

# Private-sector Participation in the Management of Potable Water in Mexico City, 1992–2002

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**ABSTRACT** *This paper is the result of a study that analyses the process of private-sector participation in water management in Mexico City. Because the concession to provide the service was not awarded to one single company, there are important differences in comparison with the experience of other cities, both in Mexico and in the rest of the world. The transfer of responsibility for the services was intended to be a gradual, three-phase process. Even so, the city government was to retain property rights over the infrastructure and would continue to set tariffs, while the companies would be paid, over 10 years, for each activity realized.*

## Introduction

Mexico City's (from hereafter referred to as Federal District) new strategy was launched in 1992 by the government of the Federal District in an effort to promote a profound structural change in the city's water management. The thinking behind it was that water could no longer be regarded as a public right (and, as a result, supplied and subsidized by the state), but as an economic asset, subject to private appropriation. The hydraulic system faced a severe crisis as a result of deterioration of the physical and commercial infrastructure, inefficiency and a charging system based on fixed tariffs. There was also a need to eliminate subsidies that promoted waste while blocking expansion and the improvement of supplies to the poorest neighbourhoods. It was also necessary to develop participation schemes for the private sector in different stages of the production, distribution and sale of water (CADF, 1993, pp. 2–3).

The new strategy had two objectives: guaranteeing the water supply that the city needed for its development on an ecologically sustainable basis, and achieving financial self-sufficiency for the system (CADF, 1994; Ministry of Finances (SF), 1997, p. 20). Both immediate and long-term measures were planned in order to achieve these goals. The immediate measures included an updating of the legal and institutional framework, including a definition of the policy to be followed on buildings, powers to curtail or cut off the supply, and charges for rights of discharge into the drainage system of water extracted

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DOI: 10.1080/0790062042000316875

from wells (the only previous charge was a one-off payment to the National Water Commission, the CNA). At the same time, control was sought over the 10 000 major users, who provided more than 60% of income (SF, 1997, p. 23).

However, these measures were not sufficient to achieve ecological and financial self-sufficiency. As a result the government had to promote two far-reaching measures that, in the end, proved to be the key to the new water strategy: (a) the introduction of a system that based all charges on metering and (b) a massive rehabilitation programme for the distribution network in an attempt to reduce losses through leakages to between 10 and 15% (CADF, 1994; SF, 1997, p. 25). The government also thought it was necessary to eliminate the overlapping of functions by all the various bodies involved with water, and bring the sector's finances into balance in the medium term. Integration, it was thought, would improve co-ordination between the functions of distribution and charging, as well as providing the necessary incentives by establishing a relation between spending and income. The aim was to create an institution that, either by itself or acting through third parties, would provide the public services of drinking water, drainage and treatment and re-use of wastewater, as well as operating, managing and conserving the hydraulic system (Beristain-Iturbide, 2002). The new body was to be semi-autonomous and incorporate all the necessary functions and faculties, while making as little impact as possible on those of the Department of Hydraulic Construction and Works (DGCOH) and keeping to a minimum any problems that might emerge on the labour front. The main function of the new body, however, was to be the introduction of a billing system based on metering, so as to bring the water and drainage budget into balance as quickly as possible. The private sector was to be invited to take charge of distribution, metering, billing, customer support and maintenance of the secondary network. At the same time, the city treasurer's office and the boroughs were to reach accords on charging and the installation of uptakes, pending the assignation of zones to private operators.

On 14 July 1992, the president of Mexico issued a decree creating the Federal District Water Commission (CADF) as an autonomous administrative body that would take overall charge of the provision of the public services of drinking water, drainage, treatment and re-use of wastewater, and would unify all efforts and measures taken in these areas (CADF, 1993, p. 7). For socio-political reasons (staff cuts and subsequent protests) and financial considerations (a reduction in income), a decision was taken to integrate the various functions one step at a time. It was thought that, in the medium term, the CADF would evolve into a body that would take in all aspects of management of the service. This thinking was justified on the basis that the conversion of rights into tariffs would make it easier to update and administer this aspect of the work, and because greater financial self-sufficiency would be achieved by the linkage of the sector's spending and income (Beristain-Iturbide, 2002, pp. 6–7).

### **The Contracts: Phasing-in and Fragmentation**

From the beginning, private sector participation in the Federal District was unorthodox. On the one hand, the private sector was gradually to take over responsibility for the system, beginning with service contracts. On the other hand, not one company was contracted but four.<sup>1</sup>

According to the CADF, in order to meet the condition of keeping the service under the responsibility of the city government, the use of such traditional schemes of private-sector

participation as the sale or concession of infrastructure was considered inappropriate. Instead, private-sector participation was structured through service contracts under which property rights in the infrastructure and control over the introduction of the new system of charges would remain in the hands of the city government (CADF, 1995, p. 21). It was also decided that the application of metering, and improvements to the system, would be carried out with the help of the private sector.

