

Local Water Supply, Sanitation and Sewage

Country Report

Israel

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MEDA Water



SOGESID
SOCIETÀ GESTIONE IMPIANTI IDRICI



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1. SUMMARY

LOCAL WATER SUPPLY, SANITATION AND SEWAGE ISRAEL

GENERAL CONTEXT

- Average Rainfall: from 25 mm in the south, up to 950 mm /yr
- Area: 20,770 sq km¹
- Population: 6,276,883 (2005)²
- Population Growth rate: 1,2% (2005)³
- Population Distribution:
 - Urban: 91.4%⁴
 - Rural: 8.6%⁵
- Currency: Israel New Shekels - 1 ILS = 0.182517 EUR

INSTITUTIONAL SETTINGS

Policy Setting: Minister of National Infrastructure
Executive / Regulatory Level: Water Commission

User Level:

70 % of water is supplied by Government Water Supply Company – Mekorot Water Company Ltd. Responsible for wholesale supply of water to urban communities, industries and agricultural users. 30% is supplied through privately-owned facilities (water associations). Municipalities are responsible for the direct connection to end users.

Private Sector Involvement:

- No private water utilities. Private involvement in works and extension activities.

WATER STRATEGY

WATER RESOURCES

- Total Water Resources(2001): 1,960 Mm³ (around 1,600 Mm³is potable)
 - Freshwater: 1,500 Mm³
 - Effluents: 290 Mm³
 - Floodwater and saline water: 170 Mm³
- No. of consumers:
- Total Potable Water Supplied (Bulkwater):688 Mm³/ (2002, to domestic sector)⁶
- Potable Water Supplied per capita: 250 litres/capita/day⁷
- Unaccounted for water (UFW):

WATER SUPPLY

- Rate of population served by Public drinking water Networks: 100%
 - Urban:
 - Rural:
- Potable Water Consumed per capita: l/cap/day
- Total Billed Consumption: m³
- Service Continuity:
- Estimated Rate of population with access to improved drinking water: 100% (2002)
 - Urban:

¹ The World Factbook – Israel – CIA Web - 2005

² The World Factbook – Israel – CIA Web - 2005

³ The World Factbook – Israel – CIA Web - 2005

⁴ Source: Central Bureau of Statistics - http://www1.cbs.gov.il/reader/cw_usr_view_SHTML?ID=629;in Hebrew

⁵ Source: Central Bureau of Statistics http://www1.cbs.gov.il/reader/cw_usr_view_SHTML?ID=629; in Hebrew

⁶ Source: Israel Ministry of the Environment - Environmental Topics - Water Sources

⁷ Source: Israel Ministry of National Infrastructures – The Water Sector - Water Production and Consumption

- Rural:

SANITATION & SEWAGE

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

Wastewater

- Total Volume of Wastewater: 450 Mm³
- Total rate of Wastewater: 95% is collected
- Waste water undergoing treatment: 290 Mm³
 - Physical: %
 - Biological: %
 - Advanced: %
- Rate of population served by waste water treatment plants
 - Urban:
 - Rural:

Estimated Rate of population with access to improved sanitation:

- Urban: 91%
- Rural: 70%

INVESTMENTS IN WATER SECTOR

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

TARIFFS

Tariff system:

- Water tariffs: Increasing block tariff,
- Medium Tariff for 1m³ of water:
- Operation & Maintenance cost covered by tariffs:
- Metering: Bills are based on meter readings

Responsible institution for setting tariffs:

- Water prices are fixed by a parliamentary committee based on recommendations made by the Ministry of Finance and the Water Commission. ⁸

⁸ Source: Israel Ministry of National Infrastructures – The Water Sector - Financing and Pricing of Water

2. GENERAL CONTEXT

2.1. Geography

Israel is located at the eastern end of the Mediterranean Sea. It is bounded on the north by Lebanon, on the northeast by Syria, on the east and southeast by Jordan, on the southwest by Egypt, and on the west by the Mediterranean Sea.

2.2. Climate

Israel has a Mediterranean climate characterized by long, hot, dry summers and short, cool, rainy winters, as modified locally by altitude and latitude. The climate is determined by Israel's location between the subtropical aridity characteristic of Egypt and the subtropical humidity of the Levant or eastern Mediterranean. January is the coldest month, with temperatures from 5 C to 10 C, and August is the hottest month at 18 C to 38 C. About 70 percent of the average rainfall in the country falls between November and March; June through August are often rainless. Rainfall is unevenly distributed, decreasing sharply as one moves southward. In the extreme south, rainfall averages less than 100 mm annually; in the north, average annual rainfall is 1,128 mm. Rainfall varies from season to season and from year to year, particularly in the Negev Desert.

