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# The Value of Water: A Global Perspective

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There are two great challenges to be faced in providing water and sanitation services to people in developing countries. The first challenge is to complete the "old agenda" of providing household services—a billion people still lack access to an adequate supply of water, and 2 billion do not have adequate sanitation facilities. What is needed is to change the focus from supply-driven, subsidized programs to ones in which users are provided the services they want and are willing to pay for. The private sector—*for-profit and not-for-profit*—will have to play a much larger role, for reasons of service, quality and financing. The second challenge is to address the "new agenda" of managing water in an environmentally sustainable manner. This is a challenge which no industrialized country has yet met successfully, and it poses an even more daunting one for developing countries, where resources are much more limited and starting conditions far worse. Emerging experience from industrialized and developing countries alike shows that the approach must include: participation by all stakeholders in basin management, close attention to costs in setting standards and prioritizing investments, and substantial use of economic instruments, such as water markets, and abstraction and pollution charges.

## **Introduction**

There are two great challenges facing the water sector in developing countries. 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"—Providing Services to Households**

### *How has coverage changed?*

A great deal has been accomplished since the start of the UN International Drinking Water Supply and Sanitation Decade. Between 1980 and 1994, about 2 billion more people have obtained access to an improved water supply, and 400 million more urban people have access to sanitation facilities. The glass is, however, also half empty—about 1 billion people still do not have access to an adequate supply of water, and 2 billion do not have access to sanitation facilities. In fact, sanitation coverage has actually declined over this period, from 67% to 63% in urban areas, and from 33% to 18% in rural areas.

### *The rising cost of raw water*

This challenge is made more daunting by the fact that the cost of raw water is rising, due to three main factors. First is the Malthusian arithmetic, which pits growing populations and increasing economic activity against a finite water resource base. Second, in all countries it

is taking time and political will to change existing allocation patterns in the face of rising scarcity and, in particular, to re-allocating water from irrigation to urban uses. And third, as cities grow, so do the "pollution halos" around the city. This often requires relocating water intakes at substantial costs (over \$350 million in the case of Shanghai, for instance). The net effect of these factors is substantial, with the cost of raw water increasing by a factor of 2 to 3 each time a new water source is tapped.

### *The inefficiency of water utilities in developing countries*

Further aggravating the cost problem is the fact that most water and sewerage supply organizations in developing countries are very inefficient. For example, whereas the level of unaccounted-for-water is about 8% in Singapore, it is 45% in Bogota, Colombia, and 58% in Manila. Throughout the Indian sub-continent the situation is so bad that losses are "controlled" by having water in the distribution system for only a couple of hours a day, and for keeping pressures very low. In Madras, for example, it is estimated that if supply was to increase from the current levels (of about 2 hours supply a day at 2 meters of pressure) to a reasonable level (say 12 hours a day at 10 meters of pressure) leaks would account for about 900 MLD, which is about 3 times the current supply in the city!

### *Should public spending be increased?*

An obvious response to the supply deficit is that public spending on the water and sanitation sector should be increased. It is also frequently asserted that spending on the sector has declined in recent decades. In fact, this is not true. A World Bank review of public expenditures in developing countries shows that public investment in the water and sanitation sector increased from under 0.3% of GDP in the 1960s and 1970s, to over 0.4% of GDP in the 1980s.

### *Private financing in the informal sector*

Whatever the state of public facilities, people have to have water to live, and have to deal

with their sanitation needs. Accordingly, where there are deficits in formal supplies, households have to devise other ways of meeting these needs, generally at very high costs. Water vendors are ubiquitous in developing countries, and typically charge around \$3 per cubic meter of water, which is ten or more times the cost of water through the formal system. The magnitude of this "black economy" is huge. In the city of Onitsha in Nigeria, for example, aggregate annual payments to water vendors are 10 times the annual revenues of the water utility. In Jakarta, 54% of households rely on private wells and 32% on street vendors, and household investments in septic tanks are estimated at about \$400 million. Throughout the developing world this "hidden water economy" represents an immense source of financing which could be "attracted in" if the formal systems were available to all and of reasonable quality.

