

Local Water Supply, Sanitation and Sewage

Country Report

Lebanon

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MEDA Water



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SOCIETÀ GESTIONE IMPIANTI IDRICI



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1. SUMMARY

LOCAL WATER SUPPLY, SANITATION AND SEWAGE LEBANON

GENERAL CONTEXT

- Average Rainfall: Average annual rainfall is estimated at 823 mm / yr¹
- Area: 10 400 sq km²
- Population: 3 826 018 (July 2005 est.)
- Population Growth rate: 1.26% (2005 est.)
- Population Distribution:
 - Urban: approximately 87%
 - Rural: 13%
- Currency: 1000 LBP Lebanon Pounds = 0.549021 EUR

INSTITUTIONAL SETTINGS

Policy Setting: The Ministry of Energy and Water (MEW)

Executive / Regulatory Level: The General Directorate for operations (DGO). A Performance Evaluation Commission shall be set up within the Ministry of Energy and Water to prepare the supervision work especially with regard to valuation and monitoring of the functioning of the Water Authorities.

User Level:

- Water Authorities responsible for water supply and tariff setting. The responsibility for the collection of wastewater and treatment has been transferred from the Ministry of Interior and Municipalities (MIM) to MEW and the Water Authorities.

Private Sector Involvement:

- A service and management contract with a private contractor to strengthen the Tripoli Water Authority.

WATER STRATEGY

- The MEW prepares the National Water Policy and implements the projects.
- National Master Plan (regulating activities off four National Water Authorities)

WATER RESOURCES

- Total (renewable) Water Resources: 4.41(km³/Year) (2000)
 - Groundwater: Produced internally: 3.20 (km³/Year)
 - Surface Water produced internally: 4.10 (km³/Year)
 - Overlap: Surface and groundwater: 2.50 (km³/Year)
- Water resources total renewable per capita: 1,261 (m³/capita Year)
- No. of consumers:
- Total Potable Water Supplied (Bulkwater):
- Potable Water Supplied per capita: 160 L/cap/day
- Unaccounted for water (UFW): 50 % for the country as a whole.³ (2003)

WATER SUPPLY

- Rate of population served by Public drinking water Networks: Approx. 90%
 - Urban Population Served: %
 - Rural Population Served: %
- Potable Water Consumed per capita: 64 l/cap/day, due to high system and distribution

¹ Source: FAO – Acquastat - Country Pages – Lebanon - 1997

² The World Factbook – CIA - 2005

³ Source: Assessment of the role of the private sector in the development and management of water supply in selected ESCWA member Countries General, E/ESCWA/SDPD/2003/14, 3 October 2003, Original: English Ch. VII. Public-Private Partnership Experience in Lebanon.

losses⁴

- Total Billed Consumption: Mm³
- Service Level: Supply not reliable even in urban areas. Some consumers can only count on a couple of hours of supply per day.

Estimated Rate of population with access to improved drinking water: ⁵

- Urban: 100%(2002)
- Rural: 100% (2002)

SANITATION & SEWAGE

- Rate of Population connected to public sanitation:
 - Urban Population Served: %
 - Rural Population Served: %

Wastewater

- Total Volume of Wastewater: Lebanon generates an estimated 249 Mm³ of wastewater per year, with a total BOD load of 99,960 tonnes.⁶
- Total rate of Wastewater undergoing treatment:
- Waste water undergoing treatment (m³)
 - Physical: %
 - Biological:%
 - Advanced: %
- Population served by waste water treatment plants of the total population:
 - Urban:
 - Rural:

Estimated Rate of population with access to improved sanitation,

- Urban: 100% (2000)
- Rural:87%(2000)

INVESTMENTS IN WATER SECTOR

- Total Investment in the water sector:
- Investment in Water Supply %:
- Investment in Sanitation and Wastewater treatment %:
- Private Sector Part of Total Investment %:
- Innovative solutions for financing investments:

TARIFFS

Tariff system:

- Water tariffs:
- Cover O&M costs: This price covers the maintenance and renewal costs of the existing network and equipments, but does not take into account the initial or future investment paying -off costs, for network and resource extensions.⁷
- Medium Tariff for 1m³ of water:
- Metering:

Responsible institution for setting tariffs:

- The different Water Authorities establish the water price.⁸

⁴ Source: Jaber, 1999

⁵ Source: WHO / UNICEF - Joint Monitoring Programme for Water Supply and Sanitation Coverage Estimates Improved Drinking Water, Lebanon - 2002

⁶ Source: Lebanon State of the Environment Report, Ministry of Environment/LEDO, chapter 15

⁷ Source: EMWIS WEB, http://www.emwis-lb.org/EN/Institutions/water_authorities.htm

⁸ Source: EMWIS WEB, http://www.emwis-lb.org/EN/Institutions/water_authorities.htm

2. GENERAL CONTEXT

2.1. Geography

Lebanon, with a total area of 10 400 sq km, is situated east of the Mediterranean Sea and stretches about 210 km along the coast and 50 km inland. It is bordered by Syria in the north and east and by Israel in the south. Administratively it is divided into six Mohafazats or provinces.

