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# **WATER PRICING AND PUBLIC-PRIVATE PARTNERSHIP IN THE AMERICAS**

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**edited by**

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## **Preface**

The complexity and the enormity of the water problems the world is likely to face in the coming years are likely to be enormous. Thus, it is essential that new ideas and concepts should be considered to improve water management practices.

In this context, two aspects of water management that have received very high attention during the past five years are water pricing and public-private partnership. These two issues, to a certain extent, are interlinked. Unquestionably, they were two of the most controversial issues of the Second World Water Forum in The Hague, in 2000, and the Third World Water Forum in Japan in 2003. Passion reigned high from both the proponents and opponents of these two concepts during these two Forums.

The report of the World Commission on Water, whose report formed the backbone of The Hague Forum stated categorically that “Commission members agreed that the single most immediate and important measure that we can recommend is that systematic adoption of full-cost pricing for the water services”. The report then went on to say that “without full-cost pricing the present vicious circle of waste, inefficiency, and lack of services for the poor will continue. There will be little investment from the private sector, services will be of poor quality and rationed, and there will be little left for investing in water quality and other environmental improvement.”

Both at the Hague and the Japan Forums, many social activists and NGOs argued that water is a basic human right, water pricing will ensure poor will be deprived of water for which they will not be able to pay, and private sector must not profit from the provision of water services. The discussions on these issues at the two Forums were mostly simplistic, dogmatic and ideological. Unfortunately, there was no real dialogue between the proponents and opponents of the two concepts, and there was not enough objective and dispassionate discussions of the benefits and costs of following or not following these two paths. No rational or definitive conclusions could be drawn from the discussion at these two Forums, part of which stems from the fact that these events were not structured properly to facilitate objective dialogues on any issue.

It is also often not realised that financial and economic views on pricing have different objectives. The financial view on pricing is in the context of cost recovery only, whereas

economic view on pricing is in terms of changing the behaviours of the consumers, including their appreciation of the issue of water scarcity. It also includes achievement of cost recovery targets.

Because of the complexities associated with the water pricing and public-private partnership issue and their relevance to water management of the future, the Third World Water Centre for Water Management, Inter-American Development Bank and the Agencia Nacional de Aguas of Brazil sponsored two focused workshops, on water pricing in Brasilia, 3-5 June 2002, and on public-private partnership in the water sector in Mexico City, 25-27 September 2003. The main objective of both the workshops were to assess the experiences from North and South America on the issues concerned in an objective and critical manner. Papers for each of the two workshops were specially commissioned. Following the discussions at the two workshops, the authors revised their paper. The current publication includes the selected and revised papers.

It should be noted that all the authors were invited to prepare their papers in their personal capacities. Thus, the views expressed by the authors in their papers may not be the same as of the institutions they are affiliated with, or those of the three sponsors: Third World Centre for Water Management, Inter-American Development Bank and Agencia Nacional de Aguas.

On behalf of the Centre, I would like to express our special appreciation to Benedito P. F. Braga of Agencia Nacional de Aguas and Diego Rodriguez of Inter-American Development Bank, without whose support and encouragement it would not have been possible to organise the two workshops and the resulting publications.

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## Table of Contents

Water Pricing: an Outsider’s Perspective <b>Luis E. García</b> .....	1-11
Water Pricing Reforms: Issues and Challenges of Implementation <b>Luiz Gabriel T. de Azevedo and Alexandre M. Baltar</b> .....	12-24
Problems with Private Water Concessions: A Review of Experience in Latin America and other Regions <b>Emanuele Lobina and David Hall</b> .....	25-70
The Functions, Impacts and Effectiveness of Water Pricing: Evidence from The United States and Canada <b>Charles W. Howe</b> .....	71-84
Key Issues and Experience in U.S. Water Services Privatization <b>Jeffrey W. Jacobs and Charles W. Howe</b> .....	85-96
Institutional Framework for Water Tariffs in the Buenos Aires Concession, Argentina <b>Lilian del Castillo de Laborde</b> .....	97-117
Concepts of the Chilean Sanitation Legislation: Efficient Charges and Targeted Subsidies <b>Damaris Orphanópoulos</b> .....	118-139
Considerations on Price Setting for Water Use Charge in Brazil <b>Raymundo Garrido</b> .....	140-177
Water Charges: Paying for the Commons in Brazil <b>Benedito P.F. Braga, Clarice Strauss and Fatima Paiva</b> .....	178-196
Water Charges in Brazil: Implementation and Perspectives <b>Antonio Eduardo Lanna</b> .....	197-212
Water Reform Across the State/Society Divide: Looking for Synergy in the Case of Ceará, Brazil <b>Maria Carmen Lemos and João Lúcio Farias de Oliveira</b> .....	213-229
Participation of the Private Sector in Water and Sanitation Services: Assessment of Guanajuato, Mexico <b>Ricardo Sandoval Minero</b> .....	230-248
Low-Income Urban Users, Victims or Beneficiaries of Subsidies? <b>Víctor Lara Ruiz and Ricardo Sandoval Minero</b> .....	249-263

Water Prices in Spain: Possible Application for Latin America <b>Antonio Embid Irujo</b> .....	<b>264-275</b>
Public Private Partnerships in the Australian Water Industry Pre Coag and Early Coag: Straining the Corporate Model <b>Jennifer McKay</b> .....	<b>276-294</b>
The Partial Privatization of the Berlin Water Company and Some Lessons on it for Latin America <b>Martin Dettlaff</b> .....	<b>295-306</b>

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# WATER PRICING: AN OUTSIDER'S PERSPECTIVE

Luis E. García

## INTRODUCTION

The human perception about water has been gradually changing during the last three decades. It could be said that a change in paradigms can be traced in the declarations and resolutions of many international and regional conferences and meetings. Among the more relevant are perhaps the United Nation's 1977 Mar del Plata Water Conference Action Plan, the 1992 Water and Environment Dublin Conference, the 1992 Rio de Janeiro's Agenda 21, the 1998 Paris Water and Sustainable Development declaration, The declaration of The Hague World Water Forum of 2000, the 2001 Bonn declaration, the Millennium Development Goals, the Johannesburg Earth Summit declaration and the 2003 Japan World Water Forum declaration.

