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Private Sector Participation and Regulatory Reform in Water Supply: The Middle East and North African (MEDA) Experience

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Private Sector Participation and Regulatory Reform in Water Supply: The Middle East and North African (MEDA) Experience

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1 Introduction

Water is like no other commodity in the sense that it is essential to human life. It is also essential to economic growth and poverty reduction. About 18% of the world's population lacks access to improved water supply[1]. According to the World Health Organization, 1.6 million deaths per year can be attributed to unsafe water and lack of sanitation.

The problem of access to water concerns both urban and rural areas. While the number of people unserved in rural areas remains very high, it has decreased since 1990. However, the number has increased in urban areas. Governments in developing countries have difficulties to face the rapid expansion of cities. Moreover, the urbanization trend will accelerate in the coming years: according to the United Nations Population Division, by 2030 the number of people living in urban areas in the less developed regions of the world will increase by 75%; they will represent about four billion out of the five billion urban residents in the world[2]. Thus, based on the 2002 coverage and the United Nations forecast of urban population growth, meeting the water supply Millennium Development Goal by 2015 requires that services will be extended to 1.5 billion more people out of which 960 million will live in cities (Table 1).

Table 1: Number of people to whom access must be extended by 2015 to meet the Millennium Development Goal on water

	Number of people to gain access to improved water supply (millions)			Number of people to gain access to improved water sanitation (millions)		
Region	Urban	Rural	Total	Urban	Rural	Total
Sub-Saharan Africa	175	184	359	178	185	363
Middle East and North Africa	104	30	134	105	34	139
South Asia	243	201	444	263	451	714
East Asia and Pacific	290	174	464	330	376	706
Latin America and Caribbean	121	20	141	132	29	161
Former Soviet Union and Baltic states	27	0	27	24	0	24
Total	960	609	1569	1032	1075	2107

Sources: UN Millennium Project 2005. Health, Dignity, and Development: What Will it Take? Task Force on Water and Sanitation.

[1] UN Millennium Project 2005. Health, Dignity, and Development: What Will it Take? Task Force on Water and Sanitation.
[2] http://esa.un.org/unpp/

In the Mediterranean region (MEDA) and more particularly in Middle East and North African countries, the combination of aridity, foreign dependency, misallocation of water resource, climate change, rapid expansion of cities and escalating human demand for water make water supply a primary issue for health, economy and poverty reduction.

Thus, the aim of this study is to examine the institutional framework of the water sector in MEDA countries and review the development of private sector participation in the context of urban water crisis.

The paper is organized as follow. The second part of the study introduces the importance of the issue of water in the MEDA region. The third part presents the scope of private sector participation in water supply in the world, reviews possible forms of private involvement and proposes a survey of the economic literature and empirical studies on the choice of delegating water services. The fourth part focuses on the MEDA region and presents the increasing trend of private sector participation in water supply. The fifth part details the institutional framework of the water sector in Tunisia, Algeria, Egypt, Morocco and Jordan. The sixth part deals with the development of a water supply institutional scorecard and the application of this new monitoring tool to countries of the MEDA region. Based on the scorecard, policy recommendations are suggested in the seventh part of the study.

2 The issue of water in the MEDA region

2.1 Water scarcity and foreign dependency

The MEDA area is the most arid region in the world. Low precipitation and low level of ground water resources lead to an unsustainable over withdrawal problem and foreign dependency concerns. The next table (Table 2) presents for each country of the region the level of renewable water resources, withdrawal data and foreign dependency ratios. A country is considered "water stressed" when its total renewable freshwater resources lie between 1,000 cubic meters and 1,700 cubic meters per person per year. "Water-scarce" countries have an average of less than 1,000 cubic meters of renewable fresh water per person per year.

Out of the eleven countries of the MEDA region, 8 are water scarce and 2 are water stressed. With such low renewable water resources, some countries face over withdrawal problems. Egypt, Jordan and Malta withdraw respectively 117%, 114% and 100% of their renewable water resources. Much of political tensions of the region are also due to water scarcity and foreign water dependency[3]. It is particularly the case for Egypt, Jordan, the Syrian Arab Republic and Palestine, with respective foreign dependency ratios of 97%, 23%, 80% and 18%.

[3] Biswas, Asit K. (ed.) (1994), International Waters of the Middle East. From Euphrates-Tigris to Nile, Oxford University Press

Table 2: Water resource in the MEDA region					
	Average precipitation (10^9 m3/yr)	Total renewable freshwater per capita (m3/inhab/yr)	Total water withdrawal per capita (m3/inhab/yr)	Total water withdrawal as percentage of total renewable water resources (%)	Foreign dependency ratio (%)
Algeria**	212	373.2	194.1	52.03	3.6
Cyprus**	4.607	979.9	309.2	31.55	0
Egypt	51.07	826.9	968.7	117.2	96.91
Jordan	9.855	165.1	189.5	114.8	22.73
Lebanon*	6.874	1 226	383.8	31.31	0.7649
Malta	0.1792	128.5	128.5	100	0
Morocco**	154.5	964.4	419	43.45	0
*Syrian Arab Republic**	46.67	1 511	1 148	75.97	80.26
Tunisia**	33.87	472.3	271.4	57.45	8.705
Turkey	464.7	3 037	533.7	17.57	1.518
*Palestinian Territory***		52			17.86

Source: Table based on FAO/World Resource Institute. Data for the last year available: 2000.
* Water stressed.
** Water scarce.
In Bold: Over withdrawal problem.
In Italic: Foreign dependency problem.

2.2 The misallocation of water resource

To better understand the scope of the water scarcity problem in the MEDA region, it is essential to take into account the different uses of water. The table below (Table 3) presents the breakdown of water use for each country of the region.

Table 3: Sector withdrawals of water in the MEDA region			
	Agriculture	Domestic	Industry
Algeria	65%	22%	13%
Cyprus	71%	27%	2%
Egypt	78%	8%	14%
Jordan	75%	21%	4%
Lebanon	66%	33%	1%
Malta	20%	79%	1%
Morocco	87%	10%	3%
Syrian Arab Republic	95%	3%	2%
Tunisia	82%	14%	4%
Turkey	74%	15%	11%
Palestinian Territory			

Source: World Resource Institute, Data for the last year available: 2000.

Overall more than 65% of the water of the region is used for agriculture. This breakdown is in line with other developing countries, but the average withdrawal for agriculture remains very high in regard to the water scarcity of the region and in comparison with more developed regions. In Europe and North America, the sectoral withdrawals are respectively 33% and 38% for agriculture, 52% and 48% for industry and 15% and 14% for domestic use[4].

Water is a very particular good in the sense it is essential to human life. However, water is also an economic good and is used as an input for industry and agriculture. The next table (Table 4) presents the contribution of water to the GDP according to its use, agricultural or industrial. The contribution of water to the GDP is very much lower for an agricultural use than for an industrial use. It confirms a problem of misallocation of water resource, which is due to the inefficient pricing policy of water in the MEDA region. In some wet regions of the world, an inefficient pricing policy of water can eventually be understood as a public choice in order to subsidize agriculture. In arid regions, like the MEDA area, it is essential to recognize the economic value of water and to price this resource efficiently.

Table 4: GDP contribution of water to agriculture and industry

	GDP contribution of agriculture	GDP contribution of industry	Contribution of 1% of water used by the agriculture to GDP	Contribution of 1% of water used by the industry to GDP
Algeria	9.8%	56.6%	0.15%	4.35%
Egypt	15.1%	36.9%	0.19%	2.64%
Jordan	2.8%	28.8%	0.04%	7.20%
Lebanon	6.9%	20.8%	0.10%	20.80%
Morocco	15.9%	30.4%	0.18%	10.13%
Syrian Arab Republic	23.1%	27.2%	0.24%	13.60%
Tunisia	12.6%	27.8%	0.15%	6.95%
Turkey	12.9%	22.4%	0.17%	2.04%

Source: Estimates based on FAO data for 2004, own calculations.

2.3 The consequence of population growth on water supply in the region

In addition to the problem of allocation of the resource, the expected population growth in the region (Table 5) should increase water scarcity. Based on United Nations' estimates, the population of the MEDA region should increase by 38% and represent about 352 million inhabitants in 2030. With an expected increase of 63.8% over twenty five years, the urban population growth in the MEDA area is even more impressive. In 2030, there will be 239 million people living in cities in this region. Urban population will represent more than 70% of total population in nine out of the eleven countries of the region.

Algeria, Morocco, the Syrian Arab Republic, Egypt and Jordan will be particularly concerned by the rapid expansion of cities. Egypt and the Syrian Arab Republic are very extreme cases; the urban population will increase by more than 85% in the next 25 years.

Table 5: Population growth in the MEDA region

[4] World Resource Institute

	Population growth from 2005 to 2030 (%)	Urban population growth from 2005 to 2030 (%)	Percentage of population living in urban areas in 2005	Percentage of population living in urban areas in 2030
Algeria	36.1%	64.8%	60.0%	72.6%
Cyprus	25.9%	38.6%	69.5%	76.5%
Egypt	44.6%	85.0%	42.3%	54.1%
Jordan	52.1%	62.2%	79.3%	84.6%
Lebanon	23.8%	29.4%	88.0%	92.0%
Malta	8.0%	11.4%	92.0%	94.9%
Morocco	33.5%	64.7%	58.8%	72.5%
Syrian Arab Republic	57.4%	87.2%	50.3%	59.8%
Tunisia	22.5%	41.7%	64.4%	74.4%
Turkey	28.3%	48.1%	67.3%	77.7%
Palestinian Territory	93.7%	116.9%	71.9%	80.5%
MEDA region	38.0%	63.8%	57.3%	68.0%
World	26.8%	56.9%	49.2%	60.8%

Source: Own calculations based on the 2004 estimates of the United Nations Population Division

2.4 The impact of climate change on water resource

Water resources are also inextricably linked with climate. With current information available, it is very difficult to predict the impact of climate change on water resources in the MEDA region by 2050. However, there is a high probability that climate change might worsen the problem of water scarcity in the region in the coming years (Box 1).

