resources which are collected are passed back to municipalities and industries for investments in the agreed-upon water and wastewater management facilities.

Against this backdrop, developing countries face an awesome challenge. The "old agenda", namely the provision of water supply and household sanitation services, is clearly a relatively "easy" task if sensible financial policies are adopted, since consumers want and are willing to pay for these services. And yet only a handful of developing countries have been successful in meeting this "easy task" in an efficient, responsive and financially sustainable way. The "new agenda", which centers of management of wastewater and the environment, is a much more difficult and expensive one, and one in which successes (in terms of efficiency and financial sustainability) are few and far between even in industrialized countries.

There is heartening evidence that the right lessons are being drawn from the experience of many developed countries. Just five years ago the Baltic Sea Clean-up was conceived of in classic terms -- setting quality standards and then determining what was needed to finance the needed investments. In this case (as in all others) once the calculations were done it became clear that the necessary money (over \$20 billion) could not possibly be raised. In the Interministerial Conference on Financing of the Baltic Sea Clean-up in Gdansk in 1993 this approach was abandoned for a far more productive one, namely ensuring that limited available resources were invested in such a way as to develop financially sustainable, efficient water and sanitation utilities, and to ensure that the limited resources for wastewater treatment were allocated to the highest priority investments.

Daunting as the "new agenda" is, there is cause for hope. It is encouraging that delegates from over 100 countries could agree at the International Conference on Water and the Environment in Dublin on the global relevance of the principles underlying the Ruhr and French water resource management systems. Even more important are the signs that the Ruhr/French system is now being adopted, with appropriate modifications, in Spain, Poland, Brazil, Venezuela and Indonesia, and is likely to be applied in many developing countries in the near future.

Some common (erroneous) beliefs about the new approach to financing:

Finally, it is important to explore three commonly-held misconceptions which may impede the adoption of the “new” financing perspective.

Misconception #1: The existence of externalities means that a demand-based, participatory approach to sector development cannot work

It is frequently asserted that a demand-based approach is fine for “private goods” but not for “public goods” (such as environmental quality). In this context, it is important to note that a central feature of the approach advocated in this paper is respect for the capacity of stakeholders to make the right decisions. First it should be noted that the principle which applies at the household level -- namely that the household is in the best position to decide how to spend the resources available to it -- can successively be applied at greater and greater levels of social aggregation (remember that “the household”, too, is a social aggregation!) to solve the resource allocation issues appropriate to that level. Second, it should be noted that there is no appeal to override the basic behavioral-based decision process by appealing to “externalities”, but simply a need to deal with externalities at any particular level by “kicking them up” one level, where they are internalized. And third, that a successively smaller and smaller number of decisions needs to be made at higher levels.