The international consensus developed after Dublin<sup>1</sup>, as to what should be done for a more efficient and equitable use of the water resources has become a widely known revered benchmark: emphasis on integrated management, recognition of water's economic value, stockholder participation in decision making at the lowest appropriate level, access to water services by the poorest users, ecosystem approach and private sector contribution. The most evolutionary of these principles, and the one cited more often, is perhaps the one pertaining to water as an economic good. To many, this evokes images of businesspersons and markets and of private sector involvement in the provision of services such as electricity, irrigation and water supply and sanitation, which present generations became used to associate with the public sector and the common good.

However, the application of this principle is not new. Water services were provided by private parties in the United States and Europe before the 20th century and in many countries, it was not until the 1920s, 1940s and even the 1950s that these services were absorbed by local, state and national governments (Lee, 1990).

Just to cite examples from developing countries, water supply in certain areas of Guatemala City was mainly privately provided until a Municipal Water Utility (EMPAGUA) was created in the 1960s. Moreover, a water market existed in Guatemala City until some 20 years ago. Whenever EMPAGUA wanted to increase the supply by tapping a new source, the Central Bank would provide financing and would then issue water titles. Anyone could buy one of these titles or "Pajas de Agua" ("straws", named after the manner in which the aqueduct was taped in colonial times). They could be used to receive a

volume of water equivalent to 2m<sup>3</sup>/day, or they could be negotiated or used as collateral, or they could simply be saved waiting for prices to rise. When the titles from a given water supply source were sold out at the Central Bank, private buy – and - sell transactions occurred. This market collapsed, however, when the “Pajas de Agua” could not be backed up any longer with the corresponding water volumes, due to increasing population growth rates which outpaced the increase in water supply. If people were willing to trade water, nobody wanted to buy paper.

Another interesting example is that of the Panama Canal, which has operated hydraulically based on water volumes regulated by two major reservoirs, which also provide water supply for municipal and industrial uses of the central region of Panama, including Panama City. Recently, the effects of El Niño and projections of future traffic increases and larger ship sizes prompted the Panama Canal Authority to think about additional sources of water both inside and outside the original Panama Canal watershed.

As the cost of the possible future inter basin water transfers to supply the canal and the central Panama municipal and industrial water requirements are quite high, the Panama Canal Authority is studying all possible alternatives to meet the future requirements, including demand management. Among these, a new water pricing system for the use of water from the Panama Canal watershed is being studied. The main objectives of the new system would be the long-term conservation of the resource and to increase revenues for its administration and management.

Despite examples such as these, the public era of provision of services was the norm until the concept of water as an economic good was rediscovered in the late 1980s and emphasized by organizations such as the World Water Partnership and the multilateral and regional financial institutions in the late 1990s.

## **PRESENT TRENDS IN LATIN AMERICA**

The Inter-American Development Bank<sup>2</sup> (IDB) is the oldest and largest of the regional multilateral development banks. Established in 1959 to foster economic and social development in Latin America and the Caribbean, its membership currently totals 46 countries of which 26 are borrowing member countries<sup>3</sup>.

During four decades the Bank provided substantial financing to its borrowing member countries for all kinds of water-related infrastructure projects, namely water supply and sanitation, irrigation, drainage and flood control and hydroelectric generation, almost exclusively to the public sector. In the mid 1990s however, new trends in water resources management became evident in Latin America.

The emphasis in centralization for the provision of water services, which for many decades was promoted by many financial organizations seeking stronger institutions and economies of scale, was reversed and



decentralization became a rediscovered paradigm. The application of economic instruments and the involvement of the private sector in the provision of water services were strongly emphasized, encouraged by the successful example of Chile and a perceived failure of the public sector to generally provide for these services efficiently.

This, and the recurrent economic crises that increased the difficulties for public financing of the provision, operation and maintenance of water services, called for a change in the role of the public sector from provision to regulation of such services. It was also a factor in the call for a change of paradigm from development of the supply to management of the demand and from a sectoral to an integral approach in the management of the resource. With all these changes in the water sector, it also became evident that the institutional framework that in the past had the responsibility for solving the water issues and the water problems of the population, had to change and modernize.

In May of 1998, the Bank approved its strategy for integrated water resources management (IDB, 1998a). Perhaps the most emphasized of the guiding principles of the Bank's strategy relates to the institutional innovation and capacity building required to bring into practice these universal principles for integrated water resources management (IWRM), which were so clearly enunciated in Dublin.

There is a wide variety of institutional arrangements that go from market mechanisms for the allocation of water among competing uses, such as in Chile, to river basin organizations and from a negotiated bottom-up approach, such as in Brazil, to a regulated top-down approach; from public ownership to private ownership and from centralized authorities to decentralized entities, such as in Colombia. A summary of the situation and trends regarding the institutional framework for IWRM in Latin America and the Caribbean at the beginning of the millennium can be found in sources such as the paper by García (2000).

Generally speaking, countries do assign priorities to various uses. Water for human consumption gets first priority in most cases, but not in all. There are cases where water for hydroelectric generation has first priority and cases where use of water for livestock has a high priority, second only to the use of water for human consumption.

In the last decade, institutional changes in the water-use sub-sectors, such as water supply and sanitation, have taken place. The separation of the functions of providing water services, from that of regulating the provision of such services, has been the cornerstone of these changes. A new type of sub-sectoral water organization has thus appeared: the "independent" regulatory entity.

However, this water-use institutional change paid scant attention, at least at the beginning, to the fact that what was being restructured and regulated was the provision of services, i.e. the use of the water, but not the management of the water as a resource. It was simply assumed that the supply would always be there and that the return flows would always find an adequate mean of disposal. Apparently, water use

conflicts both in quantity as in quality and conflicting demands were not part of the equation; at least not at the beginning.

This situation provoked the emergence of a new model of water resources organization, this time not to regulate the relationships between the providers of services and the users of these services, but to regulate the allocation of water resources among competing uses (Garcia and Valdes, 2000).

The objective for this independent regulatory entity would be to reach an integrated management of the resource, by allocation of water use rights, including those for return flows. The criteria would be economic efficiency, financial sustainability and social equity, so that supplies could be ensured for all alternate uses and avoid conflicts, especially under scarcity conditions.

The creation of a regulated (or not) “water use rights market” could also be considered. Water for human consumption and environmental needs could (or not) be excluded from the market, and these would have (or not) priority of use. All other uses would compete in this market. If necessary, this mechanism could be established by river basin.