The next step was to decide the extent to which private companies could participate in the sector. This was defined on the basis, on the one hand, of the political decision to maintain control and responsibility for the service in the hands of the city government and, on the other, on the lack of accounting, financial and operational information on the system. In order to keep the service as a responsibility of the city government, the contract that was considered to be most appropriate was of a type similar to the French *affermage*. Under this format, the city government could retain control and responsibility for the system, as well as property rights in the infrastructure and the power to set tariffs. The contract that was finally signed was generic and atypical. The Public Works Law and its regulations and complementary dispositions had to be applied in a way that reflected its *sui generis* nature (SF, 1997, pp. 17–18).

At the same time, in order to phase in the project by stages, a juridical scheme had to be developed that would facilitate progress with the support of a normative contract that covered all stages before the risk contract, and each of these stages had to be covered by specific contracts. Under this scheme, all necessary information could be gathered before proceeding to a contract based on performance incentives. Operation under service contracts or by specific tasks would allow the city to control the pace and the policy for the introduction of new charging systems, therefore reducing the financial uncertainty and the political risk, both for the contractor and for the city government, before the adoption of a risk contract (SF, 1997, pp. 18–19).

Three stages were defined in keeping with the policy of phasing in the new system. In the first stage, contracts were to be issued for the installation of meters and billing systems based on them, as well as the drawing up of registers both of users and of the primary and secondary networks, and the regularization of uptakes. Ideally, this was to be done on the basis of contracts that paid fixed amounts for each user registered, each uptake regularized, and each meter installed, as well as for each square kilometre included in the register of the secondary network (SF, 1997, p. 19).

In stage two, the contractors were to calculate costs on the basis of the metering of consumers, billing, updating of the registers of users and the network, and acceptance of the reception of duties payable to the city government, among other activities related to commercial aspects of the water supply. In this phase, the payments due to the contractors were to be based at first on a certain amount for each reading and billing, evolving, as more information was acquired, into a formula based on a percentage of the amount charged in each operational zone by the CADF.

In the third stage, the companies were to operate, maintain and rehabilitate the secondary networks of potable water, as well as install systems for detailed measurement and the detection of both visible and invisible leaks. Payment initially was to be by km of pipeline covered, and later by measurement of the water supply in each specific zone. In the general contract, this form of payment was called 'payment by formula'.<sup>2</sup> At this stage, the contractors were to be paid in accordance with a formula that set a price differential between that of the block of water supplied to the contractor and the income generated by

retail distribution of the water at the tariffs authorized in the corresponding area. The companies would have to operate and maintain the distribution system. Where they failed to do so, they would lose income through non-payment by users, and their costs would increase where there were leakages: a formula that would promote efficiency and effectiveness. The aim of all of this was to provide an improved service and encourage efficient and rational use, as well as savings of the water itself. At the same time, the price at which water was supplied to the contractor, and the difference between that and the retail price, was to be determined once sufficient information was available on operational costs, the extent of leakages, and levels of payment after a significant time in which the system of unitary payments for specific tasks had been applied (SF, 1997, p. 20).

The other innovation with regard to the private sector's participation in the Federal District was the assigning of the service to four companies rather than one. This was done for social and political reasons that outweighed those of a purely economic nature. The city finance department maintained that, although in theory there could be a different contractor for each of the stages envisioned, efficiency incentives would be fortified by making one contractor responsible for all of them. In that way, for example, the contractor would have a major incentive to make sure the installation of meters was handled correctly in the knowledge that their profitability would depend on their precision. The optimum decision, both for the city government and for the companies, would have been to put one single company in charge of all the stages in one single zone. However, for reasons of a strategic nature,<sup>3</sup> the city was divided into four zones because: (a) should one of the companies be unable to fulfil its contract, any one of the other three would be immediately available to take over, so reducing the monopoly power of each of the contractors; (b) the risks of collusion among contractors would be reduced, given that the greater the number of companies involved, the less chance there would be of them indulging in non-competitive practices; (c) work could go on simultaneously in four of the boroughs where the potential for charging was greatest, thus increasing cash flow; (d) four zones could be assigned without the need to pay a surcharge for the assignation of a zone with less than 250 000 uptakes; and (e) the system would promote the formation of four very solid companies that would increase competitiveness at a national level.