2.2. Climate

The climate of Lebanon is typically Mediterranean, with heavy rains in the winter season (January to May) and dry and arid conditions in the remaining 7 months of the year. The average annual temperature is 20°C on the coast, 16°C in the Beeka valley and less than 10°C in the mountain zones. Average annual rainfall is estimated at 823 mm, varying from 600 to 900 mm along the coastal zones to 1 400 mm on the high mountains and decreasing to 400 mm in the eastern parts and less than 200 mm in the north-east.⁹

2.3. Social Context¹⁰

- **Population**

3,826,018 (July 2005 est.)

- **Population Growth Rate**

1.26% (2005 est.)

- **Population Distribution:**

Urban: 87%

Rural: 13%

- **Currency**

Lebanese pound (LBP)

3. INSTITUTIONAL SETTINGS

3.1. Public Organisations¹¹

- Ministry of Energy and Water
- Water Authorities
- Litani National Authority
- Council for Development and Reconstruction (CDR)
- Ministry of Public Health
- Ministry of Environment

Level	Institution	Comment
<i>Policy Level</i>	The Ministry of Energy and Water	<p>The Ministry of Energy and Water (MEW), former Ministry of Water and Electrical Resources (MWER), is the central public organization in charge of competences in the field of water in Lebanon.¹²</p> <ul style="list-style-type: none"> • <u>The General Direction of Hydraulic and Electric Resources</u> Its functions are to plan and study the hydraulic projects, to carry them out and supervise the execution, and to apply the laws and regulations relative to the protection of public water and its exploitation.¹³ • <u>The General Directorate for operations (DGO)</u>

⁹ Source: FAO – Acquastat - Country Pages – Lebanon - 1997

¹⁰ Source: The World Factbook, CIA , 2005

¹¹ Source: EMWIS WEB Page - Lebanon - Institutions - Water Authorities

¹² Source: EMWIS WEB Page - Lebanon - Institutions - Water Authorities

¹³ Source: EMWIS WEB Page - Lebanon - Institutions - Water Authorities

		<p>The mission of the Directorate General for Operations is to: Exercise supervision authority over institutions working in the field of water and electricity and over all public institutions subjected by the Government to its authority by decrees adopted in the Council of Ministers; Control water or electricity concessions; Give technical advice on quarry permits.</p> <ul style="list-style-type: none"> • <u>The General Directorate of Exploitation.</u> This Direction is mainly responsible for the administrative and financial control of the Water Authorities and the Litani National Authority, and of the application of the tender documents and specifications relative to the exploitation of water. The Ministry is also responsible for studying the complaints and measurements necessary to regulate the infringements committed by the organizations working in the water sector.¹⁴
	Litani National Authority (LRA)	<p>The Litani National authority is a public establishment under Ministry of Energy and Water, mainly responsible for preliminary studies and the construction of dams, to the exploitation of the hydroelectric power plants, and have the following duties:</p> <ul style="list-style-type: none"> • The preliminary studies and the construction of dams, • The exploitation of the hydroelectric power plants, • The big works of irrigation and their exploitation • The management of the water resources (surface and underground resources) over the whole Lebanese territory. <p>The naming "Litani River Authority " gives often to confusion, because LRA is not only a Water Agency for the management of the Litani River; its action extends over the whole Lebanese territory, specially in the domain of rivers and springs gauging</p>
<i>Regulatory Level</i>	Performance Evaluation Commission	<p>A Performance Evaluation Commission shall be set up within the General Direction of Hydraulic and Electric Resources to prepare the supervision work especially with regard to valuation and monitoring of the Water Authorities.</p>
<i>User Level</i>	The Water Authorities,	<p>The 21 Water Authorities are semi-autonomous public institutions under the Ministry for Energy and Water, depending from a financial perspective on the Ministry of Finance. They are responsible for the exploitation of both the network and the equipments for the providing of drinking water, as well as for their maintenance and their renewal.</p> <p>Since the year 2000, the water sector has been reorganized according to the law 221 (dated 29-5-2000) amended by the Law 241 (dated 7-8-2000), and the law 337 (dated 14-12-2001). The 21 Water Authorities were merged into "four public establishments for water exploitation", these are:¹⁵</p> <ul style="list-style-type: none"> • The Water Establishment of Beirut and the Mount of Lebanon (head office: Beirut), • The Water Establishment of North Lebanon (head office: Tripoli), • The Water Establishment of the Bekaa (head office: Zahleh), • The Water Establishment of South Lebanon (head office: Sidon).¹⁶ <p>The former water authorities continue to assure their role as long as</p>