2.3. Social Context

- **Total Population:**

6,276,883 (July 2005 est.)⁹

note: includes about 187,000 Israeli settlers in the West Bank, about 20,000 in the Golan Heights, and fewer than 177,000 in East Jerusalem

- **Annual growth rate:**

1.2% (2005 est.)¹⁰

⁹ Source: The World Factbook – Israel – CIA Web - 2005

¹⁰ Source: The World Factbook – Israel – CIA Web - 2005

3. INSTITUTIONS

Several different authorities are responsible for water management.

On the ministerial level:

- Ministry of Health (drinking water quality and quality of effluents for irrigation),
- Ministry of Environment (prevention of pollution to water sources),
- Ministry of Finance (water pricing),
- Water Commission in the Ministry of National Infrastructures (water quantity, production and supply)
- Ministry of Agriculture (drainage authorities and agricultural use of water)
- Ministry of the Interior (water and sewage supply and treatment in local authorities).
- The Water Commission
- The Hydrological Service
- Ministry of the Environment
- Mekorot, Israel National Water Company

Level		Comment
Policy Setting	Minister of National Infrastructure	
	The Ministry of the Environment	<p>In December 1988, a Ministry of the Environment was established in Israel.¹¹</p> <p>The Minister of the Environment is authorized to protect water quality, to prevent water pollution, and to promulgate regulations on these issues¹²</p> <p>At the national level, the ministry is responsible for formulating an integrated and comprehensive national environmental policy and for developing specific strategies, standards and priorities for environmental protection and resource conservation.¹³</p>
Regulatory / Executive	Water Commission	<p>The Water Commission is responsible for implementing the Government's policy, ensuring sufficient water supply of the required quality and reliability, while conserving and preserving water resources, including:</p> <ul style="list-style-type: none"> • Allocating water for the domestic agricultural and industrial sectors, at the appropriate levels of quality, reliability and service, in accordance with national development plans. • Planning, constructing and operating the water supply systems and delivery facilities necessary for meeting national demand. • Advising the Government about water tariffs based on water quality and sector of consumption. • Ensuring the reliable supply of all the potable water increasing needs, including through seawater desalination. • Monitoring and evaluating water resources. • Creating public awareness about water conservation needs. <p>The Administration for Wastewater Infrastructure within the Water Commission is responsible for coordinating activities between the Government ministries, local municipalities and operational bodies. These activities pertain to all aspects of construction of waste treatment facilities and their disposal and reuse in accordance with criteria determined by the Ministry of the Environment and the Ministry of Health.¹⁴</p>
User Level	Mekorot Water Company Ltd	Mekorot Water Company Ltd. is a Government-owned company and, as Israel's national water company, responsible for managing

¹¹ Source: Israel Ministry of the Environment – About Us

¹² Source: Israel Ministry of the Environment - Laws & regulations - Water

¹³ Source: Israel Ministry of the Environment – About Us

¹⁴ Source: Israel Ministry of National Infrastructures – Wastewater Treatment and Reuse - Background

		<p>the country's water resources, developing new sources and ensuring regular delivery of water to all localities for all purposes. Mekorot is in charge of the wholesale supply of water to urban communities, industries and agricultural users. Mekorot produces and supplies about two-thirds of the total amount of water used in Israel. The remainder is provided through privately-owned facilities.¹⁵</p> <p>In July 2003, under a plan to change Mekorot's structure, three new Government Companies were established: The new Government Company Mekorot Holdings Ltd. serves as a parent company that will manage and determine policy for three subsidiaries:</p> <ul style="list-style-type: none"> • Mekorot Water Ltd., • Mekorot National Carrier Ltd. • Mekorot Initiatives and Development Ltd. <p>In addition, within three years an operations company will be established that will be a subsidiary of Mekorot.¹⁶</p> <p>Mekorot Water Ltd. will be the national water authority in accordance with the Water Law, and will be responsible for the operation of the water system, including production, water treatment, operation of the waste water treatment plants, and the establishment and renewal of water enterprises.¹⁷</p> <p>Mekorot Initiatives and Development Ltd. will manage and activate various projects in the water field and cooperate with private entrepreneurs in various projects. Mekorot National Carrier Ltd. will manage and develop the national Carrier system and its branches together with the State and the Mekorot Water Holding company.¹⁸</p>
	Municipalities	Responsible for the local infrastructure to supply water and waste water treatment.
	The Ministry of Health	The Ministry of Health is responsible for the quality of drinking water within the framework of Regulations Concerning the Sanitary Quality of Drinking Water under the Public Health Ordinance. A 1995 regulation establishes conditions for drilling water wells including quality assessment based on microbial and chemical tests and establishment of three protection zones around drinking water wells in which different types of activities are prohibited. Israel's amended regulations (2000) on drinking water, within the framework of the Public Health Ordinance, set limits on concentrations of various chemicals and microbes in drinking water and specify requirements for sampling and testing. ¹⁹

