

Local Water Supply, Sanitation and Sewage

Country Report

Jordan

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MEDA Water



SOGESID
SOCIETÀ GESTIONE IMPIANTI IDRICI



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Table of Contents

1.	SUMMARY.....	4
2.	GENERAL CONTEXT.....	7
2.1.	Geography.....	7
2.2.	Climate	7
2.3.	Social Context	7
3.	INSTITUTIONAL SETTINGS	8
3.1.	History	8
3.2.	Institutions	8
3.3.	Private sector involvement	9
3.3.1.	Example of MWI privatisation activities	9
3.3.2.	Public / Private Water Utilities	10
3.3.3.	Disi Amman Water Conveyor (BOT) - Disi-Mudawwara project	10
3.3.4.	OMS Project Micro PSP	11
4.	LEGAL FRAMEWORK.....	12
5.	WATER STRATEGY.....	14
5.1.	Water Strategy	14
5.2.	Water Sector Improvement Program (GAWSIP).	14
6.	WATER ASSESSMENT	15
6.1.	Water Resources.....	15
6.2.	Water Supply.....	16
6.3.	Sanitation and Sewage	16
6.3.1.	Cost of wastewater services.....	18
6.4.	Performance 2003- Water Utility LEMA	18
6.5.	Performance 2003 – Northern Governorates Water Administration (NGWA)	19
7.	FINANCE AND INVESTMENT	21
8.	TARIFFS	22
8.1.1.	Differentiated Pricing	23
8.1.2.	Metering.....	23
9.	REFERENCES.....	24

1. SUMMARY

LOCAL WATER SUPPLY, SANITATION AND SEWAGE JORDAN
GENERAL CONTEXT
<ul style="list-style-type: none"> • Average Rainfall: mm 92.5/ ¹yr • Area: 92,300 sq km • Population (2003): 5.480.000² • Population Growth rate (2003): 2,8%³ • Population Distribution: <ul style="list-style-type: none"> • Urban: approximately 70% • Rural: • Currency: 1 Jordanian Dinar (JOD) =1000 fils = 1,185 Euro (EUR)
INSTITUTIONAL SETTINGS
<p>Policy Setting: Ministry of Water and Irrigation (MWI)</p> <p>Executive / Regulatory Level: Water Authority of Jordan (WAJ)</p> <p>User Level: Responsibility delegated from centrally controlled Water Authority (WAJ) to local regional units, with some of them operating on commercial basis with private sector involvement through Management Contracts. See background below for your information:</p> <p>WAJ is considered the responsible body for the operation of supply systems for most of the governorates within the kingdom, namely the Middle (Madaba, Balqa and Zarqa) and Southern Governorates in Karak, Tafilah and Ma'an.</p> <p>Elsewhere in Jordan, several forms of Private Sector Participation (PSP) options and utility corporatisation were introduced. Such as the management contract for Greater Amman, where water and wastewater utilities and services are operated by a private company (LEMA), which is administered and managed by WAJ Program Management Unit (PMU) mandated to regulate the water supply and wastewater utilities under private management.</p> <p>While in the Northern Governorates (Irbid, Ajloun, Jarash and Mafraq) which are presently administered by WAJ Northern Governorates Administration (NGWA), it is envisaged that a public company for water and wastewater services will be established after three years.</p> <p>Private Sector Involvement:</p> <ul style="list-style-type: none"> • LEMA- A four year management contract for water and wastewater services in the Amman Governorate was awarded to LEMA 1999. Contract was extended till 2006. Water Assets remain public property. • NGWA - Northern Governorates Water Administration, presently considered as part of WAJ. It is however envisaged that a public company for water and wastewater services will be established in 2008. Management contract to private operator under process. • AWC: Aqaba Water Company established in August of 2004 as a limited liability company operated as a financially viable, self-sustaining entity that would run under commercial principles.
WATER STRATEGY
<p>Water Strategy adopted in 1997</p> <ul style="list-style-type: none"> • Develop new resources • Reduction of Water Losses • Demand management through tariffs and information campaigns <p>Private Sector Involvement through management contracts and concessions.</p>

¹ Source: Ministry of Water and Irrigation. National Water Master Plan Brochure 2004. Water Resources in Jordan.