Variations of this model have been favored in actual operations by multilateral financing organizations such as the World Bank and the IDB (van Hofwegen and Jaspers, 1998; World Bank, 2000, IDB 2000a, IDB, 2000b, IDB, 2000c, ICWS and CRESEE, 2000).

## **QUESTIONS FROM AN OUTSIDER’S POINT OF VIEW**

Presently, it would be hard to find a country where its water policies and/or strategies, if existent, do not expressly endorse the Dublin principles. One of those principles is that water is an economic good; therefore, it must have a value. But what does this mean, in practical terms, for the water organizations and the consumers? From an outsider’s point of view, not privy to the internal intricacies of charging for water, some degree of naiveté is – hopefully – permissible: Therefore, it is posed that the bottom line is that water must be valued and charges must be levied for its use. Also, from a practical point of view, posing the following question as the name of the game does not imply great difficulty: “who charges who, for what, how, and how much?”

One of the underlying premises of the institutional model described in the previous section is that the water resources regulatory entity is self-sustained. That it generates revenues from the allocation of water rights to the users only for its operation expenses. This is equivalent to providing a service and charging for it. Once a water right is allocated to a user, the market will assign the water to the most productive use, such as in the Chilean model. But having been forced to look more closely into this, the naïve outsider cannot help but to experience certain uneasiness. To feel that a lot is missing from the picture. That in the real world things are not that simple. There are too many actors and variables to

consider and many more questions, such as the following, come to mind:

Will the “service charge” of the regulatory entity be equal for all users? And if not, how and what to charge to different users and on what basis?

- If no economic instruments, such as a water rights market, are used for the allocation of water among competing uses and users, how much and how to charge to promote efficiency?
- If only a “service charge” is made, does it mean that once the rights are obtained, water use is free? Should it be free or should the government charge again for its use, given that it belongs to the Nation? If it were private property, the owner would surely charge.
- Should the product of these charges be considered as a source of national revenue?
- Should service providers or “resellers” of water be charged equally than individual users? If that should not be the case, how and how much to charge each one?
- How much should service providers or “resellers” charge to their “clients” and how?
- Should pricing strategies be universally designed by marginal cost pricing?
- Should pricing strategies be designed only for surface waters, in absence of groundwater abstraction and pollution charges, or a more comprehensive pricing strategy considering these should be designed?
- Is there a “right” price for water?
- Water has a value in-use, but its use also has a cost. Certain schools of thought promote charging the “full cost of water”, but what is it?
- The literature mentions the economic cost, which is easier to determine than the environmental externalities. Components of the economic cost are capital costs, operation and maintenance, opportunity costs and economic externalities (Bhatia et al, 1999).
- Can pricing at “full cost” or “full pricing” be achieved in practice and under which conditions? Earlier proponents of this principle are now having second thoughts in the face of income limitations of large population groups and decreasing agricultural revenues in developing countries.
- Under these conditions, does its application reduces or increases equity?
- If the value of using water to the users is greater than the cost of using it, it makes sense to use it for that purpose, although there may be cases where the cost is greater than its value in-use.
- Does water have an “intrinsic” value, even if it is not used by humans that should be added to its value in-use, and therefore included when determining its “full price”? Although there is a school of thought favoring this, it does not seem to be a consensus about how to assess this intrinsic value.
- Will different pricing schemes produce different consequences for integrated water resources

management?

- Should pricing strategies be tailored to the circumstances at hand, to influence and change water managers' and users' behavior?
- Are certain policy results achievable through water pricing schemes?
- Is water pricing a policy tool or only a revenue tool?

## **SOME DIFFICULTIES INVOLVED IN WATER PRICING**

The fact that water is also a basic living need and that it also has a social and environmental value, makes it extremely difficult to select an appropriate price (IWMI 1998). Sometimes water is a private good and sometimes it is a public good. In some cases the marginal utility of water is very high, such as in a drought for irrigation purposes, and sometimes it is very low, making it difficult for markets to function. Also, given the complexity of the flow of water through a river basin, transaction costs may be high, and insecure and undefined property rights and high incidence of externalities are major causes of market failures in developing countries (Perry, C.J. et al 1998).

Since water is a basic human need, cultural values and value judgments have important implications. Many people believe that there is an obligation for society to assure reasonable levels of water, the same as food, shelter and medical care up to a certain level, to ensure that basic human needs are met, but not beyond, suggesting that water has different value for different levels of consumption (IWMI 1998). Because of this, among other reasons, some believe that water policy decisions must be formulated in terms of multi-objective decision making, recognizing that the relevance and importance of the different values will vary under different conditions of time and place (Perry, C.J. et al 1998).

### **Some Useful Guidelines**

Hanemann (1999) presents an interesting discussion about the role of pricing in promoting integrated water resources management from a U.S. perspective. Bhatia et al (1999) discuss the use of prices to promote equity, efficiency and sustainability, drawing from experiences from India and Jakarta and OECD countries. What follows is summarized from these discussions.

Hanemann (1999) takes a pragmatic approach and poses that a pricing strategy should not be designed in isolation by a mechanical application of marginal cost pricing. That it needs to be tailored to the circumstances at hand, since the underlying goal of water pricing is both to influence and change water managers' and water users' behavior. In what direction it is desired to influence these behaviors, and how this can best be accomplished, requires local judgment and will vary with circumstances.

For example, in an illustrative manner he discusses four major and two subsidiary possible objectives for designing a rate structure. The major objectives are:

- Raising revenue (for financial sustainability, stability and predictability).
- Allocation of costs among different uses and users (for social equity, political acceptability).
- Changing behavior (by providing effective incentives to users).
- Promoting economic efficiency (both in the use of water as well as to new investments).
- The subsidiary objectives are:
  - Ease of administration (transparency, simplicity).
  - Avoiding negative environmental externalities and promoting environmental sustainability).
- Rate design depends on the objectives and these vary with circumstances. Sometimes the focus is backward looking, to raise revenue in order to recover past costs. Emphasis is on covering existing financial obligations and to provide water as inexpensive as possible. Future financial obligations will be dealt with later. This is the objective of raising revenue (objective 1) and Hanemann (1999) poses that it is reasonable as long as it does not conflict too much with the objective of allocation of costs among different uses and users (objective 2) and the same purpose cannot be attained through marginal cost pricing (objective 4). Also, an adequate supply of water must exist and there should not be a foreseeable need for future investments in water supply. If either one of these fails to hold, a forward-looking approach is proposed to change water behavior (objective 3) or promoting efficiency (objective 4).