¹⁵ Source: Israel Ministry of National Infrastructures – The Water Sector - Water Supply companies- Mekorot Water Supply Co.

¹⁶ Exhibit D to the State of Israel's Annual Report on Form 18-K to the U.S. Securities and Exchange Commission for the fiscal year ended December 31, 2003, June 28, 2004

¹⁷ Exhibit D to the State of Israel's Annual Report on Form 18-K to the U.S. Securities and Exchange Commission for the fiscal year ended December 31, 2003, June 28, 2004

¹⁸ Exhibit D to the State of Israel's Annual Report on Form 18-K to the U.S. Securities and Exchange Commission for the fiscal year ended December 31, 2003, June 28, 2004

¹⁹ Source: Israel Ministry of the Environment - Environmental Topics - Water and Rivers

3.1. Private Sector Participation

Israel has started restructuring the water industry to open the sector to private investments.

So far private participation has been concentrated on a desalinated water BOT plant with a consortium that includes Vivendi. Other than that, private participation has been limited to construction of desalination facilities.²⁰

- **Ashkelon BOT**

In 2002 started the construction of Ashkelon desalination plant, a 25-year BOT under which the consortium will be responsible for constructing and managing the plant and will sell the water produced to the government over a set period of years at a guaranteed price.

- **Lead Contractors and Suppliers²¹**

VID comprises IDE Technologies (50% and lead partner), Vivendi Water (25%) and Dankner-Ellern Infrastructure (25%). OTID, a joint venture company formed by IDE and OTV (Vivendi Group) are responsible for the engineering, procurement and construction (EPC) contract. Operation and maintenance will be performed by a Vivendi Group, IDE and Ellern joint venture. The reverse osmosis membrane elements are being provided by the Dow Chemical Company and the temperature and pressure transmitters by Smar. Product water distribution will be by Mekorot.²²

The general view is that market forces are the most suitable tools for the efficient use of water in the urban and agricultural sectors. Accordingly, water prices that are largely determined by the Government, based on the existing block rate and the non-tradable allocation, are to be converted into a market negotiating system. This change would eventually lead to a greater involvement of the private sector in the production and supply of water to the various consumers.²³

Further, it is anticipated that rational water use will be achieved by the creation of new water suppliers, carved out of Mekorot. The role of Mekorot will be limited to the operation of the National Carrier, while the regional water supply schemes will be privatised and defined as public service under the supervision of the Water Commissioner.²⁴

Shares allocation attracting dividends and voting rights will replace existing water rights. The shareholders will control the performance of the new regional corporations, while external efficiency will be achieved by the market forces and the value of the shares in the financial market. To balance between supply and demand, a shadow price reflecting the water value at the source will be added, thus rendering the historic allocations ineffective. Regulation orders will still be maintained in case of emergency, such as during a series of drought years. Subsidized prices, if available, will be fully indicated and calculated reflecting their portion of the full costs and budgeted for each specific system.²⁵

²⁰ Water in Middle East and North Africa (MENA) – trends in investment and privatisation. David Hall, Kate Bayliss and Emanuele Lobina. October 2002, Public Services International Research Unit (PSIRU)

²¹ Source: Water Technology Net - Israel

²² Source: Israel Ministry of National Infrastructures – The Water Sector - Privatization and Institutional Reform

²³ Source: Israel Ministry of National Infrastructures – The Water Sector - Privatization and Institutional Reform

²⁴ Source: Israel Ministry of National Infrastructures – The Water Sector - Privatization and Institutional Reform

²⁵ Source: Israel Ministry of National Infrastructures – The Water Sector - Privatization and Institutional Reform