² Source: The Hashemite Kingdom of Jordan Department of Statistics (DOS) - 2003

³ Source: The Hashemite Kingdom of Jordan Department of Statistics (DOS) - 2003

<p>WATER RESOURCES⁴</p> <ul style="list-style-type: none"> Total Water Resources: (2004)⁵ <ul style="list-style-type: none"> Renewable Groundwater: 422 Mm³ Fossil Groundwater: 79 Mm³ Surface Water: 279 Mm³ Treated Waste Water: 86 Mm³ Total Potable Water Supplied (Bulkwater): 235 Mm³ (2001) Potable Water Supplied per capita: 125 l/cap/day (2001) Unaccounted for water (UFW): The average UFW for water in Municipal networks was estimated to 52% (2001) <ul style="list-style-type: none"> LEMA: 49%⁶ (2001) Northern Governorates Water Administration have an UFW of 48.0 % (2002)⁷
<p>WATER SUPPLY</p> <ul style="list-style-type: none"> Rate of population served by Public drinking water Networks: % <ul style="list-style-type: none"> Urban Population Served: 94.5 % Rural Population Served: 85.5 % Potable Water Consumed per capita: 86 l/cap/day (2001) Total Billed: 114 Mm³ (2001) Service Level: Supply is not reliable and continuous. Average supply is 2 days a week.⁸ Approximately 95% of the population in Jordan had access to improved water resources 2002.⁹
<p>SANITATION & SEWAGE</p> <ul style="list-style-type: none"> Rate of population with access to improved sanitation, 2002¹⁰ <ul style="list-style-type: none"> Urban: 94.5% Rural: 85.5% Rate of population connected through a sewerage connection, 2002¹¹ <ul style="list-style-type: none"> Urban: 73 % Rural: 6% <p>Wastewater</p> <ul style="list-style-type: none"> Total Volume of Wastewater: effluent quantity was 73,5 Mm³ (2002) Total rate of Wastewater undergoing treatment: 243 000 m³/day (2002) Waste water undergoing treatment: 89 Mm³ (2002) <ul style="list-style-type: none"> Physical: 0% Biological: 94% Advanced: 6%
<p>INVESTMENTS IN WATER SECTOR</p> <ul style="list-style-type: none"> Total Investment in the water sector: Jordan's future investment program amount to approx. 2.50 billion US\$¹² Investment in Water Supply: 44.6% Investment Sanitation and Wastewater treatment: 16.9% Private Sector Part of Total Investment: 38.5% <p>Innovative solutions for financing investments:</p>

⁴ Source: The Ministry of Water and Irrigation – Water Demand Management Forum - “Wastewater Reuse”, The Hashemite Kingdom of Jordan, March 2002. Fayez Bataineh, Mohamed Najjar, Saleh Malkawai

⁵ Ministry of Water and Irrigation, 2004

⁶ National Water Master Plan Directorate.

⁷ Source: NGWA - Northern Governorates Water Administration - Web Page

⁸ Seawater and Brackish Water Desalination in the Middle East, North Africa and Central Asia - Annex 3 - Final Report - Jordan, 2004, The World Bank

⁹ Four countries report on water as a human right – Jordan, Egypt, Lebanon and Palestine, Heinrich Boell, 2004

¹⁰ Source: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation Coverage, Access to Improved Sanitation, Estimates Jordan, Updated 2004

¹¹ Source: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation Coverage, Access to Improved Sanitation, Estimates Jordan, Updated 2004

TARIFFS

Tariff system:

- Water tariffs: Should recover O&M costs and part of the capital cost as well.
- Progressive Block Tariffs. The first 20m³ of consumed water (quarterly) is subsidized. Intention is that subsidized water is covered by higher tariffs for larger volumes.
- Rate of O&M costs covered through tariffs:
- Medium Tariff for 1m³ of water: Minimum charge is 2JD per quarter for consumption up to 20m³.
- Metering: Water meters are read once each quarter of a year.

Responsible institution for setting tariffs:

- Ministry of Water and Irrigation

2. GENERAL CONTEXT

2.1. Geography¹³

The Hashemite Kingdom of Jordan lies to the east of the Jordan river and is divided into twelve governorates: Amman, Zarqa, Irbid, Mafrqa, Jarash, Madaba, Aqaba, Ajloun, Balqa, Karak, Tafileh and Ma'an. The Jordan River and the Rift Valley, an extension of the Great Rift Valley in Africa, follow the western border of the country. The Jordan River flows from the north through the Sea of Galilee (Lake Tiberias) and empties into the Dead Sea. (FAO Forestry)

2.2. Climate

The climate in Jordan is characterized by a long, dry, hot summer, a rainy winter and an autumn drier-than the spring. The temperature increases going south, with the exception of some southern highlands. Rainfall varies considerably with location, due mainly to the country's topography. Annual rainfall ranges between 50 mm in the eastern and southern desert regions to 650 mm in the northern highlands. Over 90% of the country receives less than 200 mm of rainfall per year. (1997 – FAO Country Pages)

2.3. Social Context

Due to the last years of conflicts in the region, Jordan has experienced an un-proportional increase in the population. This fact has contributed to complicate the water situation even more and the emergency to find alternative ways to satisfy water demand.

The population in 2003¹⁴

5.480.000

Population Growth rate 2003¹⁵ :

2.8%

Urban Population:

Around 70% of Jordan's people now live in urban areas, with nomads and semi-nomads comprising around 5% of the population.¹⁶

¹³ Source: FAO Country Pages, 1997

¹⁴ Source: The Hashemite Kingdom of Jordan Department of Statistics (DOS) - 2003

¹⁵ Source: The Hashemite Kingdom of Jordan Department of Statistics (DOS) - 2003

¹⁶ Source: Seawater and Brackish Water Desalination in the Middle East, North Africa and Central Asia - Annex 3 - Final Report - Jordan, 2004, The World Bank

3. INSTITUTIONAL SETTINGS

3.1. History

Jordan started providing water and wastewater services some 50 years ago. These services were managed by the local Municipalities. When the demand for water started to increase and become more costly, the government formed several organizations to manage this vital sector, beginning with Amman Water and Sewerage Authority (AWSA) in the Amman Municipality, Jordan Valley Authority (JVA) in the Jordan Valley and Water Supply Corporation (WSC) in the rest of the Kingdom.¹⁷

Municipal water use was made more systematic with the creation of the Water Authority of Jordan (WAJ), by merging AWSA, WSC and some departments in 1985.