The zones were drawn up using a linear programming model so that the boroughs assigned to each bidder bordered on each other, thus facilitating detailed measurement. The boroughs with the greatest potential were assigned to different groups with the aim of them starting work at the same time, so speeding up the generation of greater cash flows. It was also hoped that the zones would be roughly equal in the number of uptakes and in the projected value of the corresponding contracts. Finally, the priority set by the contracts was the promotion both of sufficient competition among the companies and of the city's development (SF, 1997, pp. 20–21).

As far as the financial aspects of the project are concerned, funding came from the city government's budget. In order to obtain the best possible financial terms, the CADF worked out a mechanism with the National Bank of Public Works and Services (BANOBRAS) that made this bank the agent for the payments of the obligations that the city government undertook as a result of the tender. BANOBRAS promised punctuality in the payments (Casasús, *Construcción*, 1993, p. 31, cited by Martínez Omaña, 2002, p. 182). The financial impact of the change from a system of fixed charges for water to one based on measured consumption would imply an investment of approximately 208 million pesos in 1993 and 1994. In return, this was expected to increase the income of 472 million

pesos in 1992, to close to 1 billion pesos in 1994 (CADF, 1993, p. 11, cited by Martínez Omaña, 2002, pp. 182–183). However, as established in the general contract, the contractor had to offer the city government financing for the payments relating to the activities of the first stage. The payments due to the contractor in return for the work that corresponded to that stage were to be made in the form of a bimonthly quota in return for services rendered in regularizing the metering service (Casasús, 1993). At the same time, the contractors were to be responsible for detecting visible and invisible leaks (Martínez Omaña, 2002, p. 183).

### **Tender and the Choice of Companies**

The process leading to private-sector participation was launched in November 1992, when the tender was published. The terms included a stipulation that bids could only be submitted by companies in which a majority of the capital was Mexican. In February 1993, seven bids were submitted and, rather than accepting the most attractive, the decision was taken to divide the city into four zones. The general contracts were signed in the last quarter of 1993, followed by the specific first-stage contracts in May 1994, when fieldwork began. In November and December of that same year, the second-stage contracts were signed. It is important to note that the decision to divide the city into four zones was taken after the companies had submitted their bids and when senior members of the city government had shown concern over the idea of handing over responsibility for the city to one single company because they feared that it would create a monopoly over potable water supply.

In accordance with the new scheme, the 16 boroughs that make up the Federal District were divided into four zones. The division was set by Article 15 of the Federal District's constitution as follows:

- Zone A: Gustavo A. Madero, Azcapotzalco and Cuauhtémoc boroughs, with an estimated 298 557 uptakes.
- Zone B: Benito Juárez, Coyoacán, Iztacalco and Venustiano Carranza, with an estimated 257 825 uptakes.
- Zone C: Iztapalapa, Tláhuac, Xochimilco and Milpa Alta, with an estimated 327 408 uptakes.
- Zone D: the boroughs of Tlalpan, Magdalena Contreras, Álvaro Obregón, Cuajimalpa y Miguel Hidalgo, with an estimated 263 789 uptakes (Table 1).

Foreign private investors were allowed to take part on condition that their investments were considered as such by the law for the promotion of Mexican investment; nor were they given faculties to determine the management and effective control of the consortiums to which they belonged (Martínez de Omaña, 2002, p. 175).

In accordance with the terms of the general contract, each of the companies had to present proposals for the following four areas:

- Client services, including meter reading, billing and attention to the public. This was to be done through offices in each of the boroughs where users could go to apply to be connected or disconnected, change meters, etc. In addition, telephone call centres were to be set up.
- Support, human resources and systems. The responsibility of this area was to provide quality control to ensure that the procedures in use were the best possible at all times.

**Table 1.** Contractors, including the partners involved, zone, boroughs and number of uptakes, 1994

Zone	Consortium	Partners	Boroughs	No. of uptakes
A	SAPSA	ICA CIE. Generale des Eaux BANAMEX	Gustavo A. Madero, Azcapotzalco and Cuauhtémoc	298 557
B	IASA	Socios Ambientales de Mexico (SAMSA) Severn Trent	Benito Juárez, Coyoacán, Iztacalco and Venustiano Carranza	257 825
C	TECSA	Bufete Industrial BANCOMER Lyonnaise Anglian Water	Iztapalapa, Tláhuac, Xochimilco and Milpa Alta	327 408
D	AGUAMEX	GUTSA Northwest Water	Tlalpan, Magdalena Contreras, Álvaro Obregón, Cuajimalpa and Miguel Hidalgo	263 789

*Source:* CADF (1994).