Egypt offers a good example of vulnerability of the region to climate change. As said previously, Egyptian water resources depend mostly on foreign countries. Indeed, its major water source, the River Nile, comes mainly from Ethiopia. Thus, Egypt is very much concerned by the climate of Ethiopia and several models project that rainfall in Ethiopia would highly decrease and become more erratic in the next 50 years. This scenario would have catastrophic human and economic consequences for Egypt.

Box 1: The impact of climate change on rainfall in North Africa

"Climate change scenarios for Africa, based on results from several general circulation models using data collated by the Intergovernmental Panel on Climate Change (IPCC) Data Distribution Center (DDC), indicate future warming across Africa ranging from 0.2°C per decade (low scenario) to more than 0.5°C per decade (high scenario). […] Under intermediate warming scenarios, most models project that by 2050 North Africa will experience decreases [in rainfall] during the growing season that exceed one standard deviation of natural variability"
Intergovernmental Panel on Climate Change (IPCC). 2001. Climate Change 2001: Impacts, Adaptation and Vulnerability. Cambridge University Press.

3 Private sector participation in water supply and sanitation

3.1 Possible forms of private sector participation

There are very different forms of private sector participation in water delivery (Table 6): from the minimum involvement, the service contract, to the full divestiture as in the United Kingdom and Chile.

The 7 major types of private involvement are the service contract, the management contract, the lease contract “Affermage”, the Build Operate Transfer, the concession contract, the joint venture and the divestiture.

Under a service contract, the participation of the private sector is very limited. It provides technical and administrative tasks, such as repairs, meter reading or payment collection. The private sector does not bear any commercial risk regarding water supply. The contract period exceeds rarely one or two years. This contract is adapted to all situations even when the regulatory framework is particularly weak.

Under a management contract, the private sector takes over operation and management responsibilities. However, the user remains legally client of the public entity. The private contractor is paid on a “fee per unit” basis defined in the contract: per volume of water sold, per number of connections... The duration of the contract is usually three to five years and the private company does not bear commercial risks regarding water supply.

The lease contract differs from the management contract in the sense that the private company assumes the legal responsibility for operating the service in exchange for payments for the use of the fixed assets. Users become direct clients of the private contractor, which bears a much more important part of commercial risks. However, it is not in charge of capital investment. In exchange for greater risks, the leaseholder receives a part or the totality of water revenues. The duration of the contract is usually of ten to twelve years.

Under a Build-Operate-Transfer contract, the private sector is in charge of designing, building and financing a new investment project. It has also to operate and maintain it for the concession period and then hand it over to the public sector. This mechanism has the advantage of not increasing the sovereign debt. This type of contract is usually used for construction of water production and desalination plants and sale of bulk water to the public provider rather than for water distribution. Currency risks and the significant length of legal negotiation increase the cost of projects financed under a Build-Operate-Transfer contract.

The concession contract is similar to the lease contract, but the concessionaire is in charge of financing the expansion and the rehabilitation of the network. As in the lease contract, users are direct clients of the private contractor. The duration of the contract ranges between twenty five and thirty years. At the end of this period, the private operator hands over the installation to the state.

Under a joint venture contract, the state or municipality and a private operator co-owns the water operator. Usually, the private sector holds the largest part of the newly created company, but in some cases the state can have a “golden share”. The 2 shareholders share responsibilities and benefits. Even if this agreement seems adapted to the politically sensitive case of water supply, such kind of contract can be very unstable.

The last form of private sector participation in water supply is the full divestiture. Under this arrangement, assets are entirely sold to the private sector. The private operator is in charge of financing, operation, management and bears all the risks. However, these private monopolies remain overseen by the public sector and independent regulatory agencies.

Table 6: Forms of private involvement in water supply								
Option	Setting performance standards	Asset ownership	Capital investment	Design and build	Operation and maintenance	Commercial risk	Oversight of performance and fees	Duration (years)
Service contract	Public	Public	Public	Public	Shared Public/Private	Public	Public	1–2
Management contract	Public	Public	Public	Public	Private	Public	Public	3–5
Lease contract "Affermage"	Public	Public	Public	Public	Private	Shared Public/Private	Public	10–12
Build-Operate-Transfer	Public	Private Bulk services	Private	Private	Private	Private	Public	20–30
Concession contract	Public	Public	Private	Private	Private	Private	Public	25–30
Joint Venture	Public	Shared Public/Private	Shared Public/Private	Shared Public/Private	Shared Public/Private	Shared Public/Private	Public	Indefinite
Divestiture	Public	Private	Private	Private	Private	Private	Public	Indefinite

Source: Adapted from Bradford Gentry, Yale-UNDP Collaborative Program, 1998.

3.2 The scope of private water provision in the world

On an international scale, private water supply constitutes an exception. Only 5% to 10% of the world's population receives its drinking water from a private operator. Opponents to private sector participation in water supply quote often this low percentage in order to insist on the unusual nature of private provision.

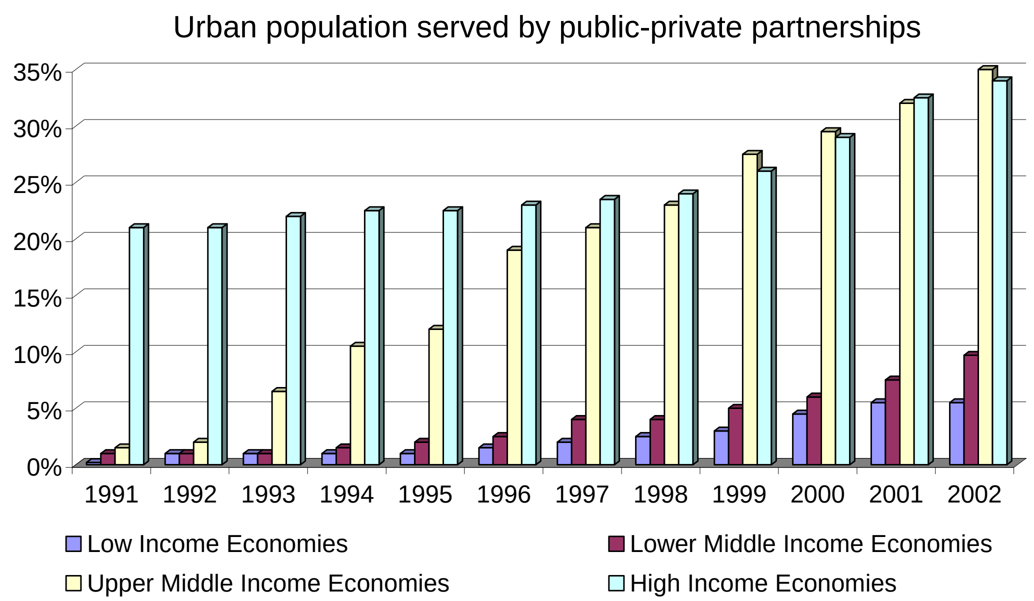
However, this percentage is much more important for urban areas and even more important in high income countries (Figure 1). 25% of urban dwellers in the world are served by the private sector (Franceys, 2003). In high income countries, more than one urban resident on three is delivered by a private operator. Thus, private water provision is not exceptional.

Private sector participation in water supply is not a new tool either. During the XIXth century, private provision of drinking water was prevalent in France, the United Kingdom and the United States (Gentry, 2000).

The real novelty consists in the increase of private sector participation in water supply in developing countries during the last fifteen years.

In 1991, the percentage of urban residents served by the private sector was 0%, 1% and 2% respectively for Low Income Economies, Middle Income Economies and Upper Middle Income Economies. In ten years, this percentage has increased to about 5%, 10% and 35% respectively (Figure 1).

Figure 1: Private provision of drinking water in urban areas

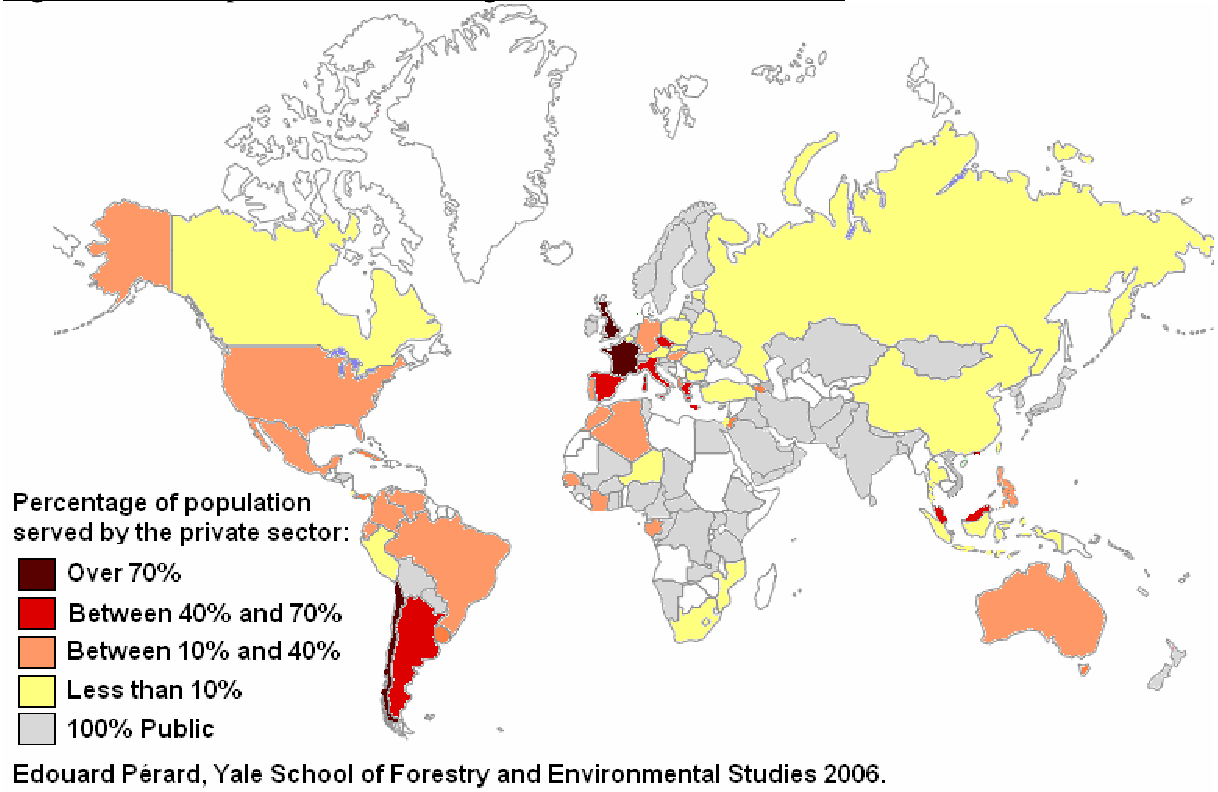


Source: Based on IWE, Cranfield PPP Database, Franceys 2003.