### *What do users pay and what are the implications?*

Consumers in developing countries typically pay only about one-third of the costs incurred in supplying them with water from public systems. There are many pernicious results from this distorted financing picture. First, fine-sounding statements notwithstanding, he who pays the piper will always call the tune. Consequently, utility managers correctly see government as their most important stakeholder—there is little accountability to the users of the services. Second, because government is a fickle client, there is seldom sufficient reliable financing to cover the costs of maintenance and to extend coverage. For some the result is no services at all, for others the services are of poor quality. Third is the vital and paradoxical issue of equity. The universal stated rationale for subsidizing services is that "water is a basic human need, for which the poor cannot afford to pay". In virtually every situation, however, the story is the same—when services are rationed, it is always those with access to political power, namely the rich and middle classes—who get served, and it is always the poor who do not get

services and who have to rely on the "black market". In city after city in the developing world the consequence of "social tariffs" is that the rich are heavily subsidized, while the poor pay very high prices for "black market" water. The "hydraulic law of subsidies" always pertains—water flows towards influence and power, which the poor never have. In country after country it is the richest segments of the population who receive the subsidized service, and the poor who are deprived.

### *Innovative, equitable, approaches to financing of water and sanitation services*

In recent years a number of innovative approaches to dealing with the issue of cost recovery have emerged. In rural Bangladesh, the renowned Grameen Bank makes unsubsidized loans available to groups of organized poor women. While the bulk of such loans have been used for directly economically-productive activities, in recent years about \$15 million a year is lent for private tubewells and hand-pumps. As with all other Grameen projects, repayment rates are high (98%).

At the other end of the development spectrum, Chile has developed an equally innovative and effective approach. Until the late 1980s water utilities in Chile (like most developing countries) used cross-subsidies to address the needs of the poor. What was observed was that this introduced several distortions. First, it meant that each poor person served meant a financial loss for the utility, which, consequently, had a disincentive to actually serve the poor. Second, it meant that utility managers were diverted from their primary focus, which was running their company efficiently. The essence of the new approach was to separate the welfare and business functions, by introducing the idea of "water stamps", which are provided by the government to means-tested poor people, and which are used by the recipients to pay part of their water bills. This has worked very well for the past five years. It has meant that utility managers are now out of the welfare business, and it has meant that subsidies are visible and transparent.

A very common problem for water utilities in developing countries (including Eastern Europe and the former Soviet Union) is that of how to make a transition out of a "low-level equilibrium trap", in which the quantity and quality of services are poor, which means willingness to pay is low, which means revenues are low, which means services are poor, and so on. An innovative approach in the city of Conakry in the West African state of Guinea shows how creative financing can help break out of this vicious cycle. In 1987, the government water utility functioned very poorly, and the quality of services in Conakry was abysmal. The government of Guinea decided that they wanted to attract the private sector, an approach which had worked well in the Ivory Coast and other countries in the region. The problem was an obvious one—no private company would be interested in a contract when revenues were only a fraction of the costs! The solution was an ingenious one of broad applicability—the private operator was assured of sufficient revenues by a combination of (initially low, but rising) revenues from users and (initially high, but declining) subsidies from the government (largely paid out of a World Bank credit). The trick was to use a time-bound, transparent "transition subsidy" to improve services, and then raising tariffs for the improved service. The vicious cycle was replaced by a virtuous cycle of good service and reliable revenues.

### *Serving the poor—the Orangi Pilot Project example*

These general lessons on how to provide services to poor people in developing countries are well illustrated by the Orangi Pilot Project in Karachi. In the early 1980s, Akhter Hameed Khan, a 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 pay for anything else." And how they would get it, too, was clear to them—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 the project director 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.

### *Developing efficient formal institutions*

It is obvious that there can never be good services for people in developing countries unless the formal utilities which serve them function well. The ingredients for successful utility performance are universal, simple and clear—managerial autonomy, a commercial orientation and a strong voice for consumers. Throughout the developing world (and substantial parts of the developed world!) water and sewerage utilities are run as a direct agent of government. As a rule, these utilities are politicized, bureaucratic and inefficient, with the result that coverage is low, and services are costly and of poor quality.