This autonomous authority was responsible for the public water supply, wastewater services and related projects as well as for the overall water resources planning and monitoring, construction, operations and maintenance. In 1992 WAJ was merged with the Jordan Valley Authority (JVA) to form the Ministry of Water and Irrigation (MWI) in response to Jordan's recognition for the need of a more integrated approach to the National water management.¹⁸

3.2. Institutions

Level	Institution	Comment
<i>Policy Setting Level</i>	Ministry of Water and Irrigation (MWI)	In the Water Utility Policy the Ministry of Water and Irrigation (MWI) is defined as the governmental organization responsible for: <ul style="list-style-type: none"> • policy formulation • decision making • water pricing • national water planning • water resources monitoring and studies • integrating Water Information Systems
<i>Executive Level</i>	Water Authority of Jordan (WAJ)	The Water Authority of Jordan (WAJ) is responsible for the construction, operation and maintenance of domestic water supply and sewage facilities and for the management of the national water resources. It formulates water supply and sewage policies and prepares water resources management plans. It also overlooks the water supply and sewage services. The Water Utility Policy, 1997 implies a separation between bulkwater supply and retail delivery functions. According to this policy, retail functions is to be transferred from WAJ to private sector and commercial enterprises through management contracts. The role of WAJ is to supervise and monitor these management contracts and the private providers.

¹⁷ Source: Engineer Abdelrahman Omari, INCO-MED Amman 2004 Conference – “Private Sector Participation in the Management of Water and Wastewater Services - LEMA Experience. June 2004

¹⁸ Source: Engineer Abdelrahman Omari, INCO-MED Amman 2004 Conference – “Private Sector Participation in the Management of Water and Wastewater Services - LEMA Experience. June 2004

<i>User Level</i>	Greater Amman: Management Contract with LEMA - Private Operator	LEMA started on 31/07/1999 with a 4 year management contract which was extended to the end of 2004 and recently till 2006. LEMA activities are supervised by the Programme Management Unit (PMU) of WAJ, which is mandated to regulate the water supply and wastewater utilities under private management.
	Northern Governorates Water Administration (NGWA)	Created 2001 and comprise the 4 Northern Governorates of Irbid, Jerash, Ajloun and Mafraq (including North Badia) - Operations Management Support (OMS). The intention was to assign the management of NGWA to a private operator through a management contract. Presently it is envisaged that a public company for water and wastewater services will be established in 2008
	The Jordan Valley Authority (JVA)	The New Mission of the Jordan Valley Authority is to develop, manage, and protect water and land resources and their supporting infrastructure in the Jordan Valley, in an environmentally and economically sound manner the Jordanian national interest. The Authority will create partnerships with the private sector where appropriate. JVA will also implement projects stemming from regional agreements on water and development on behalf of the Jordanian government.
<i>Other Institutions</i>	The Ministry of Health	Responsible body for ensuring the water quality of drinking water supplies including the source areas (e.g. springs) and the distribution network. Quality assurance of wastewater systems,
	Ministry of Environment)	Responsible for monitoring water resources quality and for protecting these resources from pollution. Environmental research and education, supervising treated wastewater reuse, quality assurance for solid waste disposal to prevent water pollution

3.3. Private sector involvement

Water Strategy state the following regarding private sector participation:

- *“The role of the private sector shall be expanded. Management contracts, concessions and other forms of private sector participation in water utilities shall be considered and adopted as appropriate.*
- *The concepts of BOT/BOO shall be entertained, and the impact of such concepts on the consumers shall be continually assessed, and negative impacts mitigated.*
- *The private sector role in irrigated agriculture shall also be encouraged and expanded. Emphasis shall be placed on the social benefits in conjunction with the private investments.”¹⁹*

3.3.1. Example of MWI privatisation activities

- LEMA. A four year management contract between WAJ and a consortium led by a French Company started 1999, for all water and wastewater related services in Amman Governorate.
- MWI has been considering other options for the largest wastewater treatment plant in Jordan (Al-Samra) as a Build-Operate-Transfer (BOT) system with a consortium led by an international company.
- Underway to award a management contract to a consortium led by international company for the water service operations of the four Northern Governorates of Jordan (Irbid, Ajloun, Jerash and Mafraq), expected to start the implementation in the first half of 2004.
- MWI is studying the establishment of public companies for other water and wastewater services in other areas throughout the Kingdom.

Another important PSP contract is the BOT contract for the Asamra WWTP near Zarka. The total investment will be some JOD 154 million, of which around 50% will be funded by a USAID grant. This project is won by

¹⁹ Source: Jordan Water Strategy, MWI, Web Page

Ondeo, Morganti (a US Engineering-Contractor), and Inflico / Degremont. The daily capacity of this plant will be some 267,000m³/day, and can be expanded up to 530,000m³/day.