¹⁴ Source: EMWIS WEB Page - Lebanon - Institutions - Water Authorities

¹⁵ Source: EMWIS WEB Page - Lebanon - Institutions - Water Authorities

¹⁶ Source: EMWIS WEB Page - Lebanon - Institutions - Water Authorities

		<p>the four new establishments are not operational.</p> <p>Furthermore, the responsibility of the waste water treatment sector is transferred from the Ministry of Interior and Municipalities (MIM) to the Ministry of Energy and Water; presently; this sector is entrusted to the four new establishments.¹⁷</p>
	The Council for Development (CDR)	<p>The Council for Development was founded 1977 by DL no. 5, to be the government unit responsible of reconstruction and development. CDR is responsible for financing and implementation of infrastructure projects, to rehabilitate, extend, modernise existing infrastructure or build new. CDR is an institution that implements large investment projects within the framework of the National Water Policy.¹⁸</p> <p>The main tasks can be summarized as follows:</p> <ul style="list-style-type: none"> • Preparing general plan for the country, investment and implementation programs for reconstruction and development projects. • Mobilizing external financing for priority projects within the investment plans. • Implementing projects by appointment from the Council of Ministers. • Taking action in rehabilitating the public administration and reconstruction of the infrastructure and negotiating foreign financing agreements.
	Ministry of Environment (MOE)	Ministry of Environment (MOE) have a monitoring and control functions together with the Ministry of Health.
	Ministry of Public Health	The Ministry established a Department of Sanitary Engineering to monitor water quality. The ministry also sets standards for drinking water; proposes specifications for wastewater and drinking water networks; recommends action for pollution prevention; and operates water quality equipment such as chlorinators.

3.2. Private Sector Involvement

While the government has been advocating private sector participation in many sectors including water, many factors hinder this participation, such as lack of written policies and action plans, an inadequate legal framework and unclear procedures for creating and sustaining public-private partnerships.¹⁹

As a first step towards privatising of the water sector, the Government is in the final stages of negotiating a mandate with the investment bank "Société Générale" for advisory services for the privatisation of the water and waste water sectors in Lebanon. The mandate incorporates the responsibility for preparing the sector for its privatisation, including its audit and legal groundwork.²⁰

3.2.1. Service Management contract - Tripoli Water Authority

A management contract to finance infrastructure work in the Tripoli water office (which is to become the North Water Authority in accordance with the new water and waste water law) was awarded to a private company under a €20 million project financed by the "Agence Francaise de Development (AFD)".²¹

The privatisation of the Tripoli Water Authority is still in the initial stages, as it began only in February 2003. Law No. 401, enacted on 5 June 2003, approved public participation in the management of the Tripoli Water

¹⁷ Source: EMWIS WEB Page - Lebanon - Institutions - Water Authorities

¹⁸ Source: Council for Development and Reconstruction - Republic of Lebanon - What is CDR

¹⁹ Source: Lebanon State of the Environment Report 2001- Ministry of Environment/LEDO - Water

²⁰ Source: Republic of Lebanon - Ministry of Finance - Yearly Report 2001 - Fiscal, Trade and Structural Developments - 25 February 2002

²¹ Source: Republic of Lebanon - Ministry of Finance - Yearly Report 2001 - Fiscal, Trade and Structural Developments - 25 February 2002

Authority, the main objective being defined as “the conclusion of a service and management contract with a private contractor to strengthen the Tripoli Water Authority”.²²

Specifically, the proceeds of the loans were to be used to implement a service and management contract with a private contractor to strengthen the Tripoli Water Authority. Under that contract, the Authority retains its administrative and legal responsibilities. The contract represents the first direct example of private-sector participation in water service provision. As such, it will serve as a model for participation by private firms in the management of other public utilities in the future.²³

The contractor must assume responsibility for piping water from intake points to storage reservoirs and from the storage reservoirs to the water pressure gauges of subscribers continuously and under satisfactory pressure conditions. In the area of client services, the contractor is required to enhance customer satisfaction, prepare and regularly update an inventory of illicit consumers and suspend service to consumers refusing to subscribe. It is also required to improve the services and efficiency of employees whose work brings them into direct contact with clients. Other tasks include handling registration requests, signing registration contracts and organizing information campaigns on water conservation for the general public.²⁴

²² Source: Assessment of the role of the private sector in the development and management of water supply in selected ESCWA member Countries General, E/ESCWA/SDPD/2003/14, 3 October 2003, Original: English Ch. VII. Public-Private Partnership Experience in Lebanon.