It is easy to see that these objectives may have conflicting implications for rate design (Hanemann 1999). For example:

- Reducing what users pay reaches the objective of raising their welfare but diminishes the incentives for efficient use of water and lowers revenue.
- Fixed charges promote stability and predictability, but diminish the incentives for efficient use of water.
- Charges based on consumption promote conservation and efficiency in water use, but cause uncertainties in the revenue stream.

The conclusion is that no single approach can be globally applied, but depends on the objectives and the circumstances. Along the same lines, Bhatia et al (1999) state that there is no universal “best” rate design.

What is “best” for a given community and situation is that which reaches an acceptable compromise among the objectives that are important for that community (Rogers et al, 2001). In a more extensive and closer to reality manner, they discuss not six but seventeen objectives. It can be imagined that the situation and the implications become even more complex in the real world.

In the case of water use tariffs, OECD countries use some combination of the following elements (Bhatia et al., 1999):

- Connection charges
- Fixed charges
- Volumetric charges
- Block charges
- Minimum charges

For example, some countries use a two-part tariff system, which has fixed and variable elements. Other countries include an increasing block tariff system for the variable part, providing different prices for two or more pre-specified blocks of water, raising the price for each successive block. In this case, decisions must be made on the number of blocks (a managerial decision), volume of water associated with each block and price to be charged for each block (these last two are social and political).

Moreover, there is more than one method for setting the tariff prices in relation to costs, such as average incremental costs, marginal cost, price cap, benchmark or “Empresa Modelo”, and average referential price (Bhatia et al., 1999). Elasticities must also be considered and there are also groundwater extraction charges, wastewater and sewerage charges and subsidies to account for, making tariff design also a complex endeavor.

As an example, the Venezuelan experience in setting the tariff structure for Caracas is explained by Rubinstein (1999). In a highly discretionary environment lacking regulation, Hidrocapital, the Caracas’ water utility was motivated by two factors: (i) government fund transfers were ceased and (ii) an intended privatization process aborted. The objective was to increase revenue to cover costs and several methodologies were explored, finally selecting the average referential price method.

As a background, the rate setting procedure prior to 1993 was long and complex and highly political. It involved at least seven consultation and approval instances with various ministries, with the possibility of re-negotiation loops. After 1993, a simplified procedure was allowed, allowing the water utility to set the rates using inflation or its best estimate as a proxy for increase factor and deciding the frequency of rate increases. Two parameters set the price: an average referential price and an average referential price for social users. Cross subsidies between users were allowed and it was automatically

indexed over time.

At the time, the water sector in Venezuela was enjoying a regulatory vacuum, not because of laws and regulations, and not because of lack of actors, but due to lack of direction and leadership, fragmented and dispersed responsibilities, and lack of penalties for non compliance (Rubinstein 1999). This vacuum gave the water utility the ability to increase the tariff and to explore different ways of private participation and shielded it from political interference. However, as a disadvantage, the rules of the game were unclear, producing a highly discretionary, unstable and risky situation, and responsibilities and accountability were not defined. Even then, the conclusion was that lack of regulation was better than inappropriate regulation and that the tariff increase improved the financial situation of the utility, without a significant consumption reduction (Rubinstein, 1999).

## **CONCLUSIONS**

From an outsider's point of view, it is evident that there are many questions and no easy answers. It is very clear, however, that determining the value of the use of water and water pricing is a complex process.

It is also clear that when talking about water pricing, wholesaling and retailing, and charging for treated water as well as charges for "raw" water should be clearly differentiated and should not be lumped together or confused. Therefore water pricing goes beyond – and should not be confused with – the determination of water utility tariffs, a process equally complex.

Water pricing is an important policy component of water resources planning and management that, because of its complexity, is often not considered by water resources managers. Nevertheless, it is an important component of water resources management and planning and more attention should be given to it in all of its possible implications and objectives, including influencing and modifying behavior, and not only to the objective of increasing efficiency.

It is also evident that there is no universal model. The solutions have to be tailored for each case and be acceptable by the community.

In Latin America water pricing has been traditionally considered mainly on a retail scale with a user welfare objective. In some instances, the objective has been shifted towards increasing the revenue of the water utilities. Water pricing on a wholesale scale for "raw" water is less frequent although it is duly being considered in some of the large countries such as Mexico and Brazil.

## **NOTES**

1. International Conference on Water and the Environment: Development Issues for the 21st Century. January

26-31, Dublin, Ireland.

2. Throughout this paper the Inter-American Development Bank will be referred to as the IDB or the Bank.
3. Argentina, Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Dominican Republic, Suriname, Trinidad and Tobago, Uruguay and Venezuela

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# **WATER PRICING REFORMS: ISSUES AND CHALLENGES OF IMPLEMENTATION<sup>1</sup>**

**Luiz Gabriel T. de Azevedo and Alexandre M. Baltar**

## **INTRODUCTION**

The more scarce a resource becomes, the more efficient should be its use. Water resources do not fall apart of this rule. Limited renewable availability and increasing demands have made water resources scarcity one of the world's most challenging issues with serious local, national, regional, as well as global impacts.

The realization that water is finite led to the development of new concepts and approaches in an attempt to effectively address the multiple challenges facing water resources management. The scope of a new framework has been widely debated in a number of important international events during the past two decades resulting in a broad global consensus, forged during the Rio Earth Summit process, which recommends that modern water resources management be based on three fundamental principles (known as “the Dublin Principles”). First there is the ecological principle, which argues that water management has to be comprehensive, integrated and inter-sectoral, that the river basin must become the unit of analysis, that land and water need to be jointly managed, and that much greater attention needs to be paid to the environment. Second is the institutional principle, which argues that water resources management is best done when all stakeholders participate, including governments, the private sector and civil society; that women need to be active participants of the decision making process; and that resource management should adopt the guiding principle of subsidiarity, with actions taken at the lowest appropriate level. Third is the instrument principle, which argues that water is a scarce resource, and that greater use needs to be made of incentives and economic principles in improving allocation and enhancing quality.

It is within this context that water pricing ought to be considered. The use of pricing mechanisms is not an objective in itself but an effective means of improving water resources management and the provisions of water services. Therefore, the implementation of water pricing reforms should always be evaluated within a broader perspective which takes into account elements related to the three principles – ecological, institutional and instrumental – as well as political, social, natural, legal, and cultural characteristics of each country or region.