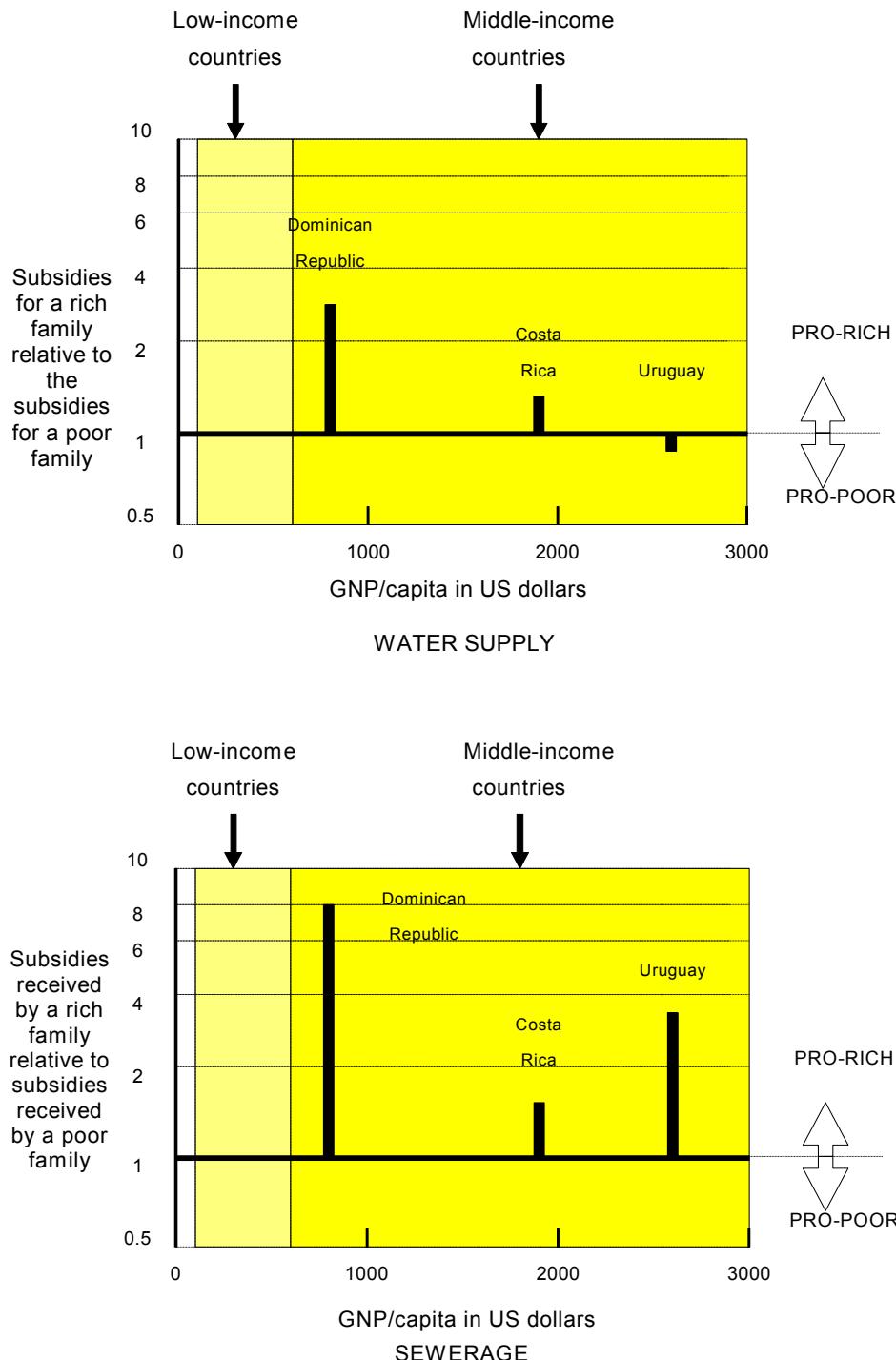
There is clear evidence from the experience in industrialized countries (as illustrated by the Ruhr example discussed earlier) and by the experience of the World Bank in developing countries that concern with environmental quality can easily lead to a supply-driven approach which mandates investments on the basis of “technocratic criteria” and which ends up serving the interests of consultants and contractors, but not the people to be served or the environment in which they live. In such a context it has correctly been asserted that “externalities are the first refuge of scoundrels”!

Misconception #2: The new approach to financing does not address the needs of the poor

A second myth about the “new” approach to financing is that it does not take adequate account of the situation of the poor and their need for subsidies.

The justification for high levels of public financing for water and sanitation services in developing countries usually offered is the low ability of poor people to pay for services. In practice, however, it is the rich, not the poor, who virtually always benefit disproportionately from subsidized water and sanitation services.

Figure 10: Who benefits from subsidized services in Latin America



Note:

“Rich” here means those in the top 20% of the income distribution, and “poor” means the bottom 20%

Source: Adapted from Petrei, 1989

As described earlier, the unserved people, particularly those in urban areas, pay much higher prices for water. And it is the poor who are the unserved. Figure 10 reports the results of a detailed assessment of who benefits from public subsidies of water supply and sanitation services in several Latin American countries. The results are striking and the conclusions clear -- although subsidies are justified as "being necessary because poor people cannot afford to pay", they end up heavily favoring the top 20% ("the rich"), with the inequity directly related to the degree of rationing of the service. Inequity is, accordingly, greater in low- than in middle-income countries, and greater for sewerage than for water supply.

The cycle is clear. Where services are heavily subsidized, service expansion is relatively slow, both because available resources are used inefficiently (because the supply organizations are not directly accountable to their customers) and because of constraints on public financing. The consequence is that "the lucky ones" get subsidized services while "the unlucky ones" who are not served pay an exorbitant human, social and financial price to get services. Data from Latin America (Figure 10 below) provide clear confirmation of the universal rule, namely that "luck" is not a random outcome, but is the prerogative of the privileged. These data also show that inequities are greatest where services are most heavily rationed, namely in the poorest countries and for sewerage. (This has appropriately been termed "the hydraulic law of subsidies" -- the subsidies go with the service, and it will always be the better off and more influential who, public pronouncements notwithstanding, benefit first. And it will always be the less influential -- the poor -- who are at the end of the line both literally and figuratively and who either do not get services or who suffer most from poor quality services.)