Many approaches have been tried in developing more efficient and accountable water utilities. "Corporatization" describes an approach in which service delivery remains public, but in which managers are given greater responsibility and an arms'-length relationship to government. In many cases (Indian "Water Boards" are a good case in point) the independence is paper-thin. In some cases—New Zealand and Chile are two examples—this

model has been implemented with conviction. While substantial efficiency gains are possible (and have been achieved), these gains turn out to be difficult to sustain over time. (In the face of these difficulties, Chile is now starting to divest its public utilities.)

Many utilities (water and other) are involving the private sector to an increasing extent. The simplest form of private sector participation (PSP) is for a utility to subcontract out various activities (such as billing and collecting). Once again, efficiency gains are possible, but only if the contracting utility is well run (which is often the real cause for concern!). Another drawback is that this form of private sector participation does not stimulate private investment.

Somewhat greater private sector involvement can be obtained via a management contract, whereby a private company is paid a fee for operating water and sewerage services (typically for about a five-year period). Such contracts are being implemented in Gdansk in Poland, and Mexico City. This is an obvious approach when public agencies are performing very poorly, and can be a first step in initiating a process of deeper private sector involvement. However, the arrangement offers few incentives for the private sector. Furthermore, administrative demands are substantial, and the city remains responsible for investment.

Throughout the world there is now much greater use of "stronger" instruments for involving the private sector. A common approach is the lease or "affermage" contract, in which a private company leases the water and sewerage assets for a period of 10-15 years, and operates them in return for the right to revenues from the customers. These contracts are common in France (as the name implies!). In recent years affermage contracts have been concluded in Guinea, Senegal and Australia (Adelaide). The two main advantages of the approach are that the private operator has clear performance incentives and that the operator provides the necessary working capital. The arrangement remains administratively demanding for the public sector, which also remains responsible for investments.

The second common "French" approach is the concession contract. As in the affermage contract, the city owns the assets, and a private operator operates and maintains the facilities. In this case, however, the private operator is also responsible for new investments. Accordingly, these contracts are much longer, typically 25 to 30 years. This is a popular model in France. The city of Abidjan in the Ivory Coast has moved gradually from an affermage to a concession contract. Macao, Limeira in Brazil, and Buenos Aires are other well-known recent cases of concession contracts. These contracts offer potential for high, sustainable efficiency gains in both operations and investment (as both Macao and Buenos Aires have demonstrated). The major issue with such contracts are the government commitment and regulatory demands.

Build-operate-transfer (BOT) contracts are similar in some respects to concession contracts. Here the private sector is given a contract to build and operate bulk facilities. This form of private sector participation is particularly popular in Asia, with major recent contracts in Malaysia, China and Australia (Sydney). This is a good way of getting efficient construction and delivery of bulk services, and of mobilizing private financing for this purpose. But it is not a good solution in the situation where distribution systems and operating companies are in bad shape, a situation which is, unfortunately, both the norm and the fundamental problem in many developing countries.

Finally, the most complete form of private sector involvement is that of asset sale. The best-known case of this approach is England and Wales. Chile has now decided to sell the assets of several of its corporatized water utilities. While the potential for efficiency gains is high with this approach, it requires sophisticated regulatory capacity and great commitment from the government.

### *The prospects for private sector investment in the water sector in developing countries*

The prospects for private sector investment in the water sector in developing countries are

conditioned by several factors. First, there is the nature of the water industry itself. In industrialized countries the water industry has the following characteristics: (a) high capital intensity; (b) the low profitability associated with a relatively competitive industry; and (c) the low return on assets associated with a mature, low-risk industry. Since financial leverage is a direct consequence of the interplay of (a) through (c), debt-equity ratios are inevitably high for the water sector. The implication is that private sector financing in developing countries is going to depend (as it does in industrialized countries) heavily on the availability of debt financing.