²³ Source: Assessment of the role of the private sector in the development and management of water supply in selected ESCWA member Countries General, E/ESCWA/SDPD/2003/14, 3 October 2003, Original: English Ch. VII. Public-Private Partnership Experience in Lebanon.

²⁴ Assessment of the role of the private sector in the development and management of water supply in selected ESCWA member Countries General, E/ESCWA/SDPD/2003/14, 3 October 2003, Original: English Ch. VII. Public-Private Partnership Experience in Lebanon

4. LEGAL FRAMEWORK

Most of the laws and regulations for water resources are old and date back to the French colonial period, as necessary complementary application decrees has not always been written. There are also few laws covering wastewater disposal, solid waste discharge, industrial wastewater discharge, and other sources of water pollution.

The new organization of the water sector in Lebanon is mainly governed by three laws: **Law 221** issued on May 29th 2000, corrected by the **Law 241** issued on August 7th 2000, and amended by **Law 337** issued on December 14th 2001. Lately, Decree No 8122, dated on July 3rd 2002, has defined some application processes of Law 221, particularly relating to the merging of water bodies.

The main water laws are:

Law	Argument
Order No. 144, 1925:	Protection of Surface Water and Groundwater Resources
Order No. 320/26, 1926	Protection of Catchment Areas
Decree No. 639, 1942	Protection of Nabaa Al Assal Spring, Faraya
Decree No. 10276, 1962	Protection Zones for Water Sources and Recharge Areas
Decree No. 14438, 1970	Restrictions on the Depth of Unlicensed Boreholes
Decree No. 8735, 1974	Pollution from Solid and Liquid Waste
Law No. 64, 1988	Pollution from Hazardous Waste
Decision No. 2528/C, 1996:	Protection of Groundwater at El Kneisse
Decree No. 680, 1998	The Preservation and Protection of Boreholes
Law 221 (dated 29-5-2000) amended by the law 241 (dated 7-8-2000)	In 2000, the Lebanese government passed a new water law. Under this legislation, the 21 water authorities, formerly responsible for water, were consolidated into four authorities, overseen by the federal Ministry of Energy and Water. Each authority is responsible for planning, operating, and maintaining the water system — and for implementing a cost recovery program that will allow for new resources to be invested in the system. The government has also committed to build facilities to treat wastewater. ²⁵ The government has laid down factors to take into consideration in the fixing of tariffs. Article 4.1(b) stipulates:
Law 228, 31 May 2000	A national privatisation law has been enacted expressly to encourage private sector participation in all sectors, including water and electricity. Law 228 establishes a framework within which future public-private initiatives will be able to: <ul style="list-style-type: none"> • Regulate the economic sector in question • Identify regulatory bodies to oversee public-private transfers and monitor privatised projects • Specify the duration of transactions pursuant to Article 89 of Lebanon's Constitution.²⁶
Law 337 (dated 14-12-2001)	The spirit of this law is to separate clearly between the macro and micro management of water, and to strengthen the policy of the decentralization by granting more autonomy to regional authorities involved by day to day

²⁵ Source: The International Development Research Centre - Managing the Essence of Life - Local farmers building water harvesting structures in Aarsal, Lebanon. Icarda. Profile: Bassam Jaber from Lebanon, By Yehia El Gammal

²⁶ Source: Assessment of the role of the private sector in the development and management of water supply in selected ESCWA member Countries General, E/ESCWA/SDPD/2003/14, 3 October 2003, Original: English Ch. VII. Public-Private Partnership Experience in Lebanon.