The second question is: in which countries drinking water is privately provided? There are many disparities among countries. The map below (Figure 2) presents an estimate of the percentage of people delivered by the private sector per country.

The United Kingdom and Chile are the only two countries which have fully privatized their water services. In all other countries, when private provision is possible, it co-exists with the public system. In Western Europe, about 45% of the population is delivered by a private water operator, while this percentage is only of 15% for the United States[5]. In France, Argentina, Spain, Italy and Greece, private water supply is particularly important.

Figure 2: Private provision of drinking water in the world in 2006



Source: Edouard Pérard "The Future of Public Private Partnerships in Water Supply" presentation given at the Yale University Water-Health-Environment Seminar, February 2006. Based on data updated from PSIRU, Pinsent Masons Water Yearbook 2005-2006, literature review and direct interviews.

3.3 Is private provision of water better than public delivery? The economic theory.

The issue of public versus private has been widely discussed during the last twenty years, but economic theories applied to the particular case of water monopolies remain ambiguous and cannot completely prove the superiority of one model versus the other one.

In the existent literature, the two most widespread explanations of the choice between public and private ownership and operation are corruption and efficiency.

[5] Pinsent Masons Water Yearbook 2005-2006

One of the advantages of public ownership and operation would be that it could reduce corruption. Glaeser (2001) identifies three risks in particular: the under pricing of public inputs to the private sector, the over pricing of private outputs to the public and the subvention of the private by the public. These risks exist, but the public operation does not solve the problem but moves it forward: a public supplier can also overpay private inputs. Public suppliers can be corrupted by private companies.

The argument of corruption is as much used by opponents to the involvement of the private sector in water supply than by pro-private sector participation. A switch of ownership and operation cannot solve the problem of corruption.

The argument of efficiency takes a much lager place in the literature. Most theories are considering it as the determinant of privatizations. However, theories do not agree on the effect of private ownership and operation by itself.

State Owned Enterprises are usually seen as less efficient than private firms are. Some argue that private ownership and operation by itself can improve the performance of firms (Vining and Boardman, 1992; Nellis 1994; Boycko, Shleifer and Vishny, 1996; Brada, 1996; and Shleifer 1998), others argue that the efficiency depends on the combination of three factors: the ownership, the competition and the regulation. Competition and regulation would be more important than privatization in improving performances of firms (Yarrow, 1986; Kay and Thompson, 1986; Bishop and Kay, 1986; Vickers and Yarrow, 1991). Thus, in a fully competitive market, the private sector would be more efficient than the public one; but the answer would be less clear for less competitive markets like water supply and sanitation.

As a natural monopoly, it is impossible to turn the water supply industry into a fully competitive market. The nature of the costs does not permit the duplication of the network and the fragmentation of the market would limit the economies of scale. The direct competition is not desirable and/or possible.

Demsetz proposes a solution to introduce competition in monopoly markets (1968): the competition for the market. However, Williamson (1976) and Goldberg (1976) find several problems with this approach: the bidding may not be competitive because of collusion, asymmetric information, incumbent advantages and problems in the pricing of the assets.

These arguments apply perfectly to the water sector where the number of bidders is usually small. Moreover, bids for water supply are incomplete contracts (Williamson, 1976). Competition for the market in water supply and sanitation cannot fully substitute direct competition. Thus, without a full competitive market, the theory remains unclear about efficiency gains of private sector participation in water by itself.

Because of the incomplete nature of water delegation contracts, private sector participation must be combined with an adapted institutional framework in order to increase efficiency in water supply (Box 2). A well defined regulatory environment needs to be established before delegating water services. This is a condition to any successful reform.

Box 2: The importance of regulation for private sector participation in water services

"A complete contract would be immensely complex and extremely difficult to write, monitor and enforce. Indeed it would be very hard for the government to commit not to vary some contract terms as events unfold. Much more likely, then, is some kind of incomplete contract that leaves a number of aspects to be resolved. But this is effectively just what regulation involves – a continuing task of contract monitoring, enforcement and renegotiation. Thus in circumstance of any complexity, franchising does not do away with the need for regulation"

Source: Armstrong Mark, Simon Cowan and John Vickers, 1994, "Regulatory Reform: Economic Analysis and British Experience", The MIT Press.

3.4 Empirical studies on the effect of private sector participation in water services

Empirical works confirm the theory's ambiguity about the effect of ownership in monopolistic markets. In a review of fifty-two empirical studies on the impact of ownership on the performance (Shirley and Walsh, 2000), thirty-two conclude the superiority of private ownership. However, the results are much less conclusive for monopolistic infrastructures. On the sixteen studies concerning monopolistic markets: six find private superiority, five find neutral results, and five find public superiority.

In a study on twenty-one African water utilities from 1995-1997, Estache and Kouassi (2002) found that private operators are more cost-efficient.

However in another econometric test on hundred and ten African water utilities from 1998-2001, Kirkpatrick, Parker, and Zhang (2004) found no significant difference between public and private operators in terms of cost once environmental factors have been accounted for.

Using a sample of fifty firms in nineteen Asian countries in 1997, Estache and Rossi (2002) also found no statistically significant difference between public and private water operators in the sector.

Much less empirical work has been done lately on OECD countries. A recent study of the AEI-Brookings on the effects of ownership and benchmark competition on regulatory compliance and household water expenditures in the United States concluded: "Overall, the results suggest that absent competition, whether water systems are owned by private firms or governments may, on average, simply not matter much." (Scott Wallsten and Katrina Kosec, March 2005). The Annex (page 37) presents a review of most of econometric tests and case studies on the effect of private sector participation in water services.

Empirical works on the effect of private sector participation in water services are contradictory. The fact that most of these studies do not take into account the institutional framework might explain these mixed results. A well defined regulatory environment is essential for successful private sector involvement in water services.

4 The scope of private water provision in the MEDA region

4.1 A cross-country comparison

Private water provision in the MEDA region is relatively recent. The first public private partnership was introduced in 1992 for the wastewater of Cairo. Countries of the MEDA region can be classified in three categories depending on the level of percentage of population served by the private sector.

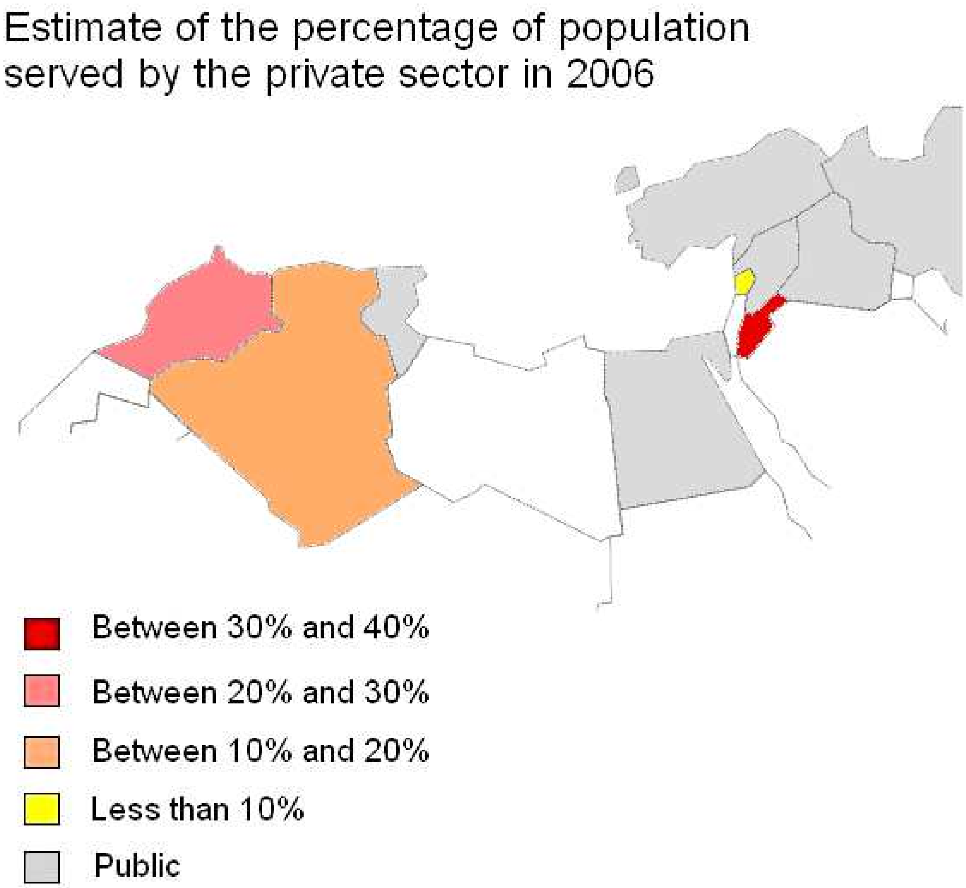
The most "active" group includes Morocco, Jordan and Algeria. Jordan has the largest share of private water supply in the region: about 40% of its population receives drinking water from a private provider. Private water operators have been respectively present in Morocco, Jordan and Algeria since 1997, 1999 and 1999.

The second group consists of countries where private sector involvement in water supply is low, but where the private model is expected to increase in the coming years. It comprises Egypt, Lebanon and Turkey.

The third group is constituted by Tunisia, the Syrian Arab Republic, Cyprus and Malta, where private provision is inexistent or quasi-inexistent.

The following map (Figure 3) presents the percentage of population served by the private sector for each country of the MEDA region.

Figure 3: Private Sector Participation in Water Supply in the MEDA Region



Source: Edouard Pérard, presented at the OECD Experts' Meeting on Access to Drinking Water and Sanitation in Africa Paris, December 1st, 2006. Based on institutional communication of water operators and press releases.