4. LEGAL FRAMEWORK

Law	Comment
Water Law of 1959 ²⁶	<p>Water Resource Protection This law establishes the framework for the control and protection of Israel's water sources (under the responsibility of the Ministers of Agriculture and National Infrastructure and of the Water Commissioner) and includes water pollution prevention provisions (under the responsibility of the Minister of the Environment).</p> <p>The law states that all sources of water in Israel are public property and that every person is entitled to use water, as long as that use does not cause the salination or depletion of the water resources.</p> <p>In 1971, the law was amended to include prohibitions against direct or indirect water pollution, regardless of the state of the water beforehand. The Minister of the Environment is authorized to protect water quality, to prevent water pollution, and to promulgate regulations on these issues.</p> <p>In recent years, enforcement against polluters of Israel's water sources has significantly increased. Between the years 2001 - 2003, charges were pressed against 163 offenders and 102 sentences were handed down by the courts.</p> <p>The law sets fine levels, establishes personal liability, empowers courts to impose cleanup expenses on polluters or to undertake cleanups, and enables citizens to initiate legal proceedings against offenders.</p>
Local Authorities (Sewerage) Law, 1962	The Local Authorities Sewage Law of 1962 prescribes the rights and duties of local authorities in the design, construction and maintenance of sewage systems. This law requires each local authority to maintain its sewage system in proper condition. ²⁷
Model Local Authorities By-Law	Rules promulgated under the Public Health Ordinance in 1981 specify the treatment required for wastewater, and list the crops suitable for effluent irrigation in accordance with the treatment level. ²⁸

²⁶ Source: Israel Ministry of the Environment - Water Law, 1959

²⁷ Source: Israel Ministry of the Environment - Laws & regulations - Water

²⁸ Source: Israel Ministry of the Environment - Laws & regulations - Water

5. WATER STRATEGY

The urban water sector is expected to undergo a profound reform, stemming from the introduction of the new law of corporation, under which the municipalities are to transfer the management of the municipal water supply to private sources. The aim is to ensure that activities in the municipal water sector will be carried out through independent, profit-making enterprises.²⁹

- **Ministerial Economic and Social Committee decisions to reduce water demands and increase water supplies - July 2000 and in April 2001**

The Ministerial Economic and Social Committee, headed by the Prime Minister, took the following decisions (among others) in July 2000 and in April 2001 to reduce water demands and increase water supplies³⁰:

- To take steps to increase the efficiency of use and savings with the object of reaching additional savings of 200 MCM of fresh water per year for the next three years—half from municipal consumption and half from agricultural consumption;
- To establish plants for water desalination at a production capacity of 200 MCM with supply to start in 2004;
- To prepare a program for the desalination of brackish water at a scope of 50 MCM over the next three years;
- To remove obstacles to effluent reuse and to advance plans for upgrading effluent quality to allow maximum use of effluents in agriculture, industry, nature and landscape, without harming the environment and groundwater;
- To reclaim contaminated wells and increase production and transport capacity;
- To contract a private developer for the supply of water from the deep-water aquifer in Mishor Rotem at a rate of 30 MCM per year;
- To increase water tariffs in order to reduce water demand for municipal gardening, home gardening, the domestic sector and the agricultural sector;
- To promulgate regulations on water savings in the urban sector including water-saving devices, car washing, facilities for water recycling, cooling towers, etc;
- To continue the public information campaign on water conservation until 2003

²⁹ Source: Israel Ministry of National Infrastructures – The Water Sector - Privatization and Institutional Reform

³⁰ Source: Israel Ministry of the Environment - Environmental Topics - Government Decision on Water Management

6. WATER ASSESSMENT

6.1. Water Resources

Israel faces a severe problem of water deficit. Preservation of Israel's water resources is one of the major challenges confronting the country today. Israel entered the 21st century with one of its greatest water overdrafts ever. Today this cumulative deficit stands at some 1.5 Bm³, an amount equal to the annual consumption of the country, in comparison to the average annual replenishment rate of major aquifers. Moreover, water scarcity is exacerbated by the deteriorating quality of water resources due to demographic, industrial and agricultural pressures³¹

Since surface and groundwater sources can no longer meet the demand of the population and the economy, Israel is increasing its development and use of treated wastewater, brackish water, water harvesting and desalination while promoting water conservation and remediation of wells.³²

The total average annual potential of renewable water amounts to some 1,800 Mm³, of which about 95% is already exploited and used for domestic consumption and irrigation. About 80% of the water potential is in the north of the country and only 20% in the south.³³

The main sources of fresh water in Israel include Lake Kinneret (the Sea of Galilee), the coastal aquifer and the mountain (Yarkon-Taninim) aquifer. These water sources are supplemented by marginal sources, including effluents, floodwater and saline water, to meet consumption needs.