	<p>management of the water supply.</p> <p>This Law encourages implicitly the regional water authorities to manage their establishment on commercial basis and to be ready to deal in the future with the private sector. The nature and the level of private public partnership could be defined accordingly to the needs, to the improvement of requested services and by taking into account the socio-economic situation. The Law 228 issued on May 31st 2000 aimed to support the restructuring of the water sector by regulating privatisation activities and defining their conditions and applications.²⁷</p> <p>In their final version, these laws comprise the following new aspects:²⁸</p> <p>With regard to the Ministry:</p> <ul style="list-style-type: none"> • The powers of the Ministry of Energy and Water are brought down to the elaboration of the National Water Policy and the National Master Plan with all what this includes in terms of database, water preservation and protection etc., besides the study and implementation of large-scale Irrigation Projects which go beyond the range of action of the Offices, other projects falling within the jurisdiction of Public Water Institutions. • Control shall be reduced to the minimum (central inspection only). The Public Service Commission can only intervene a posteriori again. • Integrated Management is expressly mentioned and the new Offices are forced to manage drinking water and wastewater as well as irrigation water. <p>With regard to the new Public Water Institutions</p> <ul style="list-style-type: none"> • The 21 existing Offices are merged and grouped into 4 new Institutions. They are responsible for water projects within their respective areas, for their necessary investments, their studies within the framework of the Master Plan laid down by the Ministry of Resources, for their implementation and, finally, for their operation, maintenance, cost recovery and renewal. • They function according to their own regulations and are subject to approval by the Parent Ministry. The said regulations shall be approved in the Council of Ministers. It implies that the said Offices may allow themselves the necessary flexibility in their regulations to be able to operate on commercial basis. • An independent audit shall be appointed to control the accounts. • Recruitment shall depend only on real needs of the new Offices and shall no longer come under the Public Service Commission in this field. • A Performance Evaluation Commission shall be set up within the Ministry of Resources to prepare the supervision work especially with regard to valuation and monitoring of the functioning of the Offices. • The Business Plan, prepared by the Offices, shall be updated annually and have the prior approval of the Ministry. • Finally, the Chairman of the Board of Directors shall at the same time be the Executive General Director of the Institution and this will help to facilitate work and avoid any conflict between the Board of Directors and the executive power (General Director) within the Institution etc.
<p>Law No. 401, enacted on 5 June 2003</p>	<p>In February 2003 it was approved public participation in the management of the Tripoli Water Authority, the main objective being defined as “the conclusion of a service and management contract with a private contractor to strengthen the Tripoli Water Authority”.²⁹</p>

²⁷ Source: S. Catafago, Restructuring water sector in Lebanon, Litani River Authority facing the challenges of good water governance.

²⁸ Source: "Water Demand Management Forum - Water Valuation - The Case of Lebanon - Valuation of Domestic Water - Bassam Jaber - Ministry of Energy and Water Beirut, Lebanon – June 2002, Water Tariffs in Lebanon"

²⁹ Source: Assessment of the role of the private sector in the development and management of water supply in selected ESCWA member Countries General, E/ESCWA/SDPD/2003/14, 3 October 2003, Original: English Ch. VII. Public-Private Partnership Experience in Lebanon.

5. WATER SECTOR STRATEGY

6. WATER ASSESSMENT

6.1. Water Resources

Lebanon is in a relatively fortunate hydrological position. It is estimated that the yearly precipitation generates an average yearly flow of 8,600 million cubic meter (Mm³), giving rise to 40 major streams and rivers (including 17 perennial rivers) and more than 2,000 springs. Despite this seemingly abundant resource, Lebanon will experience a water deficit within 10-15 years, unless sound and radical water management policies are developed and implemented.³⁰

- **Unaccounted for Water**

It has been estimated that approximately 60 % of all distribution systems are in need of rehabilitation. Furthermore, unaccounted-for water losses amount to more than 50 % for the country as a whole.³¹

- **UNESCO water assessment 2000**³²

Total internal renewable water resources: 4.80 (km³/Year)

- Groundwater Produced internally: 3.20 (km³/Year)
- Surface Water produced internally: 4.10 (km³/Year)
- Overlap, Surface and groundwater: 2.50 (km³/Year)
- Water resources total renewable: 4.41(km³/Year)
- Water resources total renewable per capita: 1,261 (m³/capita Year)

It is difficult to estimate current levels of domestic water supply. Several sources indicate that the target capacity is 160 litres per day per person. Actual delivery is presumably much lower, as low as 64 litres per day in some areas, due to high system and distribution losses (Jaber, 1999). Therefore, in addition to investing in production and treatment measures, the GoL is increasingly focusing on reducing system losses (which can reach 50 % of total supply) and improving distribution.³³

6.2. Water Supply

Although water supply coverage is estimated at close 90 % in the main cities, the water is of poor quality and the service unreliable (WB 2001). This may be attributed to the fact the few utilities have standby pumps and generators to maintain water supply distribution in the event of power failure (ESCWA 1999, A. Geadah, 2002). Furthermore, Lebanon's public water supplies are often polluted, while water distribution systems are poorly designed and undersized, and consequently will be unable to sustain the additional load that will be generated by growth in demand (World Bank 1998).³⁴

Rate of population served by Public drinking water Networks: 95%

- Urban Population Served: %
- Rural Population Served: %

- **Service Coverage**³⁵

Estimated Rate of population with access to improved drinking water:

- Urban: 100% (est.2002)
- Rural: 100% (est. 2002) (85% through household connection)

³⁰ Source: Lebanon State of the Environment Report 2001 - Ministry of Environment/LEDO - Water

³¹ Source: Assessment of the role of the private sector in the development and management of water supply in selected ESCWA member Countries General, E/ESCWA/SDPD/2003/14, 3 October 2003, Original: English Ch. VII. Public-Private Partnership Experience in Lebanon.