- Contracts and technical services. This area was in charge of carrying out the census, regularizing meters and updating the register of networks.
- Operations. This area was to be in charge of meter maintenance (during the second stage) and the pipelines (detection of leaks and repairs) (Martínez Omaña, 2002, pp. 181–182).

Implementation of the general contract was delayed for a variety of reasons (some legal, others administrative, political and financial). Although the winners of the tender were picked in March 1993, the contracts were not signed until September of the same year and were put into effect in May 1994. The main reason for the delay was a judicial complaint lodged by one of the companies that lost out in the tender (GMD/Biwater). Administratively, the GADF needed time to organize itself internally and agree with the contractors on operational aspects such as how the service orders were to be issued and paid. There were financial problems too. The 1994 peso devaluation meant a substantial increase in the cost of the imported meters. There were delays in the installation of meters because the budget assigned by the city government was insufficient to pay for them.

### Results According to the Main Players

The perceptions of main players in the Mexico City area were an important part of this research. Hence, interviews were carried out with officials, businessmen, academics and members of the public. In general, those interviewed thought that on the whole the private sector's participation was positive, although as can be seen from what follows, each had a different emphasis. Because they are considered to be the most relevant, only the views of

officials (CADF) and of those involved at the level of society in general are presented here (for a detailed analysis, see Marañón, 2004).

### *Official Views*

The broad consensus is that private-sector participation has made a positive contribution to the management of potable water in the Federal District, particularly in the operation of the commercial system (SF, 1997; Zentella, 2000; Haggarty *et al.*, 2001; Beristain-Iturbide, 2002; Saade, 2002; Marañón, 2004). Development of the commercial system was considered part of the first two stages of the general contract signed by the CADF and the companies, including the collection of basic information on the networks, the register of users, installation of meters and the beginning of billing and charging for measured consumption. Improvements in the commercial system can be seen in the register of users, the installation of meters and their maintenance, collection of charges and greater efficiency.

*The register of users.* The cornerstone of any commercial potable water system is having a users' register that is up-to-date and reliable, something which, as has been seen, simply did not exist in the Federal District. For that reason, at the beginning of the 1990s the CADF put its best effort, with private-sector support, into identifying the users of the potable water service and finding out how many there were. Between 1994 and 1996 a general census was compiled of the properties and water uptakes in all 16 boroughs with the aim of increasing the coverage and updating the ratepayers' roll of the Federal District Treasury. The census became the new register of the city's water users, with updated and specific information on each property and uptake so that each unit of consumption could be billed on a real basis and in a fair manner for each home, apartment or commercial premises and in accordance with the different branches of industry and commerce (see Table 2).

*Measurement.* Before 1994, measurement of consumption was virtually non-existent in the Federal District. The few meters installed were of widely varying types and brands, and they received no maintenance. In that same year the CADF launched a meter installation programme with the aim of achieving, in the medium term, levels of coverage comparable with those of developed countries. In the first year of the programme, 205 200 meters were installed, rising in the following years to a peak in 2002 of 1 264 500, of which 914 100 are type 'A' and 350 400 type 'B'.<sup>4</sup> As a result, the coverage of detailed measurement has reached more than 90%, a figure comparable with that of developed countries.

**Table 2.** Evolution of the updating of the Federal District register of potable water users, 1994–1996

	1994	1995	1996	Cumulative
Total number of users (000s)	544.9	1074.2	144.8	1763.9
Register of networks (km <sup>2</sup> 000s)	83.3	320.4	276.3	735.9

Source: SF (1997).

The CADF maintains that the metering has helped to promote more rational use of potable water supplies by consumers, persuading them to adopt habits that favour savings. Evidence of this lies in the fact that, although the city has received no additional potable water supplies since 1995 (and will not receive them until the completion of a project to supply the city from external sources), there have been no serious interruptions to the service. On the contrary, the meter-installation programme and the programme for the detection and suppression of leaks have enabled the recovery of substantial volumes of potable water. Even so, however, some 200 000 people in the Federal District have no access to potable water and an indeterminate number, especially in the boroughs of Tlalpan and Iztapalapa, receive an intermittent service (Haggarty *et al.*, 2001).<sup>5</sup>

Total coverage of detailed measurement would require the installation of about 400 000 more meters, which is not feasible given the state of the system, the difficulties in gaining access to isolated and remote areas, and the refusal of some users to accept them, among other factors. As a result, the CADF believes that a certain number of uptakes will never be measured. The target to be reached for coverage has, therefore, been set at 95%, which implies installing almost 100 000 meters between 2002 and 2006, in addition to those that will have to be installed as a result of the city's natural growth.