According to data provided by the Hydrological Service for 2001, the total quantity of water which is available to Israel is about 1,960 MCM as follows³⁴:

- 1,500 Mm³ – freshwater
- 290 Mm³ – effluents
- 170 Mm³ – floodwater and saline water.

Annual water availability is estimated at approximately 2,000 million cubic meters (Mm³) per year, of which about 1,600 MM³ is potable water and the rest is brackish and other marginal water sources.³⁵

After drawing on nearly all of its readily available water resources and promoting vigorous conservation programs, Israel has long made it a national mission to stretch existing sources by developing non-conventional water sources, while promoting conservation. These efforts have focused on the following³⁶:

- **Reclaimed Wastewater Effluents.**

Treated domestic effluents, estimated at 400 Mm³, form the largest water source awaiting intensive development. Currently, about 250 Mm³ of effluents, treated to varying degrees, are already utilized for irrigation, constituting about 65% of the generated wastewater. The rest is discharged into watercourses and the sea, for lack of treatment and reuse facilities.³⁷

- **Intercepted Runoff and Artificial Recharge.**

Although surface runoff is sporadic, several regional and local schemes have already been established. At present, approximately 40 Mm³ are intercepted, out of a potential of 135 Mm³/year of storm water.³⁸

- **Artificially-Induced Rainfall**

Cloud Seeding. Cloud seeding with silver iodide crystals has been practiced in Israel for last 30 years on a countrywide basis, using ground incinerators and aircraft.³⁹

³¹ Source: Israel Ministry of the Environment - Environmental Topics - Water and Rivers

³² Source: Israel Ministry of the Environment - Environmental Topics - Water Sources

³³ Source: Israel Ministry of National Infrastructures – The Water Sector - Water Resources and Water Availability

³⁴ Source: Israel Ministry of the Environment - Environmental Topics - Water Sources

³⁵ Source: Israel Ministry of National Infrastructures – The Water Sector Background

³⁶ Source: Israel Ministry of National Infrastructures – The Water Sector - Water Resources and Water Availability

³⁷ Source: Israel Ministry of National Infrastructures – The Water Sector - Water Resources and Water Availability

³⁸ Source: Israel Ministry of National Infrastructures – The Water Sector - Water Resources and Water Availability

³⁹ Source: Israel Ministry of National Infrastructures – The Water Sector - Water Resources and Water Availability

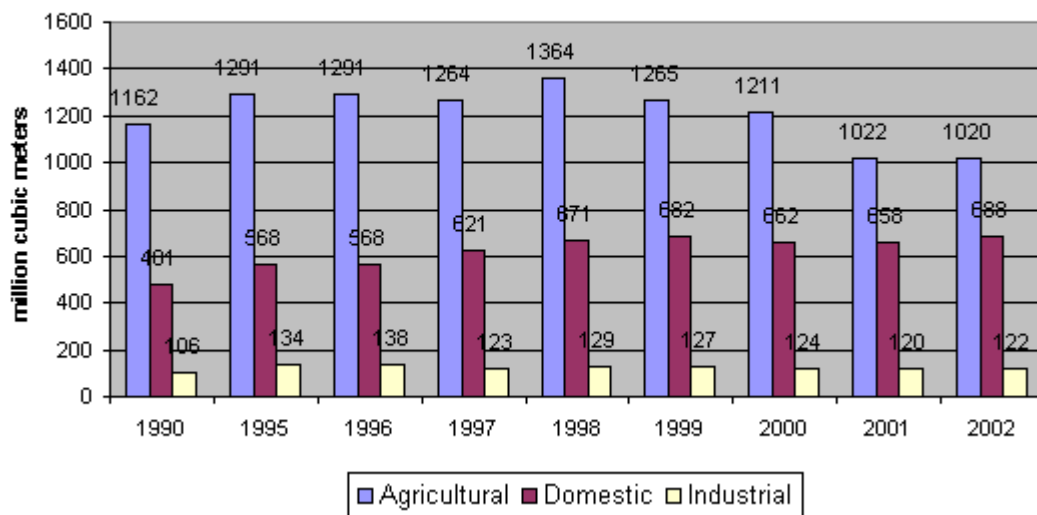
Annual water demand amounts to about 2100 Mm³/year, of which about one half is used for agriculture and the remainder is used by the urban and industrial sectors.⁴⁰