If subsidized services don't make sense, then does this mean "abandoning the poor"? The answer is a clear no. Three examples illustrate innovative approaches to addressing the financing needs of the poor.

Example #1: Micro-credit for rural water supply in Bangladesh

The Grameen Bank in Bangladesh is well known as a provider of credit to over two million poor and landless people in Bangladesh. A large proportion of the clients of the Bank are women. The great innovation of the Grameen Bank is to find an alternative to traditional forms of collateral. The key principle is that if any borrower defaults, then the group to which that borrower belongs no longer is considered creditworthy and is no longer eligible for loans.

In recent years the lending of the Grameen Bank for rural water supplies has risen dramatically. Since early 1992 the Bank has provided loans for about 70,000 tubewells. In 1993 the Bank lent about \$16 million in 1993. The interest rate charged on loans for tubewells is 20 percent, repayable over two years in weekly installments. The handpumps are procured locally by the borrowers, either from the Public Health Engineering Department or from local private manufacturers.

Example #2: “Water stamps” in Chile

In the past Chile addressed the problems of low-income water customers in the usual way -- by using a subsidized “social tariff”. As Chile has moved towards self-financed, autonomous water utilities, a dilemma has become evident. A commercially-oriented water company has incentives to not serve the poor if the company loses money as a result of the “social tariff”. The Chilean solution has been to (a) acknowledge the legitimate needs of poor people and (b) remove responsibility for social policy from the utility. The mechanism for doing this has been the introduction of a “water stamps” system, in which water services are explicitly subsidized by government, with distribution done via local authorities who target these subsidies to the poor.

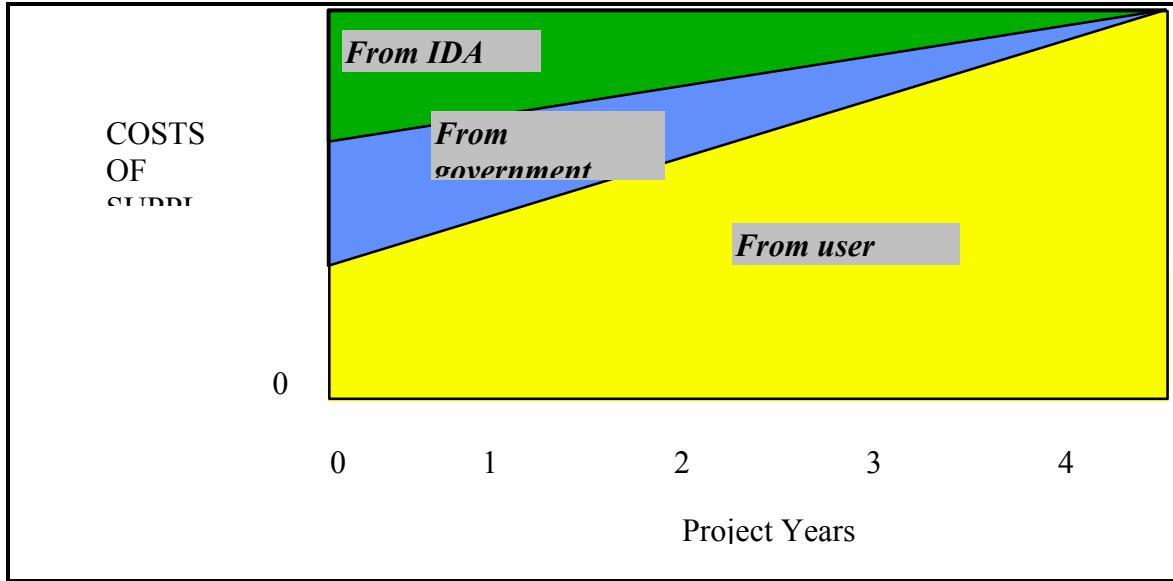
Example #3: Breaking the vicious cycle in Conakry

The governments of many developing countries face the following dilemma. It has become clear that their public water utilities will never provide customers with a reliable, accountable, efficient water supply service. However, tariffs are so low that it is impossible to attract a private sector operator. It is politically infeasible to institute massive tariff increases when users are still getting a low quality supply.