It is also important to realize that even when conditions are favorable, water pricing reforms are quite difficult to implement. Although significant progress has been achieved in many countries, these can be regarded as pilots or examples in comparison with the huge challenges that still remain. This is a

process that requires persistence and patience. As stated in the World Bank Water Resources Sector Strategy, “*all countries, including industrialized ones, have a long way to go before they manage their water resources in accordance with principles of best practice. The challenge of reform, accordingly, is to determine what is feasible, in any particular natural, cultural, economic and political environment, and to develop alliances around a sequenced, prioritized, realistic program for improvement.*”<sup>2</sup>

This paper deals primarily with this process of improving the implementation of water pricing reforms<sup>3</sup>. It is primarily based on the World Bank experience in supporting such reforms in developing countries. In the sections to follow the objectives, importance, critical challenges, options and recommendations for the implementation of water pricing reforms will be discussed.

## **WHY WATER PRICING IS IMPORTANT**

The World Commission on Water (WCW) has estimated that investments in water infrastructure to meet all water supply and sanitation, irrigation, industrial, and environmental management demands need to increase from the current level of \$75 billion to \$180 billion a year<sup>4</sup>. This enormous investment gap will demand innovative thinking and cooperative approaches to be met, while well-targeted subsidized public investments will still be needed. The development and long term sustainability of the necessary infrastructure will certainly require the systematic adoption of integrated water resources management and introduction of appropriate water pricing mechanisms.

Without adequate pricing mechanisms, consumers have no incentive to use water more efficiently as they receive no signal indicating its relative value. Similarly, if the water service providers are unable to recover the costs to adequately fund their operation, systems will deteriorate and the quality of service would suffer. The deterioration of water systems can be seen worldwide, particularly in developing countries. Finally, if the cost of maintaining clean water is not incorporated into prices charged to relevant users, then there will be little incentive to reduce water pollution. As a result, freshwater supplies will become increasingly unsafe.

Free or underpriced resources are frequently misallocated, mismanaged and wasted. The WCW Report stated that “*where services are free, the result is inevitably politicization of the concerned agencies, inefficiency, lack of accountability, capture of the subsidies by influential groups, and a vicious cycle of poor quality services, water rationing, and insufficient resources for operation, maintenance, and investment. In almost all cases, the poor end up without access to water. They also pay exorbitant prices for inferior and unreliable services provided by unregulated vendors and bear the brunt of environmental degradation*”.<sup>5</sup>

In summary, the introduction of adequate water pricing reforms gives rise to a series of fundamental and healthy changes, being essential in the process of breaking the vicious cycle outlined above, by: (i) giving users a sign of the economic value of the resource, thus helping to promote its more efficient use; (ii) providing financial resources to guarantee adequate administration, operation and maintenance (A, O&M) of water infrastructure; and (iii) funding (at least partially) water resources management and development.

## **WHY IS IT SO DIFFICULT TO IMPLEMENT WATER PRICING REFORMS?**

The World Bank has recently conducted a detailed assessment of the implementation experience of its 1993 Water Resources Management Policy, taking into account more than 400 Bank-financed projects in over 100 countries (World Bank, 2001). This evaluation came to the conclusion that “*there was a general failure to promote compliance with cost-recovery provisions and the implementation of water tariffs and charges that reconciled economic efficiency, social equity, financial criteria, and autonomous and independent regulatory systems.*”<sup>6</sup> Indeed, 78% of countries participating in sector operations have failed to comply with covenants agreed with the Bank regarding this matter. One of the reasons identified for this mediocre performance was that the Bank may have required reforms to be implemented too quickly or before the borrowers were fully committed.

This demonstrates that even with important external technical and financial support, water pricing reforms are extremely complex and take time to mature. Industrialized countries provide another example. A detailed recent review by the Organization for Economic Cooperation and Development (OECD, 1998) shows that even in the most advanced countries, where sound governance, participation, institutions, and skills do exist, much progress remains to be made on issues such as: (i) “*more consistent application of the polluter pays principle*”; (ii) “*prices very rarely reflect full economic and environmental cost*”; (iii) “*most work in improving water use efficiency remains to be done*”; and (iv) “*agricultural water use still heavily subsidized*”. Still, the OECD report stated that, while many notable successes have been achieved, “*the progress to date is the result of many years of effort*”.<sup>7</sup>

Indeed, water is not at all an easy-to-manage resource. There are some special features, such as the need for capital-intensive infrastructure, public good nature of certain water activities, and occurrence of third-party impacts (see Box 1), that add significant complexities to the financial equation of water resources management.

There are also other conceptual and practical issues that make the implementation of water pricing reforms even more difficult. These include: (i) dual objective of water pricing – economic efficiency and cost recovery; (ii) different perceptions by economists and users on what should be

considered appropriate pricing; (iii) inherent complexity of the irrigation sector; (iv) lack of accountability in water service provision; and (v) difficulties in taking opportunity cost into account.

#### **Box 1 – Special Characteristics of Water**

- ✓ Large, lumpy capital requirements and economies of scale in water infrastructure tend to create natural monopolies, warranting regulation to prevent overpricing. Moreover, many water investments produce joint products, such as recreation, electric power, flood control, and irrigation, which make pricing and allocation decisions difficult.
- ✓ The large size and extremely long time horizons of some investments, given underdeveloped capital markets and the potential for political interference in many water infrastructure investments, reduce the incentives for private investments in the sector; in such situations, public investments may be warranted.
- ✓ The uses of water within a river basin or aquifer are interdependent. Withdrawals in one part of the basin reduce the availability of water for other users; groundwater pumping by one user may lower the water table and increase pumping costs for all users; and pollution by one user affects others in the basin, especially those located downstream. These interdependencies suggest that having all users agree to the rules of the game – or lacking that, imposing government regulations, taxes, or both – could improve the social value of water resources.
- ✓ Certain aspects of water activities, such as the control of floods and waterborne diseases, are (local) public goods, which cannot easily be charged for on the basis of individual use. In such cases, public initiative may be required to ensure that levels of investment are appropriate.
- ✓ Water resources are often developed because of their strategic importance for national security and for regional development. Governments thus typically maintain ownership of water thoroughfares, providing services such as the coast guard and traffic regulation.
- ✓ Some regions are subject to periodic droughts. Because water is essential to sustaining life, governments may take control of water.