- **Desalination.**

Israel has many desalination facilities in operation today, and many small and medium desalination plants are used for processing brackish and seawater for domestic water supply in the Arava Valley and the Gulf of Eilat. The largest of these facilities produces 44,000 cum/day of water from brackish groundwater and seawater, thus meeting most of the drinking water requirements of the town of Eilat. Reverse osmosis has been adopted as the leading technique for brackish and seawater desalination. The first sea water desalination plant, with a capacity of 10,000 m³/day was commissioned in 1997 and other modules of various capacity are planned along the Red Sea and the Mediterranean Sea coast.⁴¹

- **No. of consumers:**
- **Unaccounted for Water**
- **Total Water Supplied:**
- **Potable Water Supplied per capita: l/cap/day**

Water Distribution by Purpose



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6.2. Water Supply

- **Service Coverage**

Approximately 70% of Israel's fresh water is distributed through Mekorot Water Co. Ltd., a State-owned company. The remaining 30% of Israel's fresh water is supplied by private water associations established by agricultural users and certain municipalities.⁴³

All Israeli settlements are served by public waterworks, supplying an average of about 250 litres/capita/day. Similarly, about 95% of the return flow is collected, about 80% is adequately treated, and in many cases, reused for irrigation (42%).⁴⁴

Currently, the urban sector consumes about 800 Mm³. The trend of consumption in the domestic sector is on the rise, reflecting the continuing increase in population and improved living standards of the Israeli

⁴⁰ Source: Israel Ministry of National Infrastructures – The Water Sector - Water Production and Consumption

⁴¹ Source: Israel Ministry of National Infrastructures – The Water Sector - Water Resources and Water Availability

⁴² Source: Israel Ministry of the Environment - Environmental Topics - Water Sources

⁴³ Source: Exhibit D to the State of Israel's Annual Report on Form 18-K to the U.S. Securities and Exchange Commission for the fiscal year ended December 31, 2003, dated as of June 28, 2004.

⁴⁴ Source: Israel Ministry of National Infrastructures – The Water Sector - Water Production and Consumption

population. The annual increase is about 20- 30 Mm³ per year, about 4%; it is assumed that consumption will reach 1.3 billion m³, by the year 2020.⁴⁵

Water allocations to domestic users are channelled through the Municipalities to the end users. The Municipalities have two functions, both as a consumer of bulk water and as a water supplier. Until 1995 also were subject to quota allocations.

Since 1995 the domestic uses has not been subject to allocation and the water use is regulated through a strict differential pricing mechanism instead.⁴⁶

Drinking water quality conforms with WHO standards and further improvements to meet prevailing European Union and United States standards are planned.⁴⁷

- **Service Continuity:**

6.3. Sanitation and Sewage

Wastewater treatment and disposal is generally dealt with by the health authorities who dictate the degree and criteria of treatment and discharge of effluents to water bodies according to public health standards. Current Israeli standards require biological treatment, which reduces the BOD level to 20 mg/l and SS to 30 mg/l.

Advanced treatment is required for appropriate disposal of effluents, in a manner not harmful to recipient water bodies. Treating wastewater to such a high standard is very costly and the Government has to assist the local governments, providing grants and soft loans amounting to more than US \$100 million per year.⁴⁸

Out of a total of 450 million cubic meters of sewage produced in Israel, about 96% is collected in central sewage systems and 64% of the effluents are reclaimed (290 Mm³).⁴⁹

Local authorities are responsible for the treatment of municipal sewage. In recent years new or upgraded intensive treatment plants were set up in municipalities throughout the country. The ultimate objective is to treat 100% of Israel's wastewater to a level enabling unrestricted irrigation in accordance with soil sensitivity and without risk to soil and water sources.⁵⁰

Some Facts and Figures⁵¹:

- Some 450 Mm³ of wastewater are produced in Israel per year
- Some 290 Mm³ of the effluents are reclaimed per year (about 64%)
- Some 4% of the wastewater is discharged to cesspools (19 Mm³)
- Some 96% of the waste is collected in central sewage systems
- Some 36% of the wastewater/effluents are discharged to the environment (some 160 Mm³)
- Some 37% of the wastewater is either untreated or inadequately treated (167 Mm³)
- Some 63% of the wastewater is adequately treated (about 283 Mm³)

- **Service Coverage:**

Rate of Population connected to public sanitation:

- Urban:
- Rural:

Estimated Rate of population with access to improved sanitation:

- Urban:
- Rural:

⁴⁵ Source: Israel Ministry of National Infrastructures – The Water Sector - Water Production and Consumption

⁴⁶ Source: Israel Ministry of Foreign Affairs Israel's Water Economy – Thinking of future generation – Israel's Water Economy

⁴⁷ Source: Israel Ministry of National Infrastructures – The Water Sector - Water Production and Consumption

⁴⁸ Source: Israel Ministry of National Infrastructures – Wastewater Treatment and Reuse - Background

⁴⁹ Source: Israel Ministry of the Environment - Environmental Topics - Wastewater

⁵⁰ Source: Israel Ministry of the Environment - Environmental Topics - Wastewater

⁵¹ Source: Israel Ministry of the Environment - Environmental Topics - Wastewater

- **Wastewater Treatment**

Because of the combination of severe water shortage, contamination of water resources, densely populated urban areas and intensive irrigation in agriculture, wastewater treatment and reuse are high on Israel's list of national priorities. In 2001, some 46% of the effluents produced in the country (200 MCM) complied with the standards set in regulations (20/30 BOD/SS), growing to 60% (256 MCM) in 2002 and reaching 63% (283 MCM) in 2003. More stringent standards have been proposed in light of the fact that in the medium to long range, most of the effluents will serve both for irrigation and for discharge into rivers.⁵²

Future development plans for the year 2020 indicate an increase in raw wastewater to about 700 MCM, of which about 570 MCM will be used.⁵³

6.3.1. Major Wastewater Treatment Plants

About a quarter of Israel's total wastewater (about 120 MCM) undergoes treatment in the Dan Region Wastewater Reclamation Project which produces high-quality effluents. The system consists of facilities for collection, treatment, groundwater recharge and reuse of municipal wastewater from the Tel Aviv metropolitan area. It is based on a modern biological-mechanical activated sludge plant with nitrogen removal (to a level of 10 - 20 mg/liter BOD and 15 - 30 mg/liter suspended solids). Following treatment, the effluents are recharged into the regional aquifer by means of spreading basins. After recharge, the reclaimed water is supplied for agricultural irrigation to the arid southern part of the country.⁵⁴

Haifa's recently upgraded wastewater treatment plant receives about 37 Mm³ of wastewater yearly from eight municipalities and additional local and regional councils, communities and industrial plants with a population of 700,000. Some 28 Mm³ of effluents are then piped 30 kilometers eastward to irrigation reservoirs that serve the Jezreel Valley where water quality further improves after a long retention time in the reservoirs. The Kishon Complex is Israel's second largest water reclamation system.⁵⁵

Some 23 Mm³ of wastewater are treated in Jerusalem's wastewater treatment plant - Jerusalem Soreq.⁵⁶

⁵² Source: Israel Ministry of the Environment - Environmental Topics - Wastewater Treatment

⁵³ Source: Israel Ministry of National Infrastructures – Wastewater Treatment and Reuse - Background

⁵⁴ Source: Israel Ministry of the Environment - Environmental Topics - Major Wastewater Treatment Plants

⁵⁵ Source: Israel Ministry of the Environment - Environmental Topics - Major Wastewater Treatment Plants

⁵⁶ Source: Israel Ministry of the Environment - Environmental Topics - Major Wastewater Treatment Plants

7. FINANCE AND INVESTMENT

The Israeli water system is characterized by heavy investments in water elevation, large conveyance systems and treatment plants. The average water cost indicated by Mekorot is about 26 US cents/m³, for the years 1993-1999.⁵⁷

Mekorot Water Cost and Government Subsidy 1993-1999		
Year	Average Water Cost (US Cent/cum)	Government Support (%)
1993	36.4	40
1994	34.4	35
1995	32.8	26
1996	30.5	23
1999	26.2	23

Source: Mekorot Financial Statements

The cost of water includes: capital costs (41%), fixed costs (26%) and variable costs (33%). The marginal cost of water supplied to remote and elevated areas are much higher.⁵⁸

The Cost Plus method used by Mekorot to calculate water costs, was replaced in 1994 with a business oriented method in which the fixed cost (capital and labour) and variable costs (energy and materials) were defined, and a 2.5% efficiency factor was imposed on the Company's performance. A substantial increase in water prices coupled with improved performance (saving in energy cost and other variable and fixed costs) have resulted in a significant reduction in the Government's subsidy from 40% to 20% over the last four years. Under the current tariff structure, water supplied to the urban and the industrial sectors incurs the full cost, while water supplied to agriculture in the remote and the elevated areas is partially subsidized.⁵⁹