3.3.2. Public / Private Water Utilities

- **LEMA**²⁰

In 1999 the Jordanian government, in order to manage the continued rapid increase in water demand and the relatively high water cost, and to solve technical and management problems associated with the water and wastewater services, decided to contract the management of water and wastewater services in Amman to LEMA. LEMA acts as the principal and semi-autonomous entity to provide the professional, technical, and administrative services and support required for proper management of the implementation of the Greater Amman Water Sector Improvement Program (GAWSIP).

LEMA started on 31/07/1999 with a 4 year management contract which was extended to the end of 2004 and later till 2006. It works under the supervision of the Programme Management Unit (PMU) of WAJ, within the Ministry of Water and Irrigation and gets paid a basic management fee, (of some USD 2 million annually) but can earn a bonus in the form of a small share of any improvement in the cash position of the water utility. 95% of the improved profitability goes to WAJ to reinvest in the sector.

LEMA's role is as an operator. The water assets (pipes, pumping stations buildings etc) are transferred to the operator to manage but still belong to the Government. Capital investment projects and the development of new water resources remains the responsibility of WAJ.

The O&M budget within the project is paid by WAJ, while at the same time an operational investment programme is funded by the World Bank, aimed at investing in small replacements, small pumps, vehicles, computers etc. The operational investment fund is USD 55 million.²¹

For more information regarding LEMA see below under "Water Assessment".

- **Northern Governorates Water Administration (NGWA)**

NGWA covers a service area of more than 28.945 km². It started to operate under its new structure January 1st 2002. It provides water supply and wastewater disposal services to more than 1.4 million people living in a predominantly rural area. For more information regarding NGWA see below under "Water Assessment".

3.3.3. Disi Amman Water Conveyor (BOT) - Disi-Mudawwara project²²

The main objective of the Disi-Mudawwara to Amman Water Conveyance System project is to supply additional sustainable potable water to the Greater Amman Area to satisfy water demands and eliminate deficits. The estimated base capital costs of the project are US \$600 million.

The construction of a pipeline from the Disi aquifer on Jordan's border with Saudi Arabia, to Amman, a distance of some 325 km aims to provide the city with around 100 million m³/year of water. 65 new boreholes will be created together with well field collectors, a 12.000m³ collector reservoir, a main pumping station and associated balancing tanks, a 16.600m³ regulating tank, a series of flow control stations, chlorination units and a terminal reservoir in Amman. Substantial operation and maintenance facilities will also be provided, including roadways, communication and telemetry services and electrical supply lines to the well field pumping stations.

The project has a tentative five-year timetable and funding is another multi-donor effort. Libya will pay for around half the cost of the pipeline, sponsor equity accounts for 15% of total construction costs, the World Bank will support the project through partial risk guarantee and the balance comes from private investors and external funding agencies.

²⁰ Source: Private Sector Participation in the Management of Water and Wastewater Services - Lema Experience. June 2004. Engineer Abdelraham Omari. INCO-MED Amman 2004 Conference

²¹ Source: - Seawater and Brackish Water Desalination in the Middle East, North Africa and Central Asia - Annex 3 - Final Report - Jordan, 2004, The World Bank

²² Source: The World Bank - Seawater and Brackish Water Desalination in the Middle East, North Africa and Central Asia - Annex 3 - Final Report - Jordan, 2004

3.3.4. OMS Project Micro PSP²³

One problem with private management contracts, lease contracts or concessions is the long process to set up these type of collaborations. Many different interests have to be taken into account and projects often depend on external funding. In order to bridge the long periods of definition and implementation for these type of projects, the OMS project together with WAJ, tested another way of involving the private sector, referred to as a Micro PSP. Instead of waiting until a private company can take over all operations, maintenance and management activities of water services, selected business activities can be identified and outsourced separately to local private companies. In this way, specific problems in the regular business processes of WAJ can be addressed with higher flexibility and less dependency on external funding. The projects are faster and short-term improvements on the cash flow are reached almost immediate. While management contracts, lease contracts or concessions can take up to 4 years to implement, Micro PSP instead within 1-2 years.

Examples of Business processes that can be outsourced separately, mentioned by the OMS project, are meter reading, billing & revenue collection, leakage repair service, customer surveys, GIS based information management and sewerage connections management.

Practical Experiences made in the OMS project are

- outsourcing of billing and revenue collection in WAJ Aqaba
- outsourcing of billing and revenue collection in Al Koura
- a comprehensive Subscriber Survey (CSS)

Possible risks with Micro PSP are

- the lack of reliable business data for an effective project identification
- local private companies that does not possess the needed expertise to manage these type of services

²³ Source: The Operations Management Support - OMS Project Web Page

4. LEGAL FRAMEWORK

In 1997 the Jordan Government adopted a Water Strategy to address the challenges facing the water sector. This strategy has then been supplemented by four different policies: ²⁴

- Ground Water Management Policy
- Irrigation Water Policy
- Water Utility Policy
- Wastewater Management Policy