4.2 Detailed outlook of private involvement in water services

As explained previously, there is a wide range of options for private participation in water services. Besides the full divestiture, all forms of public private partnership are represented in the MEDA area.

Morocco is the most active country in outsourcing water supply. It is the only country in the area, which has awarded concession contracts. The duration of the contracts varies between twenty to twenty five years. In Jordan, private water provision is more important in percentage, but the state delegates less responsibilities to the private sector by awarding management contracts for 5 years.

After a few years experience with service contracts, Algeria signed for the first time a BOT contract for a desalination plant in 2001, and outsourced recently in 2005 the water supply of Algiers by awarding a management contract to Suez. After the first five years, more responsibilities might be delegated to the private sector and the contract could turn into a concession contract.

Besides the geopolitical problems, Lebanon and Palestine are also starting to outsource water supply and sanitation. A management contract was awarded in 1996 for water supply in Gaza and two others were awarded in Lebanon for water supply in Tripoli and Baalbeck.

In Tunisia, private sector participation concerns only wastewater with limited service contracts. In Egypt and Turkey, private sector participation is also very restricted, but should increase in the coming years.

The four following boxes present concrete examples of different forms of private sector participation in water services in MEDA countries as described in the part 3.1.

Box 3: Service contract for the rehabilitation of water systems in Constantine, Algeria

In May 2005, SOMEDEN, a subsidiary of Société des Eaux de Marseille, was awarded a service contract for the rehabilitation of the water supply network of the city of Constantine in Algeria.

This 36 months contract represents 60 million euros and is directly financed by the government of Algeria. The three main tasks of the private contractor are the renovation of 68 kilometers of pipes, leakage repairs in order to reduce unaccounted for water to 25%, modernization and computerization of the commercial management.

In addition, the contract specifies a consulting activity and SOMEDEN has to elaborate a 20 years business plan for the local water agency.

Box 4: Management contract for water and wastewater services of the city of Algiers

In November 2005, SUEZ Environment was awarded a contract for the management of the water and wastewater services for the 3.5 million inhabitants of the city of Algiers.

This contract between SUEZ and the National Office of Wastewater, the Algerian Water Authority runs for an initial term of 5 years and is worth nearly 120 million Euros overall. Its general objective is to upgrade and modernize the Algiers water and wastewater utilities so that they are more reliable over the long term. One of the main priorities is to improve service quality, with particular regard to providing a 24-hours-a-day water supply within three and a half years. Suez Environment is also in charge of transferring its know-how and training the 3,000 employees of the local water company, Société des Eaux et d'Assainissement d'Algers (SEAL).

The entire investment is funded by the Algerian authorities, which have devoted 200 million euros per year to the gradual modernization of the water supply and sewage treatment facilities.

Box 5: BOT contract for Greater Amman’s entire wastewater treatment, Jordan

In January 2002, the Jordanian authorities selected the Samra Plant Consortium for a 25 year wastewater BOT contract. The SPC consortium is a joint venture, composed of two American partners: Morganti USA and Infilco Dégremont Inc., the water treatment plant subsidiary of SUEZ Environment in North America.

The private contractor is responsible for the design and construction of the Khirbet As Samra wastewater treatment plant, the extension and conformity of the Ain Ghazal pre treatment plant. SPC is also responsible for operating both plants along with pumping stations in the Zarqa Gouvernorate in the North East of Amman.

The Khirbet As Samra plant has an average capacity of 268 000 m3/day and treats the sewage of 2.5 million inhabitants in Amman and its surrounding areas. The project represents an initial investment of 150 millions USD and is supposed to generate a total annual turnover of 15 million dollars for the 25 year duration.

SUEZ has been present in Jordan since 1999 through its local subsidiary LEMA that manages water distribution for Amman.

Box 6: Water, wastewater and electricity concession contracts in Tangier and Tetouan, Morocco

In 2001, the urban communities of Tangier and Tetouan (more than one million inhabitants) awarded management of their water, wastewater and electricity services to Amendis, a Veolia Water subsidiary, following an international call for tenders.

The primary objectives of these 25 years concession contracts are:

1. The extension of water, electricity and wastewater services in areas of urban development that are not served, or only poorly, by facilitating access to these services for underprivileged people (40,000 subsidized water and wastewater connections across the entire Tangier-Tetouan concession area).

2. The construction during the first 5 years of wastewater treatment plants and sea sewer outfalls.

3. The extension of the collection system by over 200 km during the first 10 years.

The next table (Table 7) presents details of the major contracts in water treatment, supply and sanitation in the region.

Table 7: Detailed outlook of private sector participation in water treatment, supply and sanitation in the MEDA Region

Country	Location	Sector	Type of contract	Date	Private contractor
Algeria	Oran	WSD	Service Contract	1999-2004	Saur
Algeria	Algiers Ouest	WSD (rehabilitation)	Service Contract	2000-2004	Someden (SEM)
Algeria	Constantine	WSD	Service Contract	2005-2008	Someden (SEM)
Algeria	Beni Haroun	Water pumping station	Build Operate Transfer	2002-	Alstom / Dragados
Algeria	Arzew	Desalination	Build Operate Transfer	2001-	Black and Veatch
Algeria	Bredeah	Desalination	Build Operate Transfer	2001-	Degremont (Suez)
Algeria	Algiers	WSD	Management Contract	2005-2010	Suez
Algeria	Taksbet	WT	Design Build Operate	2006-2011	Degremont (Suez)
Algeria	Athmania	WT	Design Build Operate	2006-2011	Degremont (Suez)
Egypt	Toshka	Irrigation	Build Operate Transfer	2002-	N/A
Egypt	Cairo	WWT	Management Contract	1992-1996	Joint-Venture Biwater (UK) / ECD (Egypt)
Egypt	Suez Special Economic Zone	WWT	Build Operate Transfer	2001-2002 (suspended)	SNC Lavalin
Jordan	Amman	WSD	Management Contract	1999-2006	LEMA Consortium (Suez)
Jordan	Al-Samra	WWT	Build Operate Transfer	2002-2027	Consortium Degremont (Suez) / Morganti
Jordan	Ramtha	WWT	Build Operate Transfer	2001-	Veolia
Lebanon	Chekka	WWT	Design Build Operate	2003-2008	Ondeo (Suez)
Lebanon	Batroun	WWT	Design Build Operate	2003-2008	Ondeo (Suez)
Lebanon	Jbeil	WWT	Design Build Operate	2003-2008	Ondeo (Suez)
Lebanon	Nabatieh	WWT	Design Build Operate	2003-2008	Veolia

Lebanon	Chouf	WWT	Design Build Operate	2003-2008	Veolia
Lebanon	Tripoli	WWT	Design Build Operate	2003-2006	Suez
Lebanon	Tripoli	WSD	Management Contract	2003-2005	Suez
Lebanon	Baalbeck	WSD	Management Contract	2003-2006	N/A
Morocco	Rabat	WSD/WWT	Concession Contract	1999-2029	Redal (Veolia)
Morocco	Casablanca	WSD	Concession Contract	1997-2027	LYDEC (Suez)
Morocco	Tetuouan and Tangiers	WSD/WWT	Concession Contract	2002-2027	AMENDIS (Veolia)
Morocco	Marrakech	WWT	Design Build Operate	2006-2011	Degremont (Suez)
Tunisia	Tunis South	WWC	Service Contract	2001-2005	SRA/SAVAC/SOMEN
Tunisia	Tunis North	WWC	Service Contract	2002-2006	SOMEDEN (SEM)
Tunisia	Ariana Governorate	WWC	Service Contract	2002-2006	SOMEDEN (SEM)
Tunisia	Tataouine City	WWC	Service Contract	2002-2006	SRA/SAVAC/SOMEM
Turkey	Izmit	N/A	Build Operate Transfer	1996-	RWE
West Bank & Gaza	Bethlehem and Hebron	WSD	Management Contract	1999-2003	GEKA (Veolia)
West Bank & Gaza	Gaza	WSD	Management Contract	1996-2000	LEKA (Ondeo-Suez)

Source: Edouard Perard. Based on data from Pinsent Masons Water Yearbook 2005-2006, PSIRU, Grover 2002, Institutional Communication of Suez, Degremont, Veolia, Societe Des Eaux de Marseilles, Press Releases.

WSD: Water Supply Distribution WT: Water Treatment

WWC: Wastewater Collection WWT: Wastewater Treatment

5 Water institutional framework in MEDA countries

5.1 Successful public management in Tunisia

Tunisia has very limited water resources. The amount of renewable freshwater available per inhabitant is 50% below the water scarcity standard. Moreover, this situation is exacerbated by irregular annual precipitations. In addition, water supply is confronted to two major constraints: the remote location of water resources and the low quality of water. The remoteness of water resources from consumption centers results in heavy water transfer infrastructure investments and the low quality of water resources with high salinity increases the cost of water treatment. Thus, Tunisia has made water management one of its first priorities and so far the strategy adopted has been successful.

In Tunisia, water and sanitation sectors are totally public and are managed by two centralized government agencies:

- SONEDE, Societe Nationale d'Exploitation et de Distribution des Eaux, the autonomous national public water supply utility is responsible since 1968 for delivering potable water in Tunisia, including construction, operation and maintenance of infrastructure. While its mandate traditionally focused on urban areas, in recent years SONEDE has been expanding its operations in rural areas as well. SONEDE employs more than 6900 people and delivers water to about eight million people. SONEDE is overseen by the Ministry of Agriculture and Water Resources, which formulates water sector strategies and coordinates investment planning and the allocation of the resources.

- ONAS, Office National de 1'Assainissement, the autonomous national public sewerage utility is responsible since 1974 for sewerage collection, treatment, and disposal in about 152 urban agglomerations, industrial and tourist zones. Since December 2004, ONAS is overseen by the newly created Ministry of Environment and Sustainable Development, which sets policies and investment priorities for the sanitation sector. Moderate private sector participation has been recently introduced as service contracts for sewerage and a BOT contract in June 2006.