³² Source: UNESCO - World Water Assessment Program- THE UN WORLD WATER DEVELOPMENT REPORT Water for People, Water for Life - Part II. A look at the Worlds freshwater resources - The Natural Water Cycle

³³ Source: Lebanon State of the Environment Report 2001- Ministry of Environment/LEDO - Water

³⁴ Source: Assessment of the role of the private sector in the development and management of water supply in selected ESCWA member Countries General, E/ESCWA/SDPD/2003/14, 3 October 2003, Original: English Ch. VII. Public-Private Partnership Experience in Lebanon.

³⁵ Source: WHO / UNICEF, Joint Monitoring Programme for Water Supply and Sanitation Coverage Estimates, Improved Drinking Water, Updated 2004, Lebanon

TABLE 30. WATER COVERAGE IN MAJOR CITIES IN LEBANON

City	Population	Coverage ratio (per cent)		Annual water demand
		Water	Sewerage	
Greater Beirut	1 300 000	90	80	178
Tripoli El-Mina and suburbs	487 000	90	80	66.6
Zahle and suburbs	86 000	90	40	11.78
Saida and suburbs	167 000	90	80	22.87
Zgharta	35 000	90	80	4.79
Sour and suburbs	102 000	90	60	13.97
Nabatiye	42 000	90	60	5.75
Baalbeck and suburbs	99 255	90	50	13.59
Bcharreh	35 000	90	60	4.79
Jbeil	24 000	90	10	3.29
Jounieh and district	117 000	90	80	16.02
Chhime	24 000	90	50	3.29

Source: CDR.

- **Service Continuity**

Although most dwellings in urban areas (90 per cent) and in some rural areas (up to 80 per cent) are connected to public water supply systems (see table 30), service to subscribers is unreliable. Discrepancies in connection to water supply networks and effective water supply are due mainly to common supply interruptions throughout the country.³⁶

6.3. Sanitation and Sewage

- **Service Coverage:**

According to the CAS census of Buildings and Establishments (1996-97), about 37 % of the nearly half-a-million buildings in Lebanon were connected to a sewer network. The remaining buildings (62 %) either use cesspools and septic tanks or simply release raw sewage directly into the environment, including rivers and streams, dry river beds, and underground (through dry wells). Since 1997, extensive wastewater works have been achieved, which has presumably improved the wastewater collection capacity. The current extent of buildings connected to sewer networks is not known, but presumably higher than 1996-97 levels.³⁷

- **Wastewater Treatment**

Average Waste Water Treatment costs: 0.80 dollars per cubic meters³⁸

- **Treatment Plants**

³⁶ Source: Assessment of the role of the private sector in the development and management of water supply in selected ESCWA member Countries General, E/ESCWA/SDPD/2003/14, 3 October 2003, Original: English Ch. VII. Public-Private Partnership Experience in Lebanon.

³⁷ Source: Lebanon State of the Environment Report 2001- Ministry of Environment/LEDO – Waste Water, Chapter 15

³⁸ Source: Assessment of the role of the private sector in the development and management of water supply in selected ESCWA member Countries General, E/ESCWA/SDPD/2003/14, 3 October 2003, Original: English Ch. VII. Public-Private Partnership Experience in Lebanon – ESCWA 2001b.

Table 15.1
Current Status of Wastewater Treatment Plants

Caza	Location/Name	Implementation Status		
		Under Execution	Under Preparation	No Funding Secured
Akkar	Jebraïal			X
	Abdeh			X
	Michmich		X	
Minieh-Dinnieh	Bakhoun		X	
Tripoli	Tripoli		X	
Becharre	Becharre			X
	Hasroun			X
Koura	Amioun			X
Batroun	Chikka	X		
	Batroun	X		
Jbeil	Jbeil	X		
	Kartaba		X	
Kesrouane	Khanchara			X
	Harajel		X	
	Kesrouane/Tabarja			X
Metn	Dora			X
Aley	Ghadir			X
Chouf	Chouf coastal area	X		
	Mazraat el Chouf		X	
South	Saida	X		
	Sour			X
Hermel	Hermel		X	
Baalbeck	Laboue		X	
	Yammouneh		X	
	Baalbeck	X		
Zahle	Zahle		X	
	Aanjar		X	
West Bekaa	Jib Jinnine/Deir Tahrîch		X	
	Karoun		X	
	Sohmor/Yohmor		X	
Hasbaya	Hasbaya		X	
Nabatiyeh	Jbaa		X	
	Nabatiyeh	X		
Bint Jbeil	Shakra		X	
	Bint Jbeil		X	