*Source:* World Bank Policy Paper on Water Resources Management, 1993, p. 28.

### **Economic Efficiency Versus Cost Recovery**

Some economists have argued that the ideal theoretical solution for water pricing is to set economic efficiency as the main objective and set prices according to full economic cost recovery criteria. Attaining this ideal, however, is generally not practical. Administrative and/or information complexities and political realities need to be taken into consideration, thereby yielding a more attainable objective. Setting prices according to the objective of economic efficiency, although a valid and foreseeable goal, requires detailed information on opportunity costs and value of water in alternative uses, which is at best difficult and expensive to obtain and very often provides misleading signs for policy making and implementation (Azevedo and Asad, 2000).

The Brazilian case is a good example of how pricing objectives differ from theory to practice. Although many studies have been produced in different states and river basins looking at estimates of optimum prices that capture economic values of alternatives uses, the two most relevant initiatives in Brazil relied, instead, on values decided through broad political negotiations with main water users; this is the case of the State of Ceará in the dry and poorer Northeast region – the only state where bulk water is actually being charged in Brazil; and the case of the Paraíba do Sul River Basin, a industrialized and developed basin shared by the states of Rio de Janeiro, São Paulo and Minas Gerais, where the introduction of bulk water pricing has been recently approved by the River Basin Committee. In such initiatives, agreed prices were lower than optimum values from the standpoint of economic efficiency, but can still stimulate a more efficient behavior by water users and provide financial resources to promote adequate and sustainable water resources management and development. In other words, even with prices set for the primary objective of recovering costs, there has been an efficiency enhancing effect due to the simple fact that there was no payment at all before the reforms took place.

It is also clear that there are different definitions and levels of cost recovery. As normally happens to any capital-intensive infrastructure, some amount of subsidy may be required to compose the investment package. Accordingly, charges may be set at a level to achieve full cost recovery (i.e. including a lease payment that is designed to amortize the cost of the investment over its expected life) or merely operational cost recovery. This will depend upon the objectives of the project and the nature of any subsidies which have been provided.

Since a failure to operate and maintain new infrastructure does not have immediate visible effects, potential or actual water users may argue that zero or minimal charges will encourage a rapid take-up of the newly available resources. Public bodies responsible for the construction or regulation of the infrastructure will be strongly inclined to waive charges or set them at a level well below the long run cost of operations and maintenance. This makes economic sense in the short term provided that charges are increased as demand builds up. Unfortunately, the expectations created by low initial charges are easily converted into a quasi-property right with users believing that they should never be required to pay realistic charges for their water. This is an example of the time-inconsistency of a policy strategy that can often contribute to derailing the pace of pricing reforms.

### **What is Considered Appropriate Pricing?**

The second mentioned issue refers to the different perceptions that economists and water users generally have with respect to what should be considered appropriate pricing. Economists argue that one should charge users for the marginal costs of producing the next unit of the resource. Users, on the other hand,

understand a price as a payment for a service rendered and, as this service is often provided in regime of monopoly, legitimate price for users is that which covers the costs of an efficient provider to provide the service. Thus, users consider average, not marginal, cost to be appropriate.

Additionally, there is no consensus with respect to what cost components should be included in the price to be charged to users. Users consider legitimate paying for the costs of operating and maintaining the existing infrastructure and, through transparent negotiation and effective communication, also the costs of replacement. However, they vigorously resist the notion that they should pay for sunk costs, which, in their eyes, have already been paid for by taxes or other assessments.

Similarly, the costs of water resources management that are associated with public-good-nature activities, such as flood control, drought alleviation, and environmental quality, cannot be fully charged to individual users. These costs are often diluted in the overall costs of water agencies and, since they are not easily separable, their inclusion into the price to be paid by users becomes another issue to be negotiated.

### **Inherent Complexity of the Irrigation Sector**

The third issue listed above relates to the complexity of the irrigation sector. The agriculture sector accounts for about 70% of all fresh water used in the World. Figures vary greatly among countries but irrigation is, almost everywhere, the largest water user. Experience shows that this sector is also one of the most active opposers to water pricing reforms. Generally, the stronger the political influence of agricultural sector the stronger will be the opposition to water pricing reforms.

In such context, a basic difficulty with most pricing mechanisms that are designed to guarantee adequate resources for A, O&M and better utilization of existing infrastructure is that these are open to the charge of discriminating against small farmers. From a political perspective this may be a powerful argument even though it is based on the most superficial analysis of the impact of the changes. Many studies as well as practical experience provides ample evidence that existing arrangements around the world tend to benefit large water users over small-poor farmers. When users are not required to pay for the use of water, large and influential users are usually able to ensure that they receive better service – greater reliability or higher volumes – than other users. Thus, large users are likely to have relatively less to gain from the adoption of charging and other arrangements designed to sustain better management. Small users, even where they should gain over a run of years, may be understandably reluctant to support a change which brings the certainty of higher cash payments combined with less certain promises of better services and higher incomes. The complexities and challenges of overcoming these perverse incentives to maintaining the status quo should not be underestimated.

Secondly, one should consider that there are fundamental distinctions between the markets in which irrigation and other water users (e.g. urban water supply) operate. While in the case of urban water supply the end product can be considered as a local non-tradable good, in the case of irrigation, where the end products are agricultural goods which trade on a global market, the situation is radically different. For example, as the agricultural subsidies from OECD countries are huge (about \$ 350 billion/year<sup>8</sup>) this has major impacts on the prices of agricultural products in developing countries. This is (reasonably) used by farmers as an argument against the introduction of water charges.

### **Lack of Accountability in Water Service Provision**

What happens if the service provider is not efficient? Experience shows that most attempts to increase cost recovery tend to fail if the accountability issue is not resolved, since users will obviously and legitimately have no incentives to pay for the cost of water provision given the inefficiencies of the service providers.

In such situations effective progress in the implementation of pricing reforms requires more than the simple exhortation of the benefits and importance of cost recovery to improving water resources management and/or environmental quality. Instead, it is necessary to realign institutional arrangements and incentive structures in such way as to ensure that water suppliers are accountable to users and that water charges become a real tool guiding service provision.