The CADF has paid special attention to major non-domestic consumers, of which there are 16 050 (0.9% of the total register) accounting for 46% of all income. The major consumers are managed by the CADF itself, which reads the meters and calculates consumption levels. The CADF wants to make this process more efficient by introducing a system of remote reading in the medium term, thus raising the major consumers' contribution to 60% of overall income. It has been reckoned that, with that level of income growth, the investment needed in order to modernize the metering system of the major users could be recovered within a year.

The large number of meters now in use means that there has to be a large-scale maintenance programme to keep them in the best possible operational condition, correct any damage or defects that emerge as users point them out, and supervise and control the work done by contractors. For example, between 2001 and July 2003, maintenance was provided for 194 300 meters at an average annual cost of 74 million pesos. The costs were recovered by improvements in the measurement and control of consumption. According to the CADF, the benefits outweighed the costs.

*Detection and elimination of leaks.* The administration of the centre-left Party of the Democratic Revolution (PRD) that took over the city government in 1998, changed the criteria for the charges to companies, and launched a massive programme for the detection and elimination of leaks, with the aim of solving one of the system's gravest problems—the loss of water from the outdated secondary network. Measures that were taken included replacing asbestos tubing with PVC, which is more durable and flexible and thus less susceptible to fracture on sloping terrain.

According to the CADF, the programme for the detection and elimination of leaks has led to savings of 2.8 m<sup>3</sup> per second of potable water, producing benefits for 1.2 million city inhabitants in return for an investment of 1.516 billion pesos. Government critics, however, maintain that the true savings are much less given that the zones to be repaired were chosen without any statistical criterion based on sampling. There were no savings, they say, because although leaks were suppressed on the periphery, the tubes fractured further down the line because of the increase in pressure.



*Collection.* The CADF mainly collects rights on supply of potable water and discharges to the drainage system. Charges are also imposed for late and overdue payment, fines and expenses in cases of dispute. In addition, the CADF retains the value-added tax (VAT) charged to non-domestic users. In general terms, collection has followed a positive trend, rising by 70.5% in real terms between 1992 and 2001, offsetting the major fall that took place in 1995 and 1996. The key factor behind this development has been the strength of the commercial system, mainly the smooth operation of the meters and the billing and collection. The tariffs themselves have fallen in real terms, above all since 1996 (Haggarty *et al.*, 2001; Saade, 2002; Marañón, 2004) (see Table 3).

Debt recovery is difficult because of the general culture of non-payment of the bi-monthly rights for potable water supply. Some users do not want to pay; others cannot because of their poverty. The culture of non-payment developed as a result of the low, fixed-quota tariffs previously charged by the Federal District Treasury which also had a very limited capacity for debt collection. Traditional methods of debt collection, which proved very costly, are being replaced by mechanisms that improve the cost-benefit relationship between expenses incurred and the amounts recovered. These mechanisms include invitations by letter to pay the debt, instalment plans, and information on the bills that tell users exactly where they stand.

Even so, it should be emphasized that volumetric meters have been located for 72% of domestic consumers, a figure that rises to 90% taking into account the fact that large numbers of apartment buildings—in both upper-class and working-class neighbourhoods—measure the overall consumption then divide it up among the residents. Payment by fixed quota is marginal and happens only in areas where there is no meter, when meters are broken or when meter reading is impossible. The tariff structure includes several ranges of consumption of which the first is from 0 to 1 m<sup>3</sup> a month, for which there is no charge; minimal charges are made for amounts greater than this. There is also an additional charge for each subsequent cubic metre.

**Table 3.** Evolution of collection of charges for potable water service in the Federal District, 1992–2002

	Amount recovered (in million pesos)		Real index (1990 = 100)
	Nominal	In real terms (base: 1990)	
1992	471.0	354.2	100.0
1993	572.0	398.3	112.4
1994	712.0	463.1	130.7
1995	769.0	329.1	92.9
1996	1080.0	362.0	102.2
1997	1508.3	436.8	123.3
1998	2053.5	501.4	141.6
1999	2505.0	544.6	153.7
2000	2788.4	556.3	157.1
2001	3159.9	603.9	170.5
2002	3000.0	551.3	155.7

Source: CADF (2002).

*Efficiency.* The efficiency of the water system has improved notably since 1996 (see Table 4).

Physical efficiency has increased from 62.6 to 68.9%, which means that physical losses of water have dropped noticeably. At the same time, efficiency in the measurement of consumption has risen from 49.1 to 90.2% as a result of the installation of meters and the change in charging from a fixed-quota system. Collection has also improved substantially, increasing from 64.8 to 76.9%, reflecting advances in the register of users as well as in billing and collection. Overall efficiency (measured as a product of the three indicators already mentioned) increased from 19.9 to 47.8%, a notable improvement that contrasts sharply with the low levels recorded at the end of the 1980s (10%) (Beristain-Iturbide, 2002).