In the 1990's, while official sources of development assistance have stagnated, there have been huge increases in private sources of financing. Over this period about \$150 billion of private sector investment has gone into infrastructure in developing countries. Important and promising as this development is, it is important to realise that it has been quite selective, with most going into the more developed parts of the developing world (East Asia and Latin America) and most going into the relatively lucrative transport, telecommunications and energy sectors. Very little of this investment has gone into the poorer parts of the world (Africa and South Asia), and very little has gone into the water sector.

There are two fundamental reasons why so little of this private investment has gone into water supply and sanitation. First, because the level of cost recovery in the water sector is so much lower for water (which is widely considered to be a "social good" than it is for other infrastructure). And, second, because the capital intensity of the water industry means that pay-back periods (and hence vulnerability to political risk) is particularly high.

### **The "New Agenda"—Environmental Sustainability**

Developing countries face a daunting challenge. While facing the challenges of the "old" agenda, developing countries simultaneously face enormous financial, technical and institu-

tional challenges in managing the quantity and quality of their water resources in a sustainable way.

### ***Ambient environmental quality***

While the quality of the aquatic environment is a concern in all countries, the situation in cities in developing countries is especially acute. Even in middle-income countries sewage is rarely treated. Middle-income countries of Latin America, for instance, typically treat only about 2% of sewage. Data from the United Nations Environment Program show that water quality is far worse in developing countries than in industrialized countries. Furthermore, while environmental quality in industrialized countries improved over the 1980's, it did not improve in middle-income countries, and declined sharply in low-income countries.

### ***Costs are a major issue***

It is always expensive to treat wastewater—in the United States about \$400 per capita for conventional primary, and about double that for biological secondary treatment. Wastewater treatment costs are thus a major issue, even in rich countries. In the United States, for instance, local governments face huge investments—about \$3 billion in the case of San Diego—in meeting mandatory EPA discharge requirements. These costs have been an important element in the political controversy over "unfunded mandates" over the past several years.

### ***Institutional approaches for addressing standards and costs***

At the risk of some simplification, one can discern two major approaches to dealing with environmental standards and the costs required to achieve those standards. The first approach can be characterized as the "set-the-standards-and-then-raise-the-money" approach. The prime example of this approach is the European Union, where the magnitude of investments required to meet standards is staggering. Germany, for example, needs to invest an esti-

mated \$300 billion if existing water quality standards are to be met. At current (high) investment levels this would take 40 years to achieve. (A European parliamentarian and bureaucrat was once asked how issues of cost were factored into the discussions of standards—"Simple", he replied, "we never discussed costs"!)

The second approach is one in which environmental quality and the required financing are considered simultaneously. The origin of this approach was in the Ruhr Basin in Germany at the time of the First World War; the approach was subsequently (in 1960) adapted by France on a national scale, and it is now being used in several developing countries.

The Ruhr-French approach is based on a coherent set of institutional and instrument principles. The "institutional principles" are those of participation, subsidiarity and technical efficiency. With respect to participation, the French River Basin Financing Agencies provide a good model - 60 - 120 parliamentarians, representing all users and interested parties, choose the vector of water quality and cost appropriate for their basin, and decide on the assignment of costs. With respect to subsidiarity, the basin agencies are careful never to do anything which can and should be done at a "lower" level (such as a municipality or irrigation district). Thus, while the basin agency decides on abstraction and pollution charges, it has nothing to say about whether a city chooses to have a public or private agency operate its water supply. With respect to technical efficiency, this model depends heavily on strong technical basin agencies, which ensure that basin management is scientifically and technically sound, and which advise the water parliament on the tradeoffs between standards and costs, and on how best to deploy available resources.

The instrument principle is simple, namely to use instruments which give users and polluters of water an incentive to change their behavior. There is, accordingly, maximum use of market-based instruments, with users paying for the water they abstract, and polluters paying, according to the pollution they impose.

### *Market-friendly systems in arid countries*

The Ruhr-French approach was developed in areas where water quality management was the major water resource management issue. Arid areas of the world present a somewhat different water resources management problem, one where efficient water allocation becomes an issue of over-riding environmental and economic importance. While the Ruhr-French principles (participation, subsidiarity, technical efficiency and use of market-based instruments) remain valid, arid areas have had to be more imaginative than simply charging users for water abstractions.