Besides its potential to hinder or even to cause the failure of cost recovery efforts, the lack of accountability in water services provision has many other negative consequences to the management of water resources. In the water supply and sanitation sector, for example, experience shows that unaccountable, financially unsustainable utilities often operate in a climate of impunity, paying little attention to public responsibilities, such as wastewater goals and water quality standards set by river basin authorities and other public water resources management agencies. Conversely, accountable utilities are acutely aware that their business depends on the availability of a reliable quantity of good quality water. With that in mind, they understandably become active advocates of effective water resources management.

### **Difficulties in Taking Opportunity Cost into Account**

Should prices reflect the opportunity costs of water in each one of its alternative uses? The right answer seems to be a questionable yes in theory and a positive no in practice (see Box 2). Theoretically, *“in an economically efficient resource allocation, the marginal benefit of the employment of the resource is*



*equal across uses, and thus social welfare is maximized. This equilibrium can be achieved through the operation of price signals in a competitive marketplace for the resource.”*<sup>9</sup> Only in this ideal case, opportunity costs would be clearly obtainable. However, in the absence of an operating market, how reliable would be our estimates of these opportunity costs?

In any event, and as pointed in the Box 2, in certain circumstances (such as irrigation) it would be necessary and fundamental to take account of opportunity costs in order to give users the right signal of the real cost of the water they are using. However, in such cases pricing mechanisms (charges collected by a water agency) are not the appropriate approach to follow. The best way to internalize opportunity costs into users decisions would be the establishment of transferable water rights and creation of adequate conditions for water markets to evolve.<sup>10</sup> This is however a controversial idea in many parts of the world, and in most countries legal frameworks and institutional arrangements are not sufficiently developed to allow for the broad use of market mechanisms. However, one should not lose sight that as the challenges to water resources management increase it may be necessary to amplify the menu of alternatives available to water managers to include a combination of economic instruments such as pricing, markets, as well as other economic mechanisms capable of promoting more efficient management of water.

## **THE POLITICAL ECONOMY OF IMPROVEMENT**

Experience over the past two decades indicates that the implementation of water pricing reforms is a complex process which often challenges long standing institutional, legal, and cultural values. The consensus on the need to establish pricing reforms has been forged a long time ago. Nonetheless, actual implementation of this consensus on the ground has been at the best mediocre. It is known by now that the international water community as a whole may have underestimated the challenges and the complexity of implementing such reforms especially under the vast variety of physical, climatologic, historic, legal, cultural, institutional, etc., conditions around the world.

On the other hand there have been many lessons learned during the past several years and these should be the basis for adjusting and revising strategies and to developing additional instruments and mechanisms. Political economy is a key aspect of successful reforms and the experience thus far offers an indication of some of the aspects that need to be taken into account during the reform process:

- *Undertake reform only when there is a powerful, articulated, and clearly recognized need for reform* – the perception of the need to reform cannot be exogenous and promoted primarily by external forces but rather endogenous and strongly recognized and felt by a large number of stakeholders;

- *Involve all users and other stakeholders in the process* – this is another principle that practicing has proven to be much more difficult than reaching theoretical agreement. Nonetheless, the effective involvement of users and stakeholders in the decision making process is an essential requirement of a successful reform path.

#### **Box 2 – Financial versus opportunity costs (practical implications)**

“User payments for the financial costs of services rendered is a fundamental requirement for any financially sustainable water supply system. This is very important. But the claims for ‘pricing’ typically go beyond that of maintaining and operating infrastructure, and suggest that if ‘the prices are right, allocation will be optimal’.

Proceeding from the point of view of users (as one must when considering political economy of reform rather than theoretical elegance), it is vital to distinguish between two radically different types of cost. First there are the costs that any user can understand, namely the financial costs associated with pumps, treatment plants and pipes. Second is the far more subtle concept of the opportunity cost of the resource itself. There have been many proposals (almost all of which have come to naught) for doing sophisticated calculations of this opportunity cost, and charging users for this ‘to ensure appropriate resource allocation’. This has not worked for two fundamental reasons. First, because it is impossible to explain to the general public (let alone to angry farmers) why they should pay for something which doesn’t cost anything to produce. And, second, because those who have implicit or explicit rights to use of the resource consider (appropriately) such proposals to be the confiscation of property. (It is equivalent to asking a homeowner to pay rent at the market rate to the government for occupying the property which she owns.)

An added, and very important, factor is that the ratio between financial and opportunity costs is often radically different for different sectors. Although everything in water (like politics) is local, there are two broad patterns. It costs a lot to operate the dams, treatment plants, pumps and pipes which provide households with the modest amounts of water they use. Alongside these large financial costs, the opportunity cost of the resource itself (as measured by the value of the raw water in its next best use, often irrigation) is typically quite low. For municipal and industrial water, therefore, financial costs generally dominate opportunity costs.

For irrigation the situation is almost exactly the opposite. It costs relatively little (per unit of water) to build, operate and maintain the usual gravity systems which provide very large quantities of water. But the opportunity cost of the water (for cities and, increasingly, for high-value agricultural uses) is, in situations of scarcity, often much higher (a factor of 10 in typical cases of scarcity) than the financial cost of supplying the water.

These numbers (remembering, of course, that every place is different) have profound implications. They mean that, from the point of view of ensuring that users take into account the cost of the resources they are using, the emphasis must be on financial costs for municipal supplies, and on opportunity costs for irrigation. (Cost recovery for irrigation remains, as discussed above, very important for infrastructure sustainability, but not for allocative efficiency, which is the focus in this section.)

The great challenge for irrigation, then, is how to have farmers take account of the opportunity cost of the resource when it is both wrong in theory and impossible in practice to charge them for this.”

*Source:* World Bank, “Water Resources Sector Strategy – Strategic Directions for World Bank Engagement”, Draft for Discussion, March, 2002, p. 25.

- *Be aware that reform is dialectic, not mechanical* – the process of reform is not often associated with a linear path. It involves variables that are subjective in nature and for which mechanistic approaches are not very well suited.
- *Pay attention to general principles but adapt them to different institutional circumstances* – there is no “one-size-fits-all” model or a magic formula that can be applied everywhere and to every situation. One should make use of principles which are broad in nature and that have been shown to be the basis for successful reform, but taking into account that the implementation of such principles may require innovative thinking so that they can be adapted to different circumstances.
- *Start with the easier problems to build momentum* – the implementation of reforms should be sustained by positive results. For that to happen it is important to initiate with simpler problems or situation for which solutions may be achieved within a reasonable timeframe. Once achieved, such successes would provide lessons and incentives to moving forward into more complex challenges.
- *Acknowledge that there are no perfect solutions* – the use and/or allocation of water is a highly complex and controversial issue in most places. Very seldom consensus can be achieved as the appropriation of the resource by one sector or by upstream users often represents a less than optimal allocation by other sectors or downstream users. Therefore it is essentially important to recognize that the implementation of reforms requires negotiation and acceptance of trade-offs that must be clearly understood by all interested parties.