In addition to these two major national agencies, the Direction Générale des Grands Travaux Hydrauliques is responsible for the construction of large dams and irrigation infrastructure, and the Direction Générale du Génie Rural et de l 'Exploitation des Eaux is responsible for water resources management, irrigation supply, as well as of drinking water supply and sanitation in dispersed rural areas not covered by SONEDE or ONAS.

Water management in Tunisia is highly centralized and very much politicized. SONEDE and ONAS are committed through Contrat-Programme to achieve specific service and infrastructure goals. Their tariffs are revised periodically but not systematically, on an as-needed basis. Tariff adjustment requests are submitted to the oversight ministry, which has the option to transmit it for evaluation to a Ministerial Council headed by the Prime Minister. The tariff adjustment decision does not always follow economic rationality and does not respect prior formal commitments either.

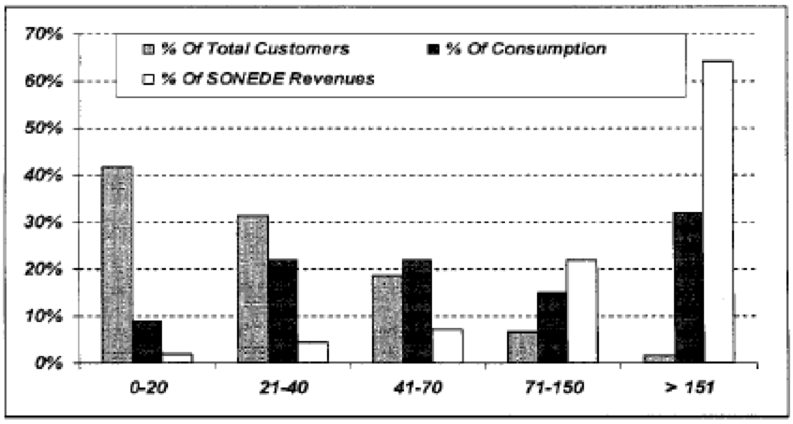
However, the performance of these agencies has been impressive by a number of criteria. For example Tunisia has one of the lowest rates of unaccounted for water in the region. Unaccounted for water was about 30% in 1987, and decreased to 21% in 1997 and to 18.2% in 2004[6]. In addition, 100% of urban residents have access to safe drinking water with an households connection rate of 98%. Contrary to other cities in the MEDA region, Tunisian cities have usually continuous water supply. The bill collection rate of SONEDE, which is also in charge of the billing activity of ONAS, is very high: over 99%.

Nevertheless, operational results of SONEDE and ONAS have recently deteriorated because of deferred tariff adjustments and ambitious capital program for rural service expansion. Since 2001, the operating ratio of SONDEDE remained consistently below 100%.

Furthermore, the tariff system in Tunisia does not seem sustainable in the long term. Contrary to other countries in the region, water and sanitation tariff structures are applied uniformly across the nation. Thus they do not reflect the real economic cost of water and differences of cost from one region to another.

The second pricing problem is the high level of cross subsidies among customers. SONEDE tariff structure has two components: a fixed component and a variable component, which is proportional to consumption. There are five blocks of tariffs: from 0 to 20m3 (TND 0.153 /m3), from 21 to 40 m3 (TND 0.215/m3), from 41 to 70m3 (TND 0.430/m3), from 71 to 150 (TND 0.650/m3), over 151 m3 (TND 0.790/m3)[6]. Differences of price are very important between blocks, the last tariff represents more than five times the first one and three times the second one. Thus 10% of customers pay for more than 80% (Figure 4) of the population and 90% of users pay water below the real economic cost[7]. This tariff structure represents a risk; large customers could switch for independent private water systems. Such level of cross subsidies does not seem viable in the long term.

Figure 4: High level of cross subsidies among Tunisian customers



Distribution of SONEDE customers, revenues and volumes sold per level of tariff.

Source: World Bank 2005, Official Project Appraisal Document on a Proposed Loan to SONEDE for an Urban Water Supply Project.

[6] World Bank 2005, Official Project Appraisal Document on a Proposed Loan to SONEDE for an Urban Water Supply Project.

[7] SONEDE Website December 2006

5.2 Promising regulatory reform in Algeria

Algeria faces important water scarcity, it has the lowest renewable water resources of North Africa (373.2 m3 renewable freshwater per capita per year). This problem is aggravated by the poor condition of the water pipes network. The water and sewage networks were built in the 1980s but have been allowed to deteriorate badly. In some cities such as Algiers up to 40% of the water carried by the network is lost[8]. The technical losses are around 32%, the other part of 8% is lost due to illegal consumption.

Moreover the mediocre management of the national water supply agency, Algerienne des Eaux, has worsened the situation. Algerienne des Eaux (ADE) is owed 293 million Euros because of irregular payments by customers and illegal connections[9]. The National Sanitation Office in 2005 observed that current tariffs only cover 10% of operating costs.

As a result, water rationing and shortages are common in Algeria.

Algeria decided an important institutional reform in 2001 and the process has been accelerated by the exceptional drought in Algiers in 2002.

Water treatment, supply and sanitation have been reorganized. These operations depend now on four public agencies and the territory is divided into five regional basins:

- The “Agence nationale des barrages” (ANB), the National Agency for Dams, is in charge of the construction of dams, reservoirs, pumping and water treatment station and connection pipes.
- The “Algerienne des Eaux” (ADE), the National Water Supply Agency, was created in 2001. This agency is legally independent and has financial autonomy. It is in charge of 26 public water operators in the most urban areas of the country. The ADE is also in charge of 5 regional agencies: one for each basin. Each regional agency is subdivided in geographic zones and each zone in functional units. For example, the regional agency of Algiers is subdivided in 4 zones: Algiers, Setif, Tizi Ouzou and Medea. There are 3 units in the zone of Algiers: production, supply and management.
- The “Office National d'Assainissement” (ONA) (National Bureau for Wastewater) was also established in 2001 after it was found that there was a complete lack of interest in the matter of waste water management within the government. This had lead to damage to the environment and to wasting a resource that could be re-used. An important task of the ONA is to develop a policy of re-utilisation of treated waste wastewater.
- The Agence Nationale de Realisation et de Gestation des Infrastructures Hydrauliques pour l’Irrigation et le Drainage (AGID) is in charge of irrigation and drainage.

In order to rationalize and centralize the management of water, these four entities ANB, ADE, ONA and AGID will be combined under a single agency from 2006.

In 2005, Algeria pursued its effort in reforming the water sector and implemented an ambitious water law. This new code emphasizes private sector participation in water and encourages public water and sewerage services to delegate their activities under a concession contract. Service contracts, Management contracts, Lease contracts and Concession contracts were legalized as early as 1995 in the Code de l’Eau. However, so far concession contracts have not been used. This might be due to the lack of political reforms before 2001. The

[8] Water and Waste Utilities of the World Ed 7 2006, ABS Energy Research.
[9] Global Water Intelligence, May 2005 (6/5) & July 2005 (6/7)

institutional framework is now well defined and concession contracts should be awarded in the coming years.

The new law proposes also to municipalities to create and delegate water supply to financially independent public operators “régie publique”. Corporatization is essential to increase efficiency of public operators and to promote true competition between public and private provision of water.

In addition, the article 65 of the law of 2005 intends to put in place an independent regulatory agency in charge of monitoring public and private water provision and setting tariffs. The final decision of creating a regulatory agency still needs to be approved in a specific law. Such decision would strengthen the institutional framework, lower the financial risks in the sector and thus contribute to attract private investors.

The recent reform concerns also water tariffs. There used to be a fixed-fee for water supply, but this system is being abandoned. The law of 2005 proposes a new progressive tariff system. People can now choose between a fixed fee, which is set rather high, and a bill against a metered supply. People are formally not obliged to accept a water meter, but the fixed fee has been increased strongly to a level at which it is advantageous for virtually everybody to have a water meter installed. The aim of this is among others to reduce demand. In practice, the first 25 m3 per trimester are sold at a low rate (DZD 3 per m3) but any higher consumption is charged at higher prices[10]. Tariffs vary according to the territorial zone and cover the actual costs of renovating and expanding potable water infrastructures.

Combating water losses is also considered a priority action; the aim is to reduce the water losses to 25%. Therefore eleven cities are being addressed under an Unaccounted for Water (UfW) programme. The emphasis is put on water metering; ADE announced in July 2003 that it would install 190,000 water meters.

Lastly the code gives the government more power to regulate water quality and protect areas with vulnerable ecosystems. It specifies penalties for breaking environmental regulations and creates "water police" to enforce them.

5.3 Recent reforms in Egypt

Water is a fundamental issue for Egypt. Indeed, 95% of its water comes from the River Nile and Egypt has to share this resource with nine other states living upstream the River. Moreover, Egypt is the country which has the largest consumption of the reserve. These circumstances engender political tensions in the region.

In addition, water stress, over withdrawal problems, high urban population growth and uncertain impact of climate change make this situation particularly alarming.

Municipal water supply and sanitary services are carried out by a set of economic authorities affiliated with the Ministry of Housing, Urbanization and New Communities (MHUNC). Under MHUNC, the National Organization for Potable Water and Sanitary Drainage (NOPWASD), is responsible for planning, design and construction of municipal drinking water purification plants, distribution systems, sewage collection systems, and municipal wastewater treatment plants allover Egypt. NOPWASD is responsible outside of

[10] Seawater and Brackish Water Desalination in the Middle East, North Africa and Central Asia, The World Bank 2004

Cairo, Alexandria, and the Suez-canal cities. For Cairo, Alexandria, and the Suez canal area, the responsibility is respectively on the General Organization for Sanitary Drainage in Cairo (GOSDC), the General Organization for Greater Cairo Water Supply (GOGCWS), the Alexandria General Organization for Sanitary Drainage (AGOSD), the Alexandria Water General Authority (AWGA), the Suez Canal Authority.

Operational and Maintenance responsibilities are delegated to local agencies classified into economic/general authorities and public/private companies or utilities in 9 Governorates (with private companies for wastewater treatment in Damietta, Kafr El Sheikh, Beheira). A central organization, the General Authority for Potable Water and Sanitary Drainage (GAPWSD) supervise these governorate entities.