Source: Adapted from CDR, 2001

7. FINANCE AND INVESTMENT

7.1. Investments

Between January 1, 1992 and December 31, 2000, CDR awarded 129 contracts worth a total of US\$409.2 million in the water supply sector (CDR, 2001). Per March 2001, 60 % of the awarded projects were completed.³⁹

More than 95 % of the total contract value are capital costs, almost four percent are technical assistance contracts and less than one percent are operation and maintenance contracts.⁴⁰

Under the National Emergency and Rehabilitation Program I (NERP), the water supply networks of 19 water boards were rehabilitated and/or upgraded, including at least eight treatment plants, about 280 pumping stations, reservoirs and distribution systems.⁴¹

As per March 2001, 16 water supply projects were under execution and 13 others were under preparation.⁴²

Financing: Since 1992, \$500 million has been spent to improve water supply, another \$670 million has been requested for this purpose. In addition, \$520 million has been requested for dams and water transport facilities and \$735 million for wastewater treatment.⁴³

7.2. Budget appropriation for 10-Year plan

In the wake of the projected water shortages that Lebanon will face within the next couple of decades, the MEW has initiated several programs to better manage Lebanon's water resources through the formulation of a 10-year plan for the years 2000 till 2009 for water and wastewater management (currently divided into two 5-year plans). This is a first step towards proper, sustainable, and comprehensive water management. This proposed plan has five main components, four of which deal with water issues. The fifth component relates to electric infrastructure. Evidently the largest share was allocated to procuring additional water resource.⁴⁴

Table 8. 14
Budget Appropriation for 10-Year Plan.

<i>Component of 10-Year Plan</i>	<i>Budget Allocation (%)</i>
Procurement of additional exploitable water resources	66.7
Potable water supply projects	15.7
Irrigation schemes and wastewater plans	9.8
Assessment of river basins & their protection from pollution and flooding	5.1
Electric infrastructure	2.7
Total budget	US\$ 850 Million
Per capita equivalent total budget (assuming a population of 4 million)	212.5

Source: MoEW, 10-Year Plan

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³⁹ Source: Lebanon State of the Environment Report 2001- Ministry of Environment/LEDO - Water

⁴⁰ Source: Lebanon State of the Environment Report 2001- Ministry of Environment/LEDO - Water

⁴¹ Source: Lebanon State of the Environment Report 2001- Ministry of Environment/LEDO - Water

⁴² Source: Lebanon State of the Environment Report 2001- Ministry of Environment/LEDO - Water

⁴³ Source: country Profile Report Lebanon – Johannesburg Summit 2002 – United Nations

⁴⁴ Source: Lebanon State of the Environment Report 2001- Ministry of Environment/LEDO - Water

⁴⁵ Source: Lebanon State of the Environment Report 2001- Ministry of Environment/LEDO - Water

8. TARIFFS

Tariffs are more geared to the social rather than the commercial aspect, especially as they are fixed according to the quantity to which the user has subscribed; moreover, they follow a horizontal curve where the tariff does not link expenses with the quantity consumed.

Wastewater treatment is charged separately. The user just pays a municipal tax “on pavements and sewage”, which represents 1.5% of the rent value of the apartment he occupies. The figure obtained is trivial compared to the costs of wastewater installations and would be worse when wastewater treatment stations would be completed and become operational.

It is the responsibility of the Water Authorities to fix the water price. This price covers the maintenance and renewal costs of the existing network and equipments, but it does not take into account the initial or future investment paying -off costs for the extension of the network and the resources.⁴⁶

Like other countries in the region, Lebanon is trying to restrain rising demand by introducing a "user pay" principle that discourages waste and over-use of water.⁴⁷

Law 221 empowers regional water authorities to set and collect water tariffs for domestic and agricultural use.⁴⁸

Subscription fees for domestic water supply vary among water boards. During the year 2001, tariffs ranged from LBP 65,000 per year (e.g., Dinniyeh, Bsharre) to LBP 231,000 per year (e.g., Metn and Beirut) for a 1-m³/day gauge subscription.⁴⁹

Differences are partly due to water availability and distribution costs as gravity distribution is cheapest, while distribution by pumping is far more expensive. In Beirut and the Metn area, where water tariffs are highest, water is conveyed long distances and/or pumped from deep wells. In Bsharre and Dinniyeh, where water tariffs are lowest, water is available from springs and delivered by gravity. Table 8.13 presents the evolution of water tariffs between 1996 and 2000 for the Beirut and Dinniyeh water boards.⁵⁰

Table 8.13
Evolution of Water Tariffs Between 1996 and 2000 for Select Regions
(in Thousand LBP for an Annual Subscription of 1m³/day)