This “vicious circle” was addressed creatively and effectively in the late 1980s in a World Bank-financed urban water project for Conakry, Guinea. The sequence, as illustrated in Figure 11, was as follows:

- Step 1 -- attract an experienced private sector operator, by paying the operator partially from user charges and partially from the proceeds of a World Bank credit and government revenues;
- Step 2 -- once service quality improved, gradually increase the proportion of costs being paid by users and reduce the subsidies.

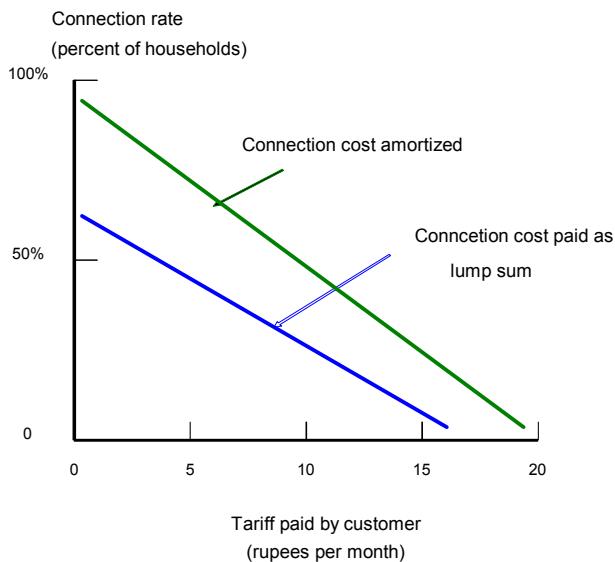
Figure 11: Breaking the vicious cycle in Conakry, Guinea



Example #4: Financing connection costs

An issue of considerable importance for the poor is that of the difficulties they face in raising the capital required for the initial costs of connecting to a piped water supply system. Studies in India and Pakistan have shown (Figure 12) that connection rates can be increased very substantially if water companies provide financing (not subsidies) to poor customers for the costs of connecting to piped systems. This practice -- of amortizing the costs of connections over, typically, five years -- has been practiced to considerable success in Latin America for many years.

Figure 12: How spreading connection costs over time affects connection rates in Kerala, India



Misconception #3: The financing problem can be overcome by mobilizing financing from the private sector

Faced with constraints on public financing, some countries have looked to the private sector for financing of the massive investments required. There are many reasons -- efficiency, innovation, and separation of provider and regulator -- suggesting that it is often appropriate to involve the private sector in the provision of these services. And there are an increasing number of examples of private sector financing being mobilized for wastewater investments (especially for Build-Operate-Transfer schemes) in Mexico, Malaysia, Indonesia and other developing countries.

In the context of the present discussion, there are two major factors to be taken into account in assessing the role of the private sector in financing of wastewater investments in developing countries. First, as shown in Figure 13, public facility projects are often characterized by a long construction period, followed by a gradual increase in the revenue extracted from the operation, with the result that the investors may have to wait 8 to 10 years before receiving their first dividend and will almost have to wait 15 to 20 years before obtaining a rate of return comparable to that offered by an industrial investment

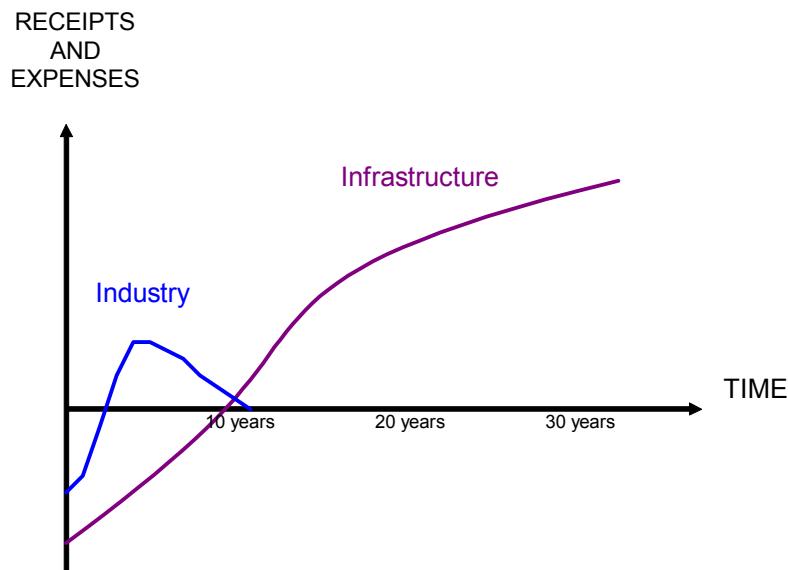
Three observations are relevant in this context. First (see Table 3), in the country with the longest history of private sector participation in the water sector -- France -- the bulk of privately-operated water supplies are privately financed (concession contracts), but