Law	Argument	Comment
<i>Water Authority Law No. 18 of 1988</i>	Water is a Public Resource	<i>"All water resources within the boundaries of the Kingdom, whether they are surface or groundwater, river or internal seas, are considered to be state-owned property and shall not be used or transported except in compliance with law"</i>
<i>Ground Water Management Policy</i>	Rules regarding water resource exploration, monitoring and water protection to guarantee sustainability.	Approved by the Council of Ministers in 1998. It addresses allocation priorities (giving priority to municipal and industrial uses together with tourism and educational institute) resource development , control and regulation of water resources, installation of water meters and legal actions that can be taken towards violators. The Private sector participation to desalinate brackish ground water is also defined in this policy.
<i>Water Utility Policy</i>	Addresses most of the issues related to the water utilities	Approved 1997. It states the rules regarding decentralisation, increase public participation, service pricing, securing availability, affordability and cost recovery, human resources development and service level improvements. The Policy also list priority areas to improve water distribution systems and services; <ul style="list-style-type: none"> • Frequency of water supply delivery to customers. • Response time for repair of network leakages, etc. • Reduction in waiting times for water and wastewater connections. • Reduction in waiting times for resolution of customer complaints. • Priority to rehabilitate water system. • Investments to rehabilitate the water networks as all water resources are practically developed • Increase wastewater reuse. • Develop other non-conventional water resources like brackish water desalination. • This is a means of enhancing water availability by managing both supply and demand. • Educate users as a tool for managing water demand.
<i>Wastewater Management Policy</i>	Management of wastewaters as a water resource including development, management, collection and treatment, reuse, and standards and regulations.	Approved by the Council of Ministers in 1998. <ul style="list-style-type: none"> • Wastewater Resources are going to be managed as much as possible with a basin approach, • Irrigation use has highest priority; • Industries will be encouraged to recycle part of their wastewater. • Reuse of Treated Effluent and Sludge (e.g., priority to agricultural use for unrestricted irrigation; blending of treated wastewater with fresh water to improve quality, where possible; treated effluent quality monitored; study potential storage of excess treated wastewater in reservoirs or ground water aquifers).

²⁴ Source: Water Policies – Irrigation Water – Jordan focal Point SEMIDE / EMWIS Web Page

		<ul style="list-style-type: none"> • Pricing (e.g., fees shall cover at least operation and maintenance costs; treated effluent priced and sold to cover delivery costs).
<i>Irrigation Water Policy</i>	Rules for irrigation water	Approved in 1998. Addresses issues related to agricultural use, resource management, technology transfer, water quality and efficiency.

5. WATER STRATEGY

5.1. Water Strategy

The Ministry of Water & Irrigation (MWI) in its drive to increase efficiency of service delivery to its customers embarked on an ambitious restructuring programme for the Jordanian Water Sector resulting in a Water Strategy approved by the Council of Ministers 1997.

One of the first steps taken was the decentralization and management of services, including the delegation of responsibilities from the centrally controlled Water Authority of Jordan (WAJ) to regional units operating on commercial basis with Private Sector Participation (PSP).

5.2. Water Sector Improvement Program (GAWSIP).

This program consists of three main components:

- The administration of the Management Contract for the provision of water and wastewater services in Greater Amman that was signed between WAJ and the private operator LEMA.
- The multi-donor financed Capital Investment program for restructuring and rehabilitation of the water supply system of Greater Amman.
- Transfer of knowledge gained within the scope of above listed activities - the lessons learnt - to other areas of the country (Governorate Support), in particular with regard to the involvement of the private sector in the provision of public services.

6. WATER ASSESSMENT

6.1. Water Resources

With a per capita availability of 160 m³ /year of fresh water, Jordan is ranked among the world's ten most water scarce countries.²⁵

Total Water Supplied (Bulkwater) to Household & Municipal purposes (million m ³) supplied WAJ	235 Mm ³ (2000)
Total Water Supplied (Bulkwater) to Household & Municipal purposes (million m ³)	258,8 Mm ³ (2003) ²⁶ <ul style="list-style-type: none"> • Middle Region: 167,3 Mm³ • North Region: 56,2 Mm³ • South Region: 35,3 Mm³
Average per capita share of drinking water supply	125 liters/cap/day (2001)
Average per capita share domestic and irrigation water	397 liters/cap/day (2004)
The allocation of the water uses among the main water user groups, (2004)	<ul style="list-style-type: none"> • Agriculture: 63 % • Domestic users: 32 % • Industry : 5 %
The quantity of the renewable water resources that can be economically exploited	780 Mm ³ per year, including 505 Mm ³ from surface water and 275 Mm ³ from groundwater aquifers. An additional amount of about 80 Mm ³ is at the moment taken from non-renewable groundwater aquifers.
Abstraction Rate	In order to close the gap between supply and demand the groundwater aquifers have been heavily over abstracted. Although the annual safe yield of the aquifers is 275 Mm ³ , the abstraction rate has been 422 Mm ³ in 2004.
The real water consumption is far below the figures listed in the table below.	The average Unaccounted For Water (UFW) was estimated to be 52% of the quantity supplied in 2001.

The water demand is expected to grow exponentially both due to the population increase and due to the demands of the agricultural and industrial sectors.

²⁵ Source: UNESCO World Water Development Report, 2003

²⁶ Source: The Hashemite Kingdom of Jordan, Department of Statistics (DOS), Energy and Water Statistics, 2003

6.2. Water Supply

The table below shows the Water Sources and Water Uses in 2004.