The Government, through the relevant ministries, provides grants and low-interest loans for the improvement and expansion of water supply and wastewater treatment plants. Investment capital is channelled through⁶⁰:

- Water Networks Rehabilitation Fund
- National Sewage Program
- Irrigation Systems Improvement Fund
- Wastewater Renovation and Reuse Program

⁵⁷ Source: Israel Ministry of National Infrastructures – The Water Sector - Financing and Pricing of Water

⁵⁸ Source: Israel Ministry of National Infrastructures – The Water Sector - Financing and Pricing of Water

⁵⁹ Source: Israel Ministry of National Infrastructures – The Water Sector - Financing and Pricing of Water

⁶⁰ Source: Israel Ministry of National Infrastructures – The Water Sector - Financing and Pricing of Water

8. TARIFFS

Water tariffs and water allocation are based on a quantitative allocation to groups of consumers, namely: towns, local councils, and water users associations. Water prices are fixed by a parliamentary committee based on recommendations made by the Ministry of National Infrastructures and Finance and the Water Commission.⁶¹

- **Mekorot**

Mekorot supplies two thirds of the water supply. The prices the company is entitled to charge are the rates set by the Ministry of National Infrastructures and Finance, approved by the Knesset's Finance Committee, and updated from time to time according to the changes in the Consumer Price Index, electricity rates and the average wage index.

- **The Local Authority/Municipality**⁶²

Rates within the local authority are set by the Ministers of Interior and Finance, based on the rate the local authority pays when buying water from Mekorot.

The rates are categorized by the different uses: domestic, consumption and services, industry and agriculture, each differing from each other.

- **Domestic Consumption**⁶³

- Domestic consumption and service rates are set based on the buying rate paid to Mekorot and the amount needed to cover the expenditures entailed in supplying this water with the required quality and reliability.
- Domestic consumption rates are progressive and rise with an increase in the amount of water consumed.
- The first price is for the initial 8 cubic meters per month for each housing unit.
- The second price is for the next 7 cubic meters. For each additional cubic meter, the price increases gradually.
- Large families are accorded water price benefits - each additional family member over 4 persons is entitled to 3 additional cubic meters a month charged according to the first rate.

- **Block Rate Prices**

An Increasing Block Rate Prices system is applied for payment for the first 50%, 80% and 100% of the allocation, leading. Different block rates are fixed by the Government and differ for the various sources and regions.⁶⁴

A consumer, who uses a small amount of water, pays only a fixed usage fee, intended to cover the local authority's expenses for reading the meters and dispatching the bill, which must be done even if water consumption is very low.⁶⁵

- Medium Tariff for 1m³ of water:
- Operation & Maintenance cost covered by tariffs:
- Metering: Each consumer must by law have an individual water meter, and water should be charged separately and not as part of the municipal taxes.

⁶¹ Source: Israel Ministry of National Infrastructures – The Water Sector - Financing and Pricing of Water

⁶² Source: MFA, Israel's Water Economy - Thinking of future generations, 10 Aug 2002

⁶³ Source: MFA, Israel's Water Economy - Thinking of future generations, 10 Aug 2002

⁶⁴ Source: Israel Ministry of National Infrastructures – The Water Sector - Financing and Pricing of Water

⁶⁵ Source: MFA, Israel's Water Economy - Thinking of future generations, 10 Aug 2002

9. REFERENCES

Source	Links
Israel Ministry of the Environment - Water and Rivers	http://www.environment.gov.il/bin/en.jsp?enPage=e_BlankPage&enDisplay=view&enDispWhat=Zone&enDispWho=water_top&enZone=water_top&
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Israel Ministry of the Environment - Environmental Topics - Guidelines on Water Sensitive Urban Planning	http://www.environment.gov.il/bin/en.jsp?enPage=e_BlankPage&enDisplay=view&enDispWhat=Object&enDispWho=Articals\13390&enZone=Water_Conservation
Israel Ministry of National Infrastructures – The Water Sector - The Water Sector Background	http://www.mni.gov.il/english/units/Water/TheWaterSector_background.shtml
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Israel Ministry of National Infrastructures – The Water Sector - Water Resources and Water Availability	http://www.mni.gov.il/english/units/Water/WaterResourcesandWaterAvailability.shtml
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