To summarize, according to the CADF, potable water management in the Federal District with private-sector participation has led to the achievement of several important results. The authorities now have basic information on the system in terms of the networks and users, metering has been applied in most cases, income has risen, and consumption has been reduced, as has the level of physical losses. On those last two points, Rodarte (2002) maintains that metering has boosted a culture of savings in both high and low-income homes. On the other hand, the same author claims that the high-tech detection and suppression of leaks has led to the recovery of 2.8 m<sup>3</sup> of water per second. Rodarte concludes, however, that the initial objective of balancing the system's books has not been achieved because the overall efficiency is only about 50%, which means that only half of what is spent is recovered. Saade (2002) estimates that annual subsidies amount to some \$2 billion dollars and suggests that tariffs be increased.

Rodarte (2002) emphasizes that a sustained increase in potable water tariffs is not viable in the Federal District for social reasons, since 72% of the population live in poor areas. When the PRI was the political party in power, ruling the capital under a virtual one-party system until 1998 and the nation until two years later, the city's inhabitants always considered water to be a vital service that has to be provided by the state. The PRI maintained water as a public service and curtailed efforts to privatize it. That concept has been strengthened, if anything, by the arrival of the PRD in power, which has the overwhelming support of the city's poor.

However, more attention needs to be paid to the current management of tariffs. The essential aim of the current tariff structure is to collect money; it is not designed to encourage savings of water. If this situation is to be changed, the ranges of consumption will have to be re-drawn by providing more support to those less able to pay and increasing the rates for the middle and upper classes (Marañón, 2004). In this context, it might be worth considering water as having two aspects, one social and the other economic. As far as the first is concerned, a certain volume of water could be supplied at low cost to meet the basic needs of the poor, while the rest could be sold at prices whose reference would be closer to opportunity costs. This could be one way of balancing the needs of an increasingly poor population with that of modifying users' perceptions on the availability of water.

### *Society in General*

The impact on society of the experience of private-sector participation in the management of potable water in the Federal District must be regarded on two levels. One level is the

Table 4. Efficiency indicators for the management of potable water in the Federal District 1996–2002

	1996	1997	1998	1999	2000	2001	2002
<i>Relative Data</i>							
Physical efficiency <sup>a</sup>	62.6	63.0	64.5	66.3	68.0	69.2	68.9
Efficiency of measurement <sup>b</sup>	49.1	80.0	86.0	88.5	90.3	90.1	90.2
Efficiency in charging <sup>c</sup>	64.8	63.5	76.0	81.7	79.3	83.1	76.9
Overall efficiency <sup>d</sup>	19.9	32.0	42.1	47.9	48.7	51.8	47.8
<i>Absolute Data</i>							
Physical efficiency							
Volume of water supplied to users (millions of m <sup>3</sup> )	686.6	690.6	691.9	720.2	752.8	752.2	757.5
Volume of water produced (millions of m <sup>3</sup> )	1096.9	1096.1	1072.8	1086.3	1107.0	1087.0	1100.0
Efficiency of measurement							
Number of users billed (thousands)	1477.5	1620.2	1644.0	1681.1	1720.0	1769.1	n.d
Meters installed (thousands)	737.2	1051.6	1137.3	1187.1	1228.6	1255.9	n.d
Number of bills based on meter readings (thousands)	725.6	1260.6	1408.3	1505.1	1552.8	1582.7	1590.0
Numbers of bills issued (thousands)	1478.2	1575.7	1637.6	1701.2	1720.0	1756.0	1800.0
Efficiency in collection							
Amount collected (billions of pesos)	1.1	1.5	2.1	2.5	2.8	3.2	3.0
Amount billed (billions of pesos)	1.7	2.4	2.7	3.1	3.5	3.8	3.9

Source: CADF (2002), non-published information.

Notes: <sup>a</sup>Volume of water delivered/Volume of water produced; <sup>b</sup>Number of bills for metered service/Number of bills issued; <sup>c</sup>Amount charged for water/Amount collected; <sup>d</sup>Physical efficiency; Physical measurement; Physical collection.

change in quality and quantity of the service, the other refers to the relations between state and society. As far as the first is concerned, the perceptions of the people interviewed (general inhabitants and leaders in the boroughs of Coyoacán, Tlalpan and Xochimilco) were contradictory. On the one hand, there was recognition of the progress made by the authorities in attention to the public through the centres set up for that purpose. The centres make it easier to pay bills, respond to inquiries on issues such as overcharging, make applications for connections and disconnections and register changes in property ownership, and make complaints about poor service or lack of adequate attention by CADF personnel. It should be remembered that the CADF insisted that the companies establish at least one centre for attention to the public for every 300 000 users, as well as having enough space to attend to the complaints, applications, payments and inspections. For the inspections, offices were opened in each neighbourhood so that users' data could be checked *in situ*. At the same time, the CADF insisted that the contractors could acquire and maintain in operation a computer system that would give them access to up-to-date commercial information.