SOURCE	USES IN MCM				Total Uses
	Municipal	Industrial	Irrigation	Livestock	
1. Surface Water	66.128	3.637	202.744	6.000	278.509
- Jordan Rift Valley	49.389	3.329	125.308	0.000	178.026
- Springs	16.739	0.308	37.00	0.000	54.047
- Base & Flood	0.000	0.000	40.436	6.000	46.436
2. Groundwater	214.732	34.102	251.452	0.802	501.088
-Renewable	192.288	29.113	199.475	0.802	421.678
-Non renewable	22.444	4.989	51.977	0.000	79.41
3. Treated Wastewater	0.000	0.000	86.422	0.000	86.422
-Registered	0.000	0.000	65.422	0.000	65.422
-Not Registered	0.000	0.000	21.000	0.000	21.000
Total	280.860	37.739	540.618	6.802	866.019

Source: MWI 2004

- **Water Service Coverage:**

Approximately 95% of the population in Jordan had access to improved water resources 2002.²⁷

- **Service Continuity:**

Supply is not reliable and continuous. Average supply is 2 days a week.²⁸ About 95 % of the households are connected to the public network of WAJ, however, Jordan has been implementing a rationing program since 1988. During the summer period, the households receive water once or twice a week for 12 to 24 hours. This obliges the households to invest in water tanks. Supply is not reliable and continuous. With an average of supply 2 days a week, the demand for bottled water has increased rapidly.²⁹

- **Water Supply Connections:**

The number of network connections was around 695 906 that served 4.69 million covering 94 % of the housing units in Jordan.³⁰

6.3. Sanitation and Sewage

Rate of population with access to improved sanitation, 2002³¹

- Urban: 94.5%
- Rural: 85.5%

Rate of population connected through a sewerage connection, 2002³²

- Urban: 73 %
- Rural: 6%

²⁷ Four countries report on water as a human right – Jordan, Egypt, Lebanon and Palestine, Heinrich Boell, 2004

²⁸ Seawater and Brackish Water Desalination in the Middle East, North Africa and Central Asia - Annex 3 - Final Report - Jordan, 2004, The World Bank

²⁹ Water Demand Management Forum - "Water Valuation" - Valuation for water for domestic use - The Ministry of Water and Irrigation, June 2002

³⁰ Source: The Ministry of Water and Irrigation – Water Demand Management Forum - "Wastewater Reuse", The Hashemite Kingdom of Jordan, March 2002.

³¹ Source: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation Coverage, Access to Improved Sanitation, Estimates Jordan, Updated 2004

³² Source: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation Coverage, Access to Improved Sanitation, Estimates Jordan, Updated 2004

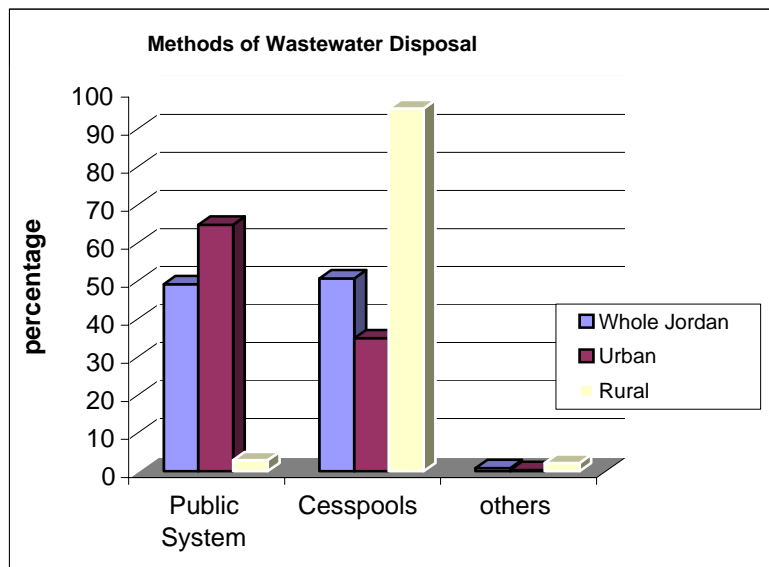
Existing Treatment Plants and Wastewater Production³³

- Presently, there are 19 treatment plants serving most of the major cities and towns in the country. Fourteen facilities are conventional mechanical treatment plants and 5 employ waste stabilization ponds (2002). Most of the waste stabilisation ponds are however being replaced with conventional mechanical treatment.
- The effluent quantity was 72.5 Mm³ per year in 2000.

Plant	Inflow m ³ /d	BOD5 g/m ³	Population	Average L/C/d
Abu Nuseir	1977	544	22,000	90
Aqaba	9329	410	74,000	126
As-Samra	178903	710	1,840,000	97
Baqa	11768	965	170,000	69
Fuhis	1523	679	21,000	73
Irbid (Central)	7121	1,144	89,000	80
Jerash (East)	2913	1,219	50,000	58
Karak	1509	708	21,400	70
Kufranja	2223	1,195	51,300	43
Ma'an	2155	688	27,000	80
Madaba	4362	1,045	63,900	68
Mafrq	1805	696	39,200	46
Ramtha	2301	852	57,500	40
Salt	3898	764	65,300	60
Tafielah	741	671	24,400	30
Wadi Arab	7055	836	165,000	43
Wadi Essir	1917	658	10,000	192
Wadi Hassan	423	860	17,000	25
Wadi Mousa	866	701	20,000	43
Total	242,788		2,828,000	70

Source: WAJ Wastewater Sector Report 2002

³³ Source: The Ministry of Water and Irrigation – Water Demand Management Forum - “Wastewater Reuse”, The Hashemite Kingdom of Jordan, March 2002. Fayez Bataineh, Mohamed Najjar, Saleh Malkawai

Methods for Waster Water Disposal:

Source: WAJ Wastewater Sector Report 2000

6.3.1. Cost of wastewater services

The direct cost of providing wastewater services is relatively high in Jordan and the reuse and discharge criteria impose even higher costs. The average cost for providing wastewater collection and treatment per household was calculated over last 20 years revealed a cost of JD 380 versus JD 500 for the construction of a cesspool or percolation pit for every household.