Egypt decided in 2004 to rationalize the organization of the public water sector and centralize all water activities. The presidential decree 135 for 2004 proposes to regroup all drinking water and sanitation entities of the country under one single Holding Company. The Holding Company counts 70 000 public workers and its debt is estimated at 13.8 billion LE. Thus, its first mission is to seek new financial resources to sustain the operation and management budget and to relief the burden on the government.

Anticipating private sector participation and a possible privatization of the Holding Company in the coming years, the government has also created a regulatory agency: the "Central Authority for the Drinking Water and Sanitation Sector, and Protection of the Consumer" (Presidential Decree, 136 for 2004). This regulatory agency reports to the Minister of Housing, Utilities and Urban Communities, and is the liaison body between the government, the society and the holding company to ensure that national policies and regulations are followed. However, this newly created regulatory agency is not autonomous at all. Indeed, the Minister of Housing heads the Governing Board and the Ministries of Finance, Health and Population and of the Environment are also represented on the governing board.

Concerning the financing of water, the government has not proposed any reform. Almost 90% of the development, operation and maintenance costs of water services in Egypt are funded by public sources. Primary financing of the water sector comes only through three principal sources:

- Sovereign sources and general-tax system
- Agricultural user-fees
- Municipal and industrial user-fees.

The lack of financing reforms is concerning since costs have very much increased. The expenses for drinking water and sanitation grew from 4.73 billion L.E. in 1997/98 to 8.45 billion L.E. in 2003/04. During the period 1982-2004, 25.0 billion L.E. have been spent for potable water supply services and 40 billion L.E. have been invested in sanitation services. According to the Ministry of Water Resources and Irrigation (2005), the costs for water services for the next fifteen years will be more than triple of the current expenditures. Future allocation of such high costs presents a heavy burden for the government state budget. Alternative scenarios for financial sustainability of the water sector need to be addressed.

Moreover, revenues cover only 40% of costs because of subsidies, inefficiency, high levels of leakage, and non-paying state customers[11]. The tariff system has not been reformed and

[11] Pinsent Masons Water Yearbook 2005-2006

prices are set very low: 0.30 LE/m3 for domestic use in Cairo[12]. Cost recovery problems and low tariffs discourage financial investors and private sector participation.

In addition to that, there is an important problem of centralization in tariffs setting. In theory, tariffs are set in accordance with local authorities. However, in practice, water supply administration in Egypt is highly centralized, local governments have neither technical competences nor budgets to manage water services.

5.4 Decentralization and concession contracts in Morocco

In Morocco, the amount of renewable freshwater available per inhabitant stands just below the scarcity line: 964.4 m3 per capita. Because of drought and population growth, several studies predict that the amount of renewable freshwater per inhabitant would drop to 500 m3 per capita[13].

All major population centers in Morocco have central water supply systems consisting of reservoirs, treatment works and distribution networks. However, many of these are in a poor state of repair. Until recently, an estimated 40% of water was lost through leakage and other problems[14]. In rural areas, where 42% of the population lives (Table 5), only 56% have access to improved water source[15]. Wastewater and sewerage systems have not been developed as widely as the water supply systems. Respectively 83% and 31% of urban and rural population has access to improved sanitation facilities[15]. Sewage systems exist in most large and medium-sized cities, however, they are often inadequate. In most parts of the country, wastewater is disposed directly into rivers or the sea. Some major cities have no wastewater treatment systems at all.

Thus, water supply and sanitation are considered by the Moroccan government as a strategic issue for development.

Contrary to the high level of centralization of the Moroccan State, water administration is very decentralized and specialized by function:

- The Directorate General of Hydraulics plans and develops water resources.
- The nine Regional Authorities for Agricultural Development (RAADs) develop and maintain water distribution networks, acquire and distribute water, collect water charges, and provide farm inputs and extension services.
- The National Office of Potable Water (ONEP) created in 1972 acquires and distributes water on a retail basis to households and industries and on a bulk supply basis to municipal/provincial governments. As in Tunisia, the National Office of Potable Water is legally and financially independent. It no longer receives subsidies, and is now developing the capacity to finance itself, in addition to which it can borrow to finance system extensions and renovations. It is the major water produce and distributes water to 416 urban centers, 3656 “Douars” and 198 small rural centers (2005).

[12] “L’eau en Egypte”, 2005, Ambassade de France en Egypte - Mission Economique.
[13] “Le secteur de l'environnement au Maroc”, 2005, Ambassade de France au Maroc - Mission Economique.
[14] Water and Waste Utilities of the World Ed 7 2006, ABS Energy Research.
[15] WHO/UNICEF Joint Monitoring Program

The new Water Code of 1995 has led to significant changes. It has created River Basin Organizations, covering one or more RAADs, as nodal agencies for water administration at the regional level. As the National Office of Potable Water, these River Basin Organizations are legally and financially independent. Their mission and financing mechanism is very similar to French Basin Agencies. They are financed through users' fees "redevance" and they can lend money for different local investment programs in water. The first River Basin Organizations has been created in 1997.

In 2002, The Moroccan government pursued the decentralization movement by giving to municipalities the full responsibility of water supply and sanitation services. Therefore, municipalities have four options:

- They can manage directly water services.
- They can create an independent public provider and delegate the management of water services.
- They can also delegate the management of water services to National Office of Potable Water (ONEP).
- Lastly, they can delegate the management of water services to private firms.

Thus, the country counts thirteen independent public operators "regie" and four private operators under a concession contract. The first concession, for Casablanca, was awarded in 1997 to Lydec (Suez), by direct negotiation. The second concession, for the capital Rabat, was awarded in 1999 to Redal (Veolia), also by direct negotiation. However, with time the process evolved to become more transparent, involving public tendering. This procedure resulted in concessions being awarded to Amendis (Veolia) for two other major cities (Tangiers and Tetouan) in 2002.

As in other MEDA countries, Morocco has adopted a progressive tariff structure. The definition of the block system is set nationally for both private and public supplier. However, the price of the m3 of water within each block is set locally and tends to reflect somehow the effective cost of water as it is emphasized in the water law of 1995.

Morocco is the only country of the MEDA region which has introduced concession contracts in water supply. After a few years of operation, the results of the first concession in Casablanca are relatively satisfying. The private operator has made major investments; between 1997 an 2002 the number of people served increased from 440,000 to 590,000; and unaccounted for water dropped from 38.9% to 27.7%[16], while it is about 25% in cities managed by ONEP[17]. However, tariffs have increased of 20% over this period and are slightly higher than those applied in other cities where water is managed by ONEP (Table 8).

[16] LYDEC Institutional Communication
[17] ONEP Website December 2006

Table 8: Tariffs of water supply in some Moroccan cities in 2006					
		0-6 m3/month	6-20 m3/month	20-40 m3/month	over 40 m3/month
ONEP (PUBLIC)	EL JADIDA	3,09	7,78	11,86	11,91
	AGADIR	2,95	7,77	9,58	9,63
	SAFI	3,32	7,88	13,12	13,17
	MARRAKECH	1,70	6,37	9,36	9,41
	OUJDA	3,81	10,11	14,72	14,77
	FES	1,95	7,07	8,79	8,84
	NADOR	2,13	6,01	8,51	8,56
	SETTAT	2,63	6,86	7,53	7,58
	B.MELLAL	2,61	6,51	10,14	10,19
	KENITRA	2,32	5,25	6,59	6,64
	LARACHE	1,74	5,31	6,06	6,11
	MEKNES	1,30	3,88	4,45	4,51
	TAZA	2,15	6,00	8,92	8,97
LYDEC (PRIVATE)	CASABLANCA	2,92	9,69	13,20	13,25
	MOHAMMEDIA	2,53	8,15	11,68	11,73

Source: Based on data from ONEP and LYDEC Websites, December 2006.

5.5 Important private sector participation in Jordan

Jordan is facing a future of very limited water resources; it has among the lowest in the world on a per capita basis (165.1 m3/inhab/year). Water scarcity is the single most important natural constraint to Jordan's economic growth and development. Jordan's water resources consist primarily of surface and ground water (Table 9) and for several years now, renewable ground water resources have been withdrawn at an unsustainable rate in order to meet the increasing demand. In addition, surface and ground water quality in some areas is deteriorating.

Table 9: Sources of water use in Jordan in 2000					
Source	Uses in million cubic meters				
	Municipal	Industrial	Irrigation	Livestock	Total
Surface Water	53.309	2.537	209.670	6.000	271.516
Groundwater	185.735	34.156	252.300	1.413	473.604
Renewable	176.362	29.586	204.644	1.409	412.001
Nonrenewable	9.373	4.570	47.656	0.004	61.603
Treated Wastewater	0.000	0.000	72.033	0.000	72.033
Total	239.044	36.693	534.003	7.413	817.153
Source: Ministry of Water and Irrigation (MWI)					

Despite scarcity, water use is not efficient: unaccounted for water reaches 47% in the Amman region[18]. Agriculture uses more than 60% of water resources, while it contributes only 2.8% to GDP (Table 4). Connection rates to the municipal network are high, at more than 90%, but water supply is intermittent.

The institutional framework of the water supply sector in Jordan consists in four entities: the Ministry of Water and Irrigation (MWI), the Water Authority of Jordan (WAJ), the Programme Management Unit (PMU) and the Jordan Valley Authority (JVA).

The Ministry of Water and Irrigation was established in 1992, in response to the need of an integrated approach to national water management. The MWI is the official body responsible for the formulation of national water strategies and policies, the monitoring of the water sector, planning and management, and procurement of financial resources.

The Water Authority of Jordan (WAJ) and the Programme Management Unit (PMU) carries out regulatory tasks.

The WAJ was established in 1983 as an autonomous centralized corporate body, with financial and administrative independence linked with Minister of Water and Irrigation. WAJ is fully responsible for public water supply and wastewater services as well as for water resources planning and monitoring, construction, operations and maintenance.

The Project Management Unit (PMU) was established within WAJ in 1996. The PMU carries out the responsibility for regulating water supply and wastewater utilities under private management. It operates under the supervisory control of an Executive Management Board, which is headed by the Minister.

The Jordan Valley Authority (JVA) was founded in 1973. JVA is responsible for the development utilization of water resources in the Jordan Valley for irrigated farming, municipal, industrial and touristic purposes. JVA is also responsible for the dams and reservoirs in the country.