the majority of privately operated sewerage is publicly financed (affermage contracts). Second, where capital markets are relatively shallow -- as is the case in most developing countries -- the transition from public financing to long-term private financing is going to take time and ingenuity. And third, because the investment costs are so large, cost recovery frequently has to be scheduled over a number of years.

Table 3: Private and public financing of privately-operated water and sewerage services in France (approximate)

	Water supply	Sewerage
Affermage (public financing)	30%	70%
Concession (private financing)	70%	30%
All delegated management	100%	100%

Figure 12: The time profile of expenses and receipts for typical infrastructure investments



After Davezies and Prud'homme, 1993

Conclusions

We can now look back at the financing challenges which face the water and sanitation sector in developing countries. First, we need to complete the “old agenda”. It is clear that the bulk of financing can and should come from users. For this to happen attention has to be given to both demand-side and supply-side factors. On the demand side there must be a rigorous focus on providing the services that people want and are willing to pay for. Above all this means changing from the “we know best” attitude which has characterized the sector for too long, to a focus on meeting households’ needs. On the supply side the focus must be on developing institutional arrangements which provide services at least cost and in a way that is responsive and accountable to consumers. The examples we have discussed provide some indications of the directions which are most promising. In many cases this will involve partnerships in which “non-formal institutions” (such as neighborhood associations) manage the feeder infrastructure, and “formal institutions” (such as utilities) manage the trunk infrastructure. And in many cases this will involve a much greater role for the private sector in the provision of services, both via non-formal and formal institutions.

Second, we need to embark on the “new agenda”. Here the challenge for developing countries is enormous. As this paper has made clear, financial realities are forcing industrialized countries to make difficult choices about the level of investment to make in preserving the aquatic environment and about how to spend the available resources. In developing countries, the situation is much more difficult in three ways. First because this challenge has to be met while the “old agenda” is still on the table. Second because the level of aquatic environmental quality is much worse in developing countries. And third because developing countries have far fewer resources to devote to environmental protection. What this means is that developing countries and those who support them have to confront difficult tradeoffs and make many tough decisions.

Finally, we need to step back from the dry intricacies of financing and put the discussion in a broader context. The overriding challenge to the developing world today is to improve the well-being of the poor in a way that is both environmentally and financially sustainable. Awesome as this challenge is, we can now discern an emerging consensus on what needs to be done and how to do it.

The consensus involves three key ideas. The first, the most mundane, is that the reduction of poverty depends in a fundamental way on sound economic policies, which means fiscal common sense and the maximum use of market and market-like instruments. The second idea is one that has come to the fore recently. It is that the only true development is one in which economic progress and environmental enhancement go hand in hand and are mutually reinforcing. The third idea is both fundamental and radical. It is that people have to be not only the object but the subject of development. It is the people themselves -- all the people -- who have to decide what services they want; it is the people to whom service institutions have to be responsive and accountable; it is the affected people who have to make the decisions (based on information from technicians) on environmental policies and standards.

The consensus around these simple and powerful ideas opens up exciting prospects for making large and sustainable progress in improving the lives of people in developing countries: in this paper we have traced the implications of these ideas for the water and sanitation sector.

We are greatly encouraged by the emerging consensus exemplified in the Dublin Statement and the freshwater chapter of Agenda 21. We recognize that there is much to be done and much to be learned. This will require concerted effort from all involved. The World Bank is committed to working with its partners in the development community (through innovative forms such as the recently-launched Global Water Partnership) and the people of the developing world in translating this consensus into actions to improve the lives of billions of people who lack adequate services and who live in degraded environments throughout the developing world.

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