At first, the introduction of charging based on meter readings caused general ill-feeling, particularly among groups of users in poor areas. The problem was that they identified the increase in their bills as an increase in tariffs instead of understanding that it was the product of a change from payment of a fixed quota to payment by measured, or real, consumption. There have been demands for a tariff reduction and improvements to the service, as well as claims of overcharging. Other complaints have centred on the reclassification of the register in neighbourhoods and housing estates, where in some, residents have blocked the installation of meters.

As for the quantity of water supplied, the evaluation is negative, mainly in the areas of the city where supply is intermittent. Indeed, it appears that there are many more such areas than has been officially recognized.<sup>6</sup> The timing and duration of the intermittent supply is variable. The supply is switched on only once every three, four or six days, or even once a fortnight, and then for only two or three hours at a time. Intermittent supplies are applied in poor outlying areas, squatter settlements or in high-altitude zones where there are pressure problems. People who live in these areas complain about the inequality in distribution of potable water and oppose the metering system with the argument that they are charged for the air that passes through the meters and not for the water. They argue that they should be charged a fixed quota and not by volumetric consumption. Haggarty *et al.* (2001) maintain that problems of service quality persist, including poor water quality and intermittent service, particularly in the south and east of the city. It is worth recalling that the reliability of the water service remains the responsibility of the boroughs. In 1998, residents of nine of the 16 boroughs suffered routine cuts to the service, although the severity of the problem and the number of people affected varied considerably. In these areas of the city, water quality is extremely poor, due in part to the fact that the underground water contains high concentrations of magnesium and also because the south-east of the city is the last to receive the water that comes from the Cutzamala System.

Another aspect worth noting was that the users who were interviewed, irrespective of their social class or whether or not they were leaders of social movements, did not know about the private sector presence in the management of the service. Those interviewed were aware of improvements to the service but had no idea of the companies' positive contribution. Hiernaux-Nicolas (2002) maintains that, considering the high degree of

politicization of the inhabitants of Mexico City, it must be concluded that the issue of participation of risk capital has been kept out of public debate and the population has not been informed of the companies' role, perhaps through fears that such knowledge could lead to protests, as it did recently in Cochabamba, Bolivia.

According to Martínez Omaña (2002), the institutional arrangement in force in the Federal District since the mid-1990s consists in the participation of the private sector through service contracts, with the state maintaining control over property rights in the infrastructure, responsibility for provision of the service, and the power to fix tariffs. The state does delegate certain basic responsibilities to the companies, including the design and distribution of bills, measurement, collection, updating of the register of users and management of the centres for attention to the public. However, the companies perform these services in the name of the CADF, not in their own name as would be the case of a concession or an asset sale. This is a reason why users, no matter their social class, are unaware of private-sector participation. Within the current arrangement, the CADF ought to be, as was established on its creation, the sole authority in charge of water management in the Federal District, co-ordinating the functions of the DGCOH and the boroughs with private-sector support. However, this idea failed to materialize. Until 2002, the CADF managed the contracts with the companies and their regulation, as well as supervising all the activities assigned to the private sector, principally in the commercial area. The DGCOH was in charge of carrying out the programmes to expand the infrastructure and the operation of the primary networks, while the boroughs were responsible for maintenance of the secondary networks of potable water and drainage, the repair of uptakes and the repair and maintenance of pipelines, as well as administration of intermittent supplies in areas of water shortage.

As far as the relation between state and society is concerned, it is important to note that the new strategy made no attempt to change the vertical, bureaucratic nature<sup>7</sup> of present-day water management in which decisions are centralized, with no participation by the public, and an abundance of red tape. The result is a substantial gap, between users and the authorities, in the perception of the social and geographical realities where water is in short supply. Efforts have been made to bridge the gap through the use of social representatives whose job is to agglutinate residents' demands, although some of them have personal agendas that they pursue.<sup>8</sup> The distance between the two sides and the absence of communication simply adds to users' ignorance of the current institution's accord. The popular view is that the authorities are fragmented: one (the CADF) that takes care of the commercial aspects (metering, billing and collection), and another (the boroughs) that is involved in distribution of the water, management of the interruptions to the service, and repairs to leaks, and hence always being criticized for shortages. Moreover, this view of a division corresponds to reality. It was not until 2002 that a new body was created, the Mexico City Water System (Sacmex), to take charge of the system by merging the CADF and the DGCOH, although the boroughs clung on to their responsibilities. Until Sacmex was founded, the hallmarks of the Federal District were a scattered approach at the institutional level and the lack of a common, integral vision of the problems and possibilities for water management.