Region	Year					% Increase (1996-2000)
	1996	1997	1998	1999	2000	
Akkar	100,000	100,000	134,100	134,000	160,100	60
Baalbeck-Hermel	110,000	132,000	132,000	132,000	132,000	20
Barouk	110,000	110,000	121,000	152,000	152,000	38
Beirut	158,400	158,400	182,160	200,500	230,500	46
Bsharre	65,000	65,000	65,000	65,000	65,000	0
Dinniyeh	75,000	75,000	75,000	75,000	75,000	0
Metn	127,100	152,800	180,600	210,100	231,100	82
Saida	99,000	115,000	147,000	148,000	148,000	49
Tripoli	132,000	132,000	132,000	132,000	165,000	25

Source: Data compiled and supplied to ECODIT by Jaber B, MoEW

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Most households incur additional expenses to meet their water consumption.⁵²

Assuming households with a 1-m³/day gauge subscription actually receive and consume this amount of water per day, such households would be paying the equivalent of US\$ 0.12/m³ to US\$ 0.42/m³ of water. In

⁴⁶ Source: EMWIS WEB, Institutions – Water Authorities

⁴⁷ Source: The International Development Research Centre - Managing the Essence of Life - Local farmers building water harvesting structures in Aarsal, Lebanon. Icarda. Profile: Bassam Jaber from Lebanon, By Yehia El Gammal

⁴⁸ Source: Lebanon State of the Environment Report 2001- Ministry of Environment/LEDO - Water

⁴⁹ Source: Water Tariffs include a 10 percent municipal surcharge

⁵⁰ Source: Lebanon State of the Environment Report 2001- Ministry of Environment/LEDO - Water

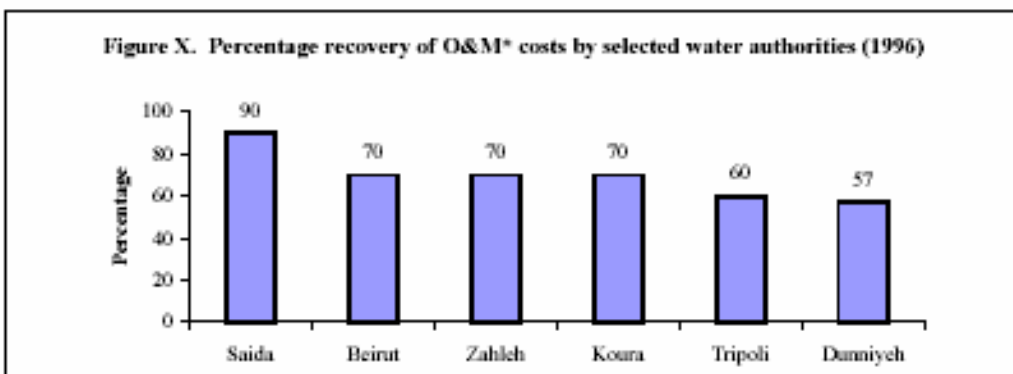
⁵¹ Source: Lebanon State of the Environment Report 2001- Ministry of Environment/LEDO - Water

⁵² Source: Lebanon State of the Environment Report 2001- Ministry of Environment/LEDO - Water

fact, most households end up paying much more on a per cubic meter basis for two main reasons: (1) frequent and periodic water shortages (some areas report receiving water only a few hours per day) and (2) need to buy water from private haulers, at costs typically around US\$5 to US\$10 per cubic meter. In particular, secondary residences pay the full annual water subscription tariff even though they use the residence only a few weeks or months during the year. In short, as long as water meters are not installed, the price of water will remain unaffected by actual water consumption and people will pay the same amount regardless of the quantity of water actually delivered/ consumed. Users have no incentives to conserve water and waste is much more common.⁵³

8.1. Percentage Recovery of O&M costs by selected water authorities

In view of the growing demand for water, the cost of expanding the network and the need for improved service, private-sector participation was clearly essential, as the government lacked financial, managerial and technical capacity to respond adequately. It was generally acknowledged, however that the sector was financially viable. Most utilities recovered 50 to 70 per cent of their operation and maintenance costs.⁵⁴



Source: WB 1998.

* Operation and maintenance costs exclusive of depreciation.

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⁵³ Source: Lebanon State of the Environment Report 2001- Ministry of Environment/LEDO - Water

⁵⁴ Source: Assessment of the role of the private sector in the development and management of water supply in selected ESCWA member Countries General, E/ESCWA/SDPD/2003/14, 3 October 2003, Original: English Ch. VII. Public-Private Partnership Experience in Lebanon.

⁵⁵ Source: Assessment of the role of the private sector in the development and management of water supply in selected ESCWA member Countries General, E/ESCWA/SDPD/2003/14, 3 October 2003, Original: English Ch. VII. Public-Private Partnership Experience in Lebanon.

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