6.4. Performance 2003- Water Utility LEMA³⁴

- Service Area consists of whole Amman and its suburbs.
- The population served under the contract are approximately 2 Million
- LEMA supplies water to around 330.000 Subscribers, 15 % commercial
- Quantity of Water produced each year is about 102 million m³
- The average operational cost³⁵ of water in 2003: 275 fils/m³.
- About 60% of LEMA subscribers are consuming water at a price less than the average operational cost.
- Population Served to Staff; Decreased from 1 employee for 1,125 consumers to 1 employee for 1,600 consumers (2003).
- LEMA has improved the profitability of the utility from a loss of about US\$3.6m at the start, to a profit of US\$8.4 in 2003.

Activities to improve Customer Services

- LEMA has updated the customer data that has not only led to improved billing but also supplies more accurate data for the new Customer Information System.
- Old and defective meters have been replaced to improve confidence in the accuracy of metering.
- Meter reading routes using GIS to improve meter reading efficiency.
- Hand-held Units & Door Step Billing LEMA is using hand held computers for taking meter readings.
- More Customer Service Offices
- LEMA Role in the Community - LEMA has developed and used various means of communicating with customers and members of the public

³⁴ Source: Engineer Abdelraham Omari, INCO-MED Amman 2004 Conference – “Private Sector Participation in the Management of Water and Wastewater Services - LEMA Experience. June 2004

³⁵ Operational cost is the cost of production, distribution and other operational costs, but does not include the capital or construction costs.)

6.5. Performance 2003 – Northern Governorates Water Administration (NGWA)³⁶

Some figures for the Northern Governorates Water Administration on the governorate level:

Figure	Status	NGWA	Irbid	Jerash	Ajloun	Mafraq
Population in Millions *	2002	1.48	0.95	0.16	0.12	0.25
Number of Subscribers	2004-09-30	190,554	126,859	19,378	13,935	30,382
Network Length in km	2004-01-31	5,465	2913	615	460	1,478
Net Water Production in Mm ³	2002	55.9	31.3	4.1	3.5	17.0
Net Billed Water in Mm ³	2002	28.0	18.1	2.7	2.1	5.1
Authorized/unauthorized unmetered consumption(estimated)in mcm	2002	1.06	0.6	0.08	0.04	0.34
UFW Average in %	2002	48.0	40.3	33.0	38.4	67.9
Staff	2004-12-31	1777	1078	183	170	346
Revenue in Mio. JOD	2003	11.778	6.699	0.965	0.686	3.428
Operational Costs in Mio. JOD	2003	16.088	8.199	1.770	1.542	4.577
Deficit in Mio. JOD	2003	-4.310	-1.500	-0.805	-0.856	-1.149

³⁶Source: Key Data - North Governorate Water Administration (NGWA) Web Page

Key Data regarding wastewater operations NGWA³⁷

The Table below shows some key data regarding wastewater operations in NGWA.

Wastewater Treatment Plants	Unit	NGWA Total	Irbid	Bani Ubaid	Ramtha	Ajloun	Jerash	Mafraq
In operation	nos.	7	2	1	1	1	1	1
Capacity	m ³ /day	26,5	15	1,3	3,2	2,2	2,8	2
Average treated Quantity in 2003	m ³ /day	25,97	14,7	1274	3,136	2,156	2,744	1,96
Total treated Quantity in 2003	Mm ³ /a	9.478	5.366	0,3229167	1.145	0,546528	1	0,496528
House Connections (Status 09/2003)	nos.	31,099	15,212	3,462	2,395	2,993	3,823	3,214
Length of Network	km	885	417	90	103	93	122	60

³⁷Source: North Governorate Water Administration (NGWA) - Web Page – Key Data

7. FINANCE AND INVESTMENT

Jordan, as water limited country, has invested heavily in the development of water management infrastructure to increase the production and supply of fresh water.³⁸

Estimates of needed investments³⁹

Recognizing the importance of water for all aspects of economic and social development, the Ministry has compiled a Water Sector Planning & Associated Investment Program for the years 2002 – 2011 that recognizes the needs for both immediate and long-term solutions.

Jordan's future investment program for the water sector consists of about 53 projects (5 Technical Assistance, 10 Private Sector, 18 Water Supply and 20 Wastewater Projects) with a value of approximately US \$2.50 billion. These planned projects, extending until the year 2011, will yield an additional 400 Mm³/year of water.

The Ministry is currently in the process of updating the Investment Program to cover the years 2005 – 2015.