An instrument of rising importance throughout the arid world is that of "water markets". A market for water is not, of course, a new phenomenon. Informal water markets have probably existed wherever water is scarce. These markets can often be very sophisticated—as has been documented in the case of Gujarat in India, for example. Formal water markets have also existed on a limited scale in Spain for centuries. In recent decades, however, the scope and importance of these markets has grown substantially. Water markets now play a prominent role in all the arid Western states of the United States. Since each state has its own history and legal and institutional structure, there is wide variation in the operation of these markets, in some water rights are separated from land rights, in others this is not the case; in some permanent sales are prominent, in others short-term leases are the only form of transaction. In Australia, too, each state has developed water markets along different lines. Since 1981 Chile has separated water and land rights, and enshrined formal water markets as a central element for ensuring that water moves towards high-valued agricultural, municipal and industrial uses.

From this accumulated experience, several conclusions can be drawn. First, it is evident that there is a role for a variety of different instruments, with temporary (seasonal or annual) leases particularly important where reliability is the principal issue, and permanent sales



particularly important where there are structural shifts in water demand. Second, although the quantities traded are large in aggregate (600 million cubic meters in California in 1991, 44 million cubic meters in Victoria in 1994), they are small in relative terms (typically 2%-3% of water changes hands each year) and do not justify gloomy predictions like "water markets will mean the end of irrigation". Third, these modest volumes notwithstanding, the net benefits are significant: \$100 million in dry years in California, for example, and \$15 million a year in a small Chilean basin. Fourth, this is a much more palatable political alternative than confiscation, since water is reallocated on a voluntary basis from low-value users to high-value users. Fifth and finally, the environmental impact of water markets are almost all positive—markets have meant a turning away from supply augmentation alternatives as the method of choice for meeting rising demands. Furthermore, water is used more judiciously, and environmental groups (including the government) are able to purchase water rights and assign these to environmental purposes.

In many ways these formal water markets are in their infancy, with several issues yet to be fully addressed. Among the principal challenges are: to ensure that the geographic and sectoral spread of markets is enlarged (many are restricted to particular regions, and many to intra-sectoral trades) so that benefits can be maximized; to ensure that legitimate third-party effects are addressed (this remains a problem when non-consumptive users impose costs on consumptive users in Chile, for instance); to ensure a reasonable allocation of initial rights (which is a more contentious and difficult issue in highly-unequal developing countries, a problem which South Africa is now confronting). The ongoing Coalition of Australian Governments (COAG) initiative for development of an inter-state water market is a model in how to take hydrological, environmental, legal, institutional and political factors into account in designing a well-regulated, large scale water market. In many ways the COAG approach can be seen as the marriage of

the tried-and-tested Ruhr-French type of participatory, technically-sound river basin management system, with the use of a broader range of economic instruments.

### *The global consensus on water management principles*

The past five years has seen a remarkable convergence in global thinking on how water should be managed. This emerging consensus was best articulated at the International Conference on Water and the Environment in Dublin, the main professional water consultation leading up to the Rio Earth Summit. The "Dublin Statement", developed by over 100 countries, embodies three main principles. First is the "ecosystem principle", which requires that a holistic approach be taken to managing water, and that environmental, social and economic concerns be considered. Second is the "institution principle", which states that water development and management should be based on a participatory approach, with decisions taken at the lowest appropriate level, and that special attention should be given to the role of women. Third is the "institution principle", which states that water has an economic value in all its competing uses and should be recognized as an economic as well as a social good.

The Dublin Statement has been widely influential in the new generation of water policies adopted both by international financial institutions (such as the World Bank and Asian Development Bank) and national governments.

### **Conclusions**

It is now possible to look back at the financing challenges which face the water and sanitation sector in developing countries. First is the challenge of completing 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 tech-

nocratic; "we know best" attitude which has characterized the sector for too long, to a focus on providing the services that households want and are willing to pay for. 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. 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 is the challenge of the "new agenda". Here the challenge for developing countries is enormous. 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, it is necessary 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, there is now 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 emerging 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, and the environment in which they live.

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