The existing organizational structure does not show clear separations between political, strategic, regulatory and operational tasks. The management of the water sector is very much centralized and political interference is usual. So called “autonomous” water agencies are headed by the Minister and are not actually independent. Regulatory functions remain limited to the monitoring of the water sector.

Due to the increase of the water demand, the Ministry of Water and Irrigation (MWI) adopted in 1997 a water strategy emphasizing to give major role for private sector. Thus, the Government decided in 1999 to contract out the operation and management of water and wastewater services in Amman to the Lema consortium (Ondeo, Montgomery Watson and Arab-tech). The contract term was initially 5 years but was extended until December 2006.

While service provision is still not satisfactory, private sector participation in Amman resulted in significant improvements in water supply: tariffs did not particularly increase, the workforce decreased by 400 staff[18] and the duration of supply increased from 36 hours per week at the start of the contract to an average of 75 hours per week in 2004[19].

[18] Regulation and Supervision in Water Supply and Sanitation, Focus: Jordan, GTZ, 2006.

[19] LEMA Institutional Communication

Other management contracts were considered but not carried out yet. Another important contract is the BOT contract for the Al-Samra. In the future, further BOT contracts, as well local private sector participation are being expected.

One of the major problems of the Jordanian water sector resides in the inefficient pricing policy. The water charges are set locally by the MWI. Jordan has adopted a well defined progressive tariff structure with subsidies for the poorest communities. However, prices are set too low to be sustainable and disparities among users are too important. The amount paid for water in the Jordan Valley is very low compared to the urban and industrial water tariffs. The average JVA tariff billed in 2000 was US$0.008/m3, while the average 2001 urban water tariff in Jordan was 90 times greater or US$0.54/m3 and industrial and non-residential water users were charged US$1.42/m3. [20]

6 Water Supply Institutional Scorecard

6.1 Determinants of the scorecard

The water supply institutional scorecard, developed in this part of the study, aims to present the problems of the water supply sector and the associated organizational framework. It is based on 5 specific issues and analyzed in 21 subtopics.

The 5 main issues, identified in our scorecard, are the state of water resources, the management of access to water, the private sector participation in water supply, the regulatory framework and the water pricing policy.

The 2 first issues of the scorecard describe problems of water resource (1) and access (2). The question of access to water supply is not necessary linked with water resource. However, water scarcity (1.1), over withdrawal practices (1.2) and foreign dependency (1.3) can emphasize the importance of water supply problem. Managing access to water is usually illustrated by the percentage of population with safe access to water (2.1). While this information is useful, it cannot give a complete outlook of the situation. In order to evaluate better the quality of water management in the country, our scorecard includes also two other variables: the continuity of water supply (2.2) and an estimate of unaccounted for water (2.3).

The third issue is the involvement of the private sector in water supply (3). Introducing private sector participation and establishing a reasonable level of competition between public and private water sector in a well defined regulatory environment can improve management efficiency. In order to evaluate properly the scope of private sector participation, the five points presented in this section are the presence of private water operators in the country (3.1), the estimate of the percentage of population delivered by the private sector (3.2), the location of private contracts (3.3), the types of contracts (3.4) and the year of introduction of private sector participation in the country (3.5).

The fourth issue is the regulatory framework (4). As discussed previously in the study, without an adapted institutional framework, delegating water services to private operators does not necessarily improve efficiency. Thus, the design of regulatory system is the most essential step in the process of reforming the water sector. The two first points of this issue concern the presence of a regulatory agency (4.1) and its effective independence (4.2). An

[20] World Bank OED evaluation of bank assistance for water development 2004.

independent regulatory agency is a valuable tool, which provides political stability and safe economic environment for both private and public water operators. Often countries create an autonomous water regulatory agency. However, in the practice these agencies are rarely independent from governments and are thus not very useful. The third component is the separation of powers (4.3). As in a corporate environment, the separation of roles, political, strategic, regulatory and operational, is condition of efficient management. Another important reform is the corporatization of local water operators (4.4). Establishing legal and financial independence of water operators reduce administrative burden and political interference. It guarantees the transparence of costs and financial flows. It also ensures a fair and fruitful competition among water operators, public or private. The last two indicators of the regulatory framework concern the decentralization of water public administration. Countries can create Basin River Organizations (4.5), which are funded through users' fees and aims to finance local water projects. Thus, part of the public responsibility is delegated to the regional level which is able to evaluate more precisely the needs. This system also reduces the fiscal and administrative burden of the central state. Without creating Basin Agencies, the administrative burden can also be moderated by decentralizing part of water policy to regions (4.6).

The pricing policy of water is the last component of the scorecard (5). Full cost recovery is a utopia; however, it is necessary to recover cost through a sustainable mix of tariff and taxation. Tariff needs to be set at a level viable enough to keep running operations and finance the capital (5.1). On another hand, it is essential to keep water affordable for everyone. According to most of experience of tariff reform in the world, the easiest way to subsidize water for the poorest seems to be through a progressive block tariff structure (5.2). The price of water increases with the quantity used. An efficient water pricing policy needs also to assess the differences of cost of water from one region to another. Water charges are not equal in arid areas and in cities; prices need to be set in consequence. Tariffs need to be set locally (5.3). Water charges need also to take into account the individual consumption; individual water metering is essential (5.4).

6.2 The water supply institutional scorecard applied to countries of the MEDA region

Indicators	Sub-Indicators	Algeria	Egypt	Jordan	Morocco	Tunisia	Source of data
1. State of water resource	1.1. Water scarcity (Total renewable freshwater per capita)	373.2 m3/inhab/yr	826.9 m3/inhab/yr	165.1 m3/inhab/yr	964.4 m3/inhab/yr	472.3 m3/inhab/yr	FAO / World Resource Institute for the year 2000
	1.2. Over withdrawal (Total water withdrawal as percentage of total renewable water resources)	52.03%	117.20%	114.80%	43.45%	57.45%	
	1.3. Foreign dependency ratio (percentage of total renewable water resources originating outside the country)	3.60%	96.91%	22.73%	0.00%	8.71%	
2. Managing access to water	2.1. Urban connection rate	92.00%	100.00%	91.00%	99.00%	94.00%	World Bank 2002
	2.2. Continuous water supply	No	?To be confirmed?	No	Mostly yes	Yes	Algeria: Press release 2006; Jordan: GTZ 2006 and World Bank; Morocco: World Bank; Tunisia: World Bank.
	2.3. Estimate of unaccounted for water	40%	?To be confirmed?	47% in Amman	Around 25-30%	Around 18%	Algeria: World Bank 2000, ABS Research 2006; Jordan: GTZ 2006; Morocco: Onep 2006, Lydec 2006; Tunisia: World Bank 2005.

Indicators	Sub-Indicators	Algeria	Egypt	Jordan	Morocco	Tunisia	Source of data
3. Private sector participation in drinking water	3.1. Presence of private operators	Yes	No	Yes	Yes	No	Institutional communication and press releases (Excludes service contracts)
	3.2. Estimate of the percentage of population delivered by the private sector	Between 10% and 20%		Around 40%	Between 20% and 30%		
	3.3. Location	Algiers, Taksbet, Athmania, Arzew, Bredeah and Beni Haroun.		Amman	Rabat, Casablanca, Tetuouan and Tangiers.		
	3.4. Types of contract	Management contract and BOT		Management contract and BOT	Concession contracts and BOT		
	3.5. Year of introduction of private sector participation	2001 (legalized in 1995, first management contract in 2005)		1999	1997		

Indicators	Sub-Indicators	Algeria	Egypt	Jordan	Morocco	Tunisia	Source of data
4. Regulatory framework	4.1. Presence of regulatory agency	Not yet. However, it has been planed in the article 65 of the new water law of 2005.	Yes, since the Presidential Decree 136 of 2004	Yes (Water Authority of Jordan and Programme Management Unit)	No	No	Official communication, laws and decrees.
	4.2. Real independence of the regulatory agency		No, the agency is headed by several Ministers	No, the agency is headed by the Minister of Water and Irrigation			
	4.3. Separation of powers	Yes	Important political interferences	Important political interferences	Yes	Some political interferences	
	4.4. Corporatization of local operators	Possible since 2005	No	No	Possible since 2002	No	
	4.5. Basin Organizations	No	No	No	Exists since 1997	No	
	4.6. Centralization Versus decentralization	Decentralized	Currently, decisions are highly centralized. Decentralization process should be on track in the coming years.	Centralized	Decentralized	Centralized	

Indicators	Sub-Indicators	Algeria	Egypt	Jordan	Morocco	Tunisia	Source of data
5. Water pricing policy	5.1. Viable level of tariffs	Yes, tariff reform on track	No	No, extremely high subsidies of water for agricultural use.	Yes	Yes overall, but the high level of cross subsidies does not seem sustainable.	Institutional communication.
	5.2. Progressive tariff structure	Yes	Yes	Yes	Yes	Yes	
	5.3. Geographical tariff setting	Tariff set locally	Tariff set locally	Tariff set locally	Tariff set locally	Tariff set nationally	
	5.4. Metering practice	Yes	Yes	Yes	Yes	Yes	

Source: E.Perard 2006

7 Policy recommendations

7.1 Tunisia

Overall, the national Tunisian water and sanitation operators are very efficient in comparison with other MEDA countries. This good performance is due to the strong commitment of the Tunisian government for more than thirty years.

However, some improvements could be made in decentralizing the management and corporatizing local water utilities.

Other potentially productive reforms concern water tariffs: the political role in adjusting tariffs could be mitigated by creating an independent agency in charge of it. Tariffs should reflect the local effective cost of water by being set regionally instead of nationally. Differences of prices among users should be reduced; the high level of cross subsidies does not seem sustainable in the long term.

More private sector participation, such as service contracts and management contracts, could also be introduced in order to increase management efficiency and to reduce the fiscal burden of the state. All these reforms would allow decreasing the cost of water services.

7.2 Algeria

The recent regulatory reform of water services in Algeria is very ambitious and should be fruitful in the short term. Corporatization of public operators, progressive water tariffs, water metering, independent regulatory agency and environmental legislation are of the many reforms that will improve efficiency in the water sector.