LEMA is assisting WAJ in the implementation of the network restructuring capital investment program of 250 M USD.⁴⁰

³⁸ Source: Ministry of Water and Irrigation MWI Web - The Plan for the response to the Water Challenge

³⁹ Source: Ministry of Water and Irrigation MWI Web - The Plan for the response to the Water Challenge

⁴⁰ Source: Engineer Abdelraham Omari, INCO-MED Amman 2004 Conference – "Private Sector Participation in the Management of Water and Wastewater Services - LEMA Experience. June 2004

8. TARIFFS

From a financial perspective the Water Strategy clearly state that Jordan should move towards full cost recovery taking into consideration the affordability of water.

- *“Recovery of the cost of utilities and the provision of services shall be targeted. Recovery of operation and maintenance cost shall be a standard practice. Capital cost recovery shall be carefully approached. The role of water tariffs shall be considered as a tool to attract private investment in water projects.*
- *Cost recovery shall be linked to the average per capita share of the GDP and its level. It all also be connected to the cost of living and the family basket of consumption. However, profitable undertakings in industry, tourism, commerce and agriculture shall be made to pay the fair water cost.*
- *Until the cost recovery is full, and the national savings become at levels capable of domestic financing of development projects, project financing will depend on concessionary loans, private borrowing and/or BOO and BOT arrangements.”⁴¹*

The Water Utility Policy state that:

- *“In view of the increasing marginal cost of supplying water in Jordan, the growing demand for water, the low rate of cost recovery and in line with the policy towards private sector participation and privatisation, the Ministry will set the municipal water and wastewater charges at a level which will cover at least the cost of operation and maintenance”.*
- *“The water tariffs mechanism shall be considered as a tool to promote cost recovery of water projects.”*
- *“Until the cost recovery is full, and the national savings reach levels capable of domestic financing of development projects, project financing will depend on concessionary loans, private borrowing and/or BOO and BOT arrangements”.*
- *“Moreover the ministry will attempt to set differential prices for water based on water quality, end users, and social and economic impact of prices on the various sectors and regions in the country.”*

The MWI is committed to set municipal water and wastewater tariffs at a level, which at a minimum will recover the costs of operation and maintenance. Recovery of capital costs will also become part of on-going pricing actions. The MWI will attempt to establish differential pricing for different qualities of water and end uses. Profitable markets (e.g., tourism, industry) will be expected to pay the full, fair water cost.⁴²

⁴¹ Source: Jordan's Water Strategy, Ministry of Water and Irrigation, 1997

⁴² Source: The Plan for the response to the Water Challenger - Ministry of Water and Irrigation, MWI Web -

Tariffs for municipal water and wastewater in Jordan

Block (m ³)	Meter Charge (JD)	Total bill value of water (JD)	Total bill value of wastewater (JD)
Amman Water & Wastewater Tariff Residential (Bill Calculation)			
0 - 20	0.300	2.000	0.600
21 - 40	0.300	0.14(q)-0.8	0.04 (q) - 0.2
41 - 130	0.300	0.006556(q ²)- 0.12224(q)	0.002889(q ²)-0.07556(q)
131 - more	0.300	0.85(q)	0.35(q)
Other Governorates & Jordan Valley Tariff Residential (Bill Calculation)			
0 - 20	0.300	1.300	0.600
21 - 40	0.300	0.075(q)-0.2	0.035(q) - 0.1
41 - 185	0.300	0.004517(q ²)- 0.10568(q)	0.001828(q ²) - 0.038103(q)
> 185	0.300	0.85(q)	0.35(q)
Commercial Rates			
6 – more	0.300	1 (q)	0.5(q)
Water for Agricultural Use			
Treated Wastewater			10 fils / m ³
Freshwater:			
0000-2500			08 fils / m ³
2500-3500			15 fils / m ³
3500-4500			20 fils / m ³
> 4500			35 fils / m ³

Source: Water Authority of Jordan, 2002. q = Quantity, 1 JD = 1,000 Fils = \$ 1.412

- These tariffs show a fixed tariff for a 0-20 m³ block, with a minimum of 20 m³ and an increasing price for each additional consumed cubic meter of municipal water.
- The above has been recently revised. And a total of 5 JD (about 7 dollars) has been added to every quarterly billed amounts to increase O&M cost recovery.

Cost of Wastewater Services : The direct cost of providing waste water services is relatively high in Jordan. The reuse and discharge criteria impose even higher costs.

8.1.1. Differentiated Pricing

The minimum amount of municipal water assumed necessary for a household is 20m³ / quarter. The applied tariffs show a fixed tariff for a 0-20m³ block as 20m³ of water are assumed to be the minimum water consumption of a household per quarter of a year in Jordan⁴³.

Medium Tariff for 1m³ of water: Minimum charge is JD 2 total per quarter for consumption up to 20m³. Average tariff of domestic water is 0.36 JD per cubic meter.

8.1.2. Metering

Water meters are read once each quarter of a year. The volume of water and wastewater for which the customer is invoiced is based on the total of measured consumption between two readings and estimated consumption from the last reading to the due date of the invoice. Ministry of finance responsible for collecting sanitation and sewage tax.

⁴³ WAJ, tariffs of 1997 - Ministry of Water and Irrigation

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