### **Concluding Remarks**

Throughout this paper, a detailed revision has been made of the process of private sector participation in the Federal District's water management between 1992 and 2002.

This aspect is of key importance because the contract expired at the end of 2003 and the parties were negotiating the terms of a new arrangement. As a result, it is important to bear in mind an evaluation based on experience.

The consensus view of the new strategy is favourable among the main players, including businessmen, academics and representatives of the institutions involved and society in general. The main advantages have been the establishment of updated registers of the networks and users, the mass installation of meters, the change from fixed quotas to measured consumption and the increase in the volume of consumption and of collection in real terms. The same positive view is held of attention to users, thanks to the offices for that purpose and the call centres set up by the companies.

Regulation by the CADF was adequate, but solutions have yet to be found for the problems experienced in co-ordinating the efforts of the authorities (DGCOH and the boroughs) and the private companies in order to define the attributions of each of them in the repairing of leaks. On occasions when users have made specific reports of a leak, all three parties have turned up to solve the problem, duplicating functions and efforts.

Uncertainty surrounded the future of private sector participation in the potable water service of the Federal District as the contract drew to a close in August 2003. The companies lacked information from the city government on the immediate future (whether private sector participation was to be maintained at the same level or increased, or whether responsibility might be put back in state hands). At the end of 2003, both sides were negotiating a new agreement that seemed to respond to the general concerns. The government was seeking to maintain the private sector's participation in the tasks already assigned to it, but was offering lower rates for each task and the same rate to each of the companies. At the same time, the government was also proposing to extend the ambit of risk capital by applying it to the management of the 'major consumers' and giving it powers to cut off the service to non-domestic customers whose payments fell overdue, as well as taking action to recharge the aquifers. Responsibility for the water supply was to remain in state hands with the private sector continuing to participate in specific areas without altering access to water as a citizens' right.

The importance of highlighting the Federal District's proposal for the articulation of the roles of the state and the private sector lies in the fact that the private sector takes part through contracts, providing technology, organization and international experience. For its part, the government decides on volumes and delivery times, as well as in the operations carried out in the name of the water authority. The social nature of the service is retained, since the government keeps control of the tariffs. This is relevant in the light of current international trends in the relationship between public and private sectors in water management. These are marked by an ideological weakening of the pro-privatization tendency and a decline in investment by the major transnational companies due to the poor results recorded at a social level in several Latin American countries and growing protests as a consequence.\*

## Notes

1. When the invitation was sent out to the private sector, there was practically no information in terms of the length of the network, the roll of users, structure and volume of consumption, levels of physical loss, billing and collection and costs, among other things. As a result of the lack of necessary financial and operational information, negotiation of the contract on a reasonable basis was simply impossible, according to one of the businessmen interviewed (Mexico City, August 2003).

2. The manner in which contractors were to be paid in each stage is described in The General Bases of Tender, clause four, section 4.6. Formula payments are described on pp. 34–35, subheading 4.6.3.1.
3. Number 5 of the subsection of Chapter III of the General Bases of Tender.
4. The collapse of the peso led to a 119% increase in the cost of type 'A' meters and 204% for type 'B'. As a result, the 1995 target for installation of meters was cut back from 586 700 to 219 300. The plan contemplates the installation of both velocity and volumetric meters. The mechanism of the velocity meters (type 'B') makes them more resistant to the suspended solids in water than those of type 'A'. The type 'B' meters are cheaper and the original aim was to install them in areas where the recovery of the investment in the more expensive apparatus appeared to be problematic (SF, 1997, p. 60).
5. According to a study by the Autonomous Metropolitan University (2000), some 12% of homes in the Federal District receive intermittent supplies of water and about 2% have no access to potable water.
6. According to borough officials in charge of potable water provision, a greater proportion of the population receives intermittent service than that declared by the DGCOS. The DGCOS, in assigning a volume for a particular zone, assumes that all the residents there receive water. Once the water reaches a neighbourhood, however, pressure is sufficient only to bring it to a fraction of all homes.
7. On this point, see Coulomb (1993).
8. On this issue, see Treviño (1999) and Avila (2003).

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