The institutional framework has been rationalized and is now well structured. Therefore, private sector participation is expected to increase in the coming years and the experience should turn into a success.

7.3 Egypt

Egypt started only recently to reform the institutional organization of the water sector. The country is looking for alternative models to finance and operate efficiently water services.

The government is currently in the process of decentralizing water policy to the local level. When effective, this reform should reduce inefficiencies due to the very centralized administrative system.

The corporatization of local water operators would also help monitoring cost and would ensure a productive competition among water providers.

Tariffs are not set at a viable level and need to be increased in order to guarantee the financial sustainability of the water policy in the long term.

If the government seeks to increase private sector participation, it should reform its tariff system and provide a real financial and legal independence to the water regulatory/monitoring agency.

7.4 Morocco

The reorganization of the water supply sector in Morocco started ten years ago. River Basin Organizations, decentralization, corporatization, sustainable progressive tariffs are of the major reforms.

The well defined institutional environment permits now true competition between the private and the public sector. This policy has led to success and should be even more fruitful in the coming years. The Moroccan experience has to be set as a model for further reforms in the neighbor country Algeria, which is already well on track.

7.5 Jordan

The overall situation of water scarcity in Jordan is very concerning. Private sector participation in Amman has led to some improvements, but a broad institutional reform of the water sector is necessary.

The organization of water authorities and their respective responsibilities should be rearranged with a clear separation between political, strategic, regulatory and operational roles. Political interferences in regulatory/monitoring activities should be reduced. Decentralization and corporatization of local water operators would allow efficiency gains. In order to attract more private investment, international dispute prevention and resolution mechanisms should also be put in place.

About water charges, Jordan should keep its progressive tariffs structure and its pro-poor policy, but Jordan needs to adjust prices to a viable level. Considering the scarce environment, it is also imperative to reduce differences of tariffs among users; the extremely high level of subsidies of water for agriculture is economically inefficient and counterproductive.

All these organizational and pricing reform would contribute improving service provision and reducing intermittent water supply.

8 Conclusion

The MEDA area is water scarcest region of the world; 8 of the 11 MEDA countries have less than 1,000 cubic meters of renewable fresh water per person per year. Climate change and demographic phenomenon will worsen the scarcity.

MEDA countries face also important problems of access to water in urban areas. With an expected urban population growth of 63.8%[21] in the MEDA region over the next 25 years, the issue of urban water supply is essential for heath and economic development.

Private sector participation is often considered by countries as a solution to improve urban water services. However, the review of the economic literature and empirical studies[22] has shown that private sector participation per se does not systematically have a positive effect on efficiency. Delegating water services to private operators, without a well defined regulatory environment, cannot be successful. Thus, reforming the water supply institutional framework is an essential prerequisite.

The study has shown that governments of MEDA countries are well aware of the urgency of the situation. Some countries have started to reform the institutional organization of the water sector a long time ago; others are still at the beginning of the process. The Moroccan experience with regulatory reform and private sector participation in water services over the last ten years is an example to follow for other countries of the region. Algeria is also well on track to reorganize successfully urban water supply. The experience of Tunisia reveals that managing efficiently public water delivery is also very much possible. However, some reforms, as corporatization and decentralization could improve the service. In other countries, Jordan and Egypt, the situation is more concerning; governments need to pursue their efforts in reshaping the institutional framework of the water supply sector and should address the problem of unviable tariffs without delay.

[21] Calculation based on the 2004 estimates of the United Nations Population Division
[22] Annex: Review of empirical tests and case studies on the performance of private versus public water services

9 Annex: Review of empirical tests and case studies on the performance of private versus public water services.

Region or Country	Method	Results	References
Africa	Stochastic Production Frontier	Private operators are more cost efficient	Estache and Kouassi (2002)
Africa	Stochastic Production Frontier / Data Envelopment Analysis	No differences in costs	Kirkpartick, Parker and Zhang (2004)
Argentina (Buenos Aires)	Multiple Case Studies	Positive effect of the introduction of private sector participation on the sector performance	Abdala (1997); Alcazar, Abdala and Shirley (2002); Artana, Navajas and Urbiztondo (1999); Crampes and Estaches (1996); Rivera (1996)
Argentina (Cordoba)	Case Study	Positive effect of the introduction of private sector participation on the sector performance	Nickson (2001a)
Argentina (Corrientes)	Case Study	Positive effect of the introduction of private sector participation on the sector performance	Artana, Navajas and Urbiztondo (1999)
Argentina (Salta)	Case Study	Positive effect of the introduction of private sector participation on the sector performance	Salatiel (2003)
Argentina (Tucumán)	Multiple Case Studies	Negative effect of the introduction of private sector participation on the sector performance	Rais, Esquivel and Sour (2002); Artana, Navajas and Urbiztondo (1998)
Asia	Stochastic Cost Frontier	No differences between public and private	Estache and Rossi (2002)
Bolivia (Cochabamba)	Multiple Case Studies	Negative effect of the introduction of private sector participation on the sector performance	Nickson and Vargas (2002); Hall (2002)
Bolivia (La Paz – El Alto)	Multiple Case Studies	Mixed results of the introduction of private sector participation on the sector performance	Hall and Lobina (2002); Komives (1999, 2001); Komives and Brook-Cowen (1998)
Brazil	Data Envelopment Analysis	No differences between public and private	Seroa da Motta and Moreira (2004)
Chile (Santiago)	Multiple Case Studies	Positive effect of the introduction of private sector participation on the sector performance	Rivera (1996); Shirley, Xu and Zuluaga (2002)
Colombia (Barranquilla)	Case Study	Positive effect of the introduction of private sector participation on the sector performance	Avendaño and Basañes (1999)
Colombia (Cartagena)	Multiple Case Studies	Positive effect of the introduction of private sector participation on the sector performance	Rivera (1996); Nickson (2001b); Beato and Díaz (2003); Avendaño and Basañes (1999)

Region or Country	Method	Results	References
Colombia (Marinilla)	Multiple Case Studies	Positive effect of the introduction of private sector participation on the sector performance	Arévalo and Schippner (2002); Avendaño and Basañes (1999)
Colombia (Montería)	Case Study	Positive effect of the introduction of private sector participation on the sector performance	Avendaño and Basañes (1999)
Côte d'Ivoire	Multiple Case Studies	Positive effect of the introduction of private sector participation on the sector performance	Collignon (2002); Kerf (2000); Menard and Clarke (2002a); Trémolet, Browning and Howard (2002)
France	Regression Model	No difference in compliance with water quality regulation	Menard and Saussier (2000)
Gabon	Multiple Case Studies	Positive effect of the introduction of private sector participation on the sector performance	Trémolet (2002); Trémolet and Neale (2002)
Gambia	Case Study	Negative effect of the introduction of private sector participation on the sector performance	Kerf (2000)
Guinea	Multiple Case Studies	Mixed results of the introduction of private sector participation on the sector performance	Brook-Cowen (1999); Brook and Lucussol (2001); Clarke, Ménard and Zugula (2002); Kerf (2000); Ménard and Clarke (2002b); Rivera (1996)
Honduras (San Pedro Sula)	Case Study	Positive effect of the introduction of private sector participation on the sector performance	Díaz (2003)
India (Prune)	Case Study	Negative effect of the introduction of private sector participation on the sector performance	Zérah (2000)
Latin America (Argentina, Bolivia, Brazil)	Regression Model	Private sector participation per se does not improve coverage	Clarke, Kosec and Wallsten (2004)
México (Cancún and Isla Mujeres)	Case Study	Mixed results of the introduction of private sector participation on the sector performance	Rivera (1996)
México (Mexico City)	Case Study	Mixed results of the introduction of private sector participation on the sector performance	Haggarty, Brook and Zuluaga (2002)
Philippines	Multiple Case Studies	Mixed results of the introduction of private sector participation on the sector performance	Dumol (2000); Santos (2003); Porter (2001)
Poland (Gdansk	Case Study	Positive effect of the introduction of private sector participation on the sector performance	Rivera (1996)

Region or Country	Method	Results	References
Senegal	Multiple Case Studies	Positive effect of the introduction of private sector participation on the sector performance	Kerf (2000); Trémolet, Browning and Howard (2002)
South Africa (Queenstown)	Case Study	Mixed results of the introduction of private sector participation on the sector performance	Palmer Development Group (2000)
Trinidad and Tobago	Multiple Case Studies	Negative effect of the introduction of private sector participation on the sector performance	Nankani (1997); Stiggers (1999)
United Kingdom	Financial Analysis	No differences after privatization	Shaoul (1997)
United Kingdom	Cost Function	Regulation lowered costs but privatization did not	Saal and Parker (2000)
United Kingdom	Productivity analysis	No difference in efficiency after privatization	Saal and Parker (2001)
United States	Cost Function	Private has lower costs	Morgan (1977)
United States	Cost Function	Private has lower costs	Crain and Zardkoohi (1978)
United States	Cost Function	Public has lower costs	Bruggink (1982)
United States	Cost Function	No differences in costs	Feigenbaum and Teeples (1983)
United States	Data Envelopment Analysis	No differences in efficiency	Byrnes et al. (1986)
United States	Cost Function	No differences in costs	Teeples and Gyler (1987)
United States	Stochastic Cost Frontier	No differences in costs	Byrnes (1991)
United States	Data Envelopment Analysis	Public operators are more efficient	Lambert et al. (1993)
United States	Stochastic Cost Frontier	Public operators are more cost efficient	Lynk (1993)
United States	Cost Function	No differences in efficiency	Bhattacharyya et al. (1994)
United States	Data Envelopment Analysis	Private operators are more efficient	Bhattacharyya et al. (1995)
United States	Regression Model	No difference in compliance with water regulation.	Wallsten and Kosec (2005)

Source: Edouard Pérard, "Water Supply and Sanitation: Public or Private?" (Forthcoming in 2007). Based on Dupont and Renzetti (2004); Clarke, Kosec and Wallsten (2004); Estache, Perelman and Trujillo (2005) and literature review.

In blue: Studies that found superiority of private water supply or positive effect of private sector participation.

In red: Studies that found superiority of public water supply or negative effect of private sector participation.

In white: Studies that found no difference between public and private water supply or mixed results.

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