Dinar (2000) provides an interesting discussion about the political economy of water pricing reforms and a detailed set of recommendations which would contribute to successful implementation of water pricing reforms, including: (i) water pricing reforms should be launched after extensive public awareness campaigns; (ii) reformers should communicate a clear economic rationale, develop a broad reform agenda, adjust to institutional and political reality, and take account of traditional customs and social structures; (iii) successful reform programs must include compensation mechanisms negotiated with stakeholders; (iv) reformers should precisely identify their objectives; (v) reforms should be well prepared, because once they are implemented, they are hard to modify; (vi) the implementing agency must be sensitive to political events when putting the reforms in place; (vii) the agency should package and sequence the reform components to minimize opposition; (viii) it should seek external support and mobilize supportive stakeholders as much as possible; (ix) gains from reforms have to be shared; (x) pricing reforms should acknowledge asymmetric upstream-downstream externalities, as well as the differences between water sources (groundwater and surface water); (xi) reformers should acknowledge the need for a set of institutions and not impose a generic process for reform implementation.

## CONCLUSION

Experience to date indicates that reaching agreement on the strong relationship between water pricing and improved water resources management was much easier than the actual implementation of proposed pricing reforms that have proven to be more complex and difficult than originally anticipated. Despite a large number of studies and pilot initiatives only a handful of examples have actually been implemented where water and/or pollution charges are actually being collected. Nonetheless the results of a vast number of initiatives while stopping short of expected results have provided substantial contributions to raising the level of the debate, to increasing our knowledge about the economics and many other aspects of water pricing. Many lessons have been learned and the water community is now better prepared to move forward.

Regarding the authors' experience with conceptual and practical issues that make the implementation of water pricing reforms difficult, five have been presented: (i) dual objective of water pricing – economic efficiency and cost recovery; (ii) different perceptions by economists and users on what should be considered appropriate pricing; (iii) inherent complexity of the irrigation sector; (iv) lack of accountability in water service provision; and (v) difficulties in taking opportunity cost into account. The challenges, however, may not be limited to these five areas alone and other relevant aspects may have to be considered under specific settings.

One of the important questions considered in this paper relates to the objectives of water pricing reform. In this regard, one should not be afraid of adopting pragmatism as a course of action. In most settings, including developed countries, the most obvious objective influencing water pricing reforms is to recover costs.

While many have argued that the ideal theoretical solution for water pricing is to set economic efficiency as the main objective and set prices according to full economic cost recovery criteria, attaining this ideal, however, is generally not practical for several reasons. One of the main challenges is the estimation of opportunity costs for different water uses. Such costs are generally known to be excessively complicated and/or expensive to estimate, at best, and completely misleading at worst. As such, increasingly, international experts are coming to the conclusion that allowing the market to determine opportunity cost prices is more sensible. This requires creating the conditions for water markets to evolve, which constitutes a gigantic challenge in itself.

A second practical challenge is that most bulk water agencies/companies are doing well if they can recover O&M costs and a portion of investment costs for bulk water supply. More typically, these services are partially or fully subsidized by public institutions. This is mainly a historical/cultural problem, which relates to the fact that in most countries water users are accustomed to pay little or

nothing for bulk water. This, then, leads to a political difficulty, whereby policy makers and politicians are generally reluctant to adopt any bulk water pricing reform at all for fear of alienating powerful water user interest groups and/or individual users/voters.

At the political level, introducing water pricing reforms at all is quite challenging, particularly since most users are accustomed to paying little or nothing for water. For the above reasons, and others, it is preferable to set aside the ideal solution (at least initially) in favor of one which sets cost recovery as the main water pricing objective. Experience demonstrates that the role of pricing, with or without consideration of environmental costs, in raising the efficiency of water resources allocation and/or use has been generally secondary. On the other hand, application of cost recovery has provided for increased discipline in considering all costs and in reaching decisions regarding new investments. Finally, as discussed in this paper, the accountability and improved services provision to water users are essential elements of successful reforms. Users will not be lured into paying higher or new charge if this is not associated with perceivable benefits to them.

Regardless of the approach taken to implement water pricing reforms, it is critical to involve all stakeholders in the process. This includes both upstream involvement in the design of pricing schemes, as well as downstream in implementation of the schemes, and collection and allocation of associated revenues. Once again, this has been a consensus that in practice has proven to be complex and challenging to implement.

Finally, the message of this paper is neither of challenging the conceptual framework regarding the importance of water pricing reform nor one of negativism regarding the potential for actually implementing the agreed principles. Rather, the authors sought to review the reasons behind a less than optimal implementation performance over the past several years with the objective of extracting lessons and suggestions that would lead to better results in the future.

## NOTES

1. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors and should not be attributed in any manner to the World Bank, or its affiliated organizations, or to members of its Board of Executive Directors or the countries they represent.
2. World Bank, "Water Resources Sector Strategy – Strategic Directions for World Bank Engagement", Draft for Discussion, March, 2002, p. 2.
3. For discussions on specific country experiences, see Dinar and Subramanian, 1997.
4. World Water Vision – Commission Report, p. 51.
5. World Water Vision – Commission Report, p. 34.

6. World Bank, Operations Evaluation Department, “Bridging Troubled Waters – Assessing the Water Resources Strategy Since 1993”, 2001, p. 1.
7. OECD, “Water Management – Performance and Challenges in OECD Countries”, 1998, p. 29-30.
8. Water Resources Sector Strategy: Strategic Directions for World Bank Engagement, Discussion Draft, March, 2002.
9. Gibbons (1986), “The Economic Value of Water”, p. 2.
10. Water markets are not discussed in this paper. For an overview of World Bank experience on this matter see Marino and Kemper (1999), Briscoe et al. (1998), Simpson and Ringskog (1997) and Dinar et al. (1997).

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