

State of Israel
The Ministry of National Infrastructures
Water Commission

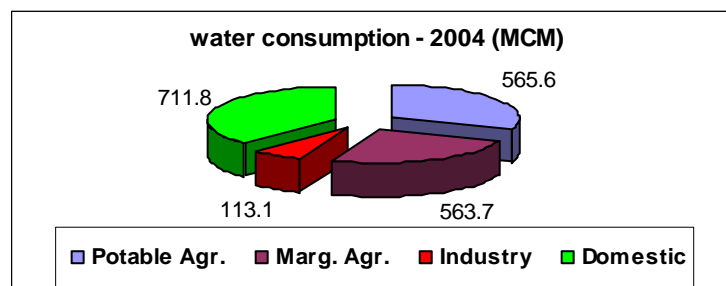
Israeli Experience in Water
Saving in The Municipal Sector

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Medidas de Ahorro de Agua en Viviendas
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Abstract

- Over the years, the state of Israel has experienced shortage of potable water.
- There are two main complementary ways of handling the shortage of water.
- The first and more common way is to increase the water supply, based (mainly) on seawater desalination.
- Another method is to adjust and decrease the water demand to the available supply while encouraging water saving in the municipal sector, and mainly in households (including landscaping), that are the main water consumer in cities.
- Saving campaigns that were carried out in the past have shown, without doubt, that 10-20% of total consumed amount in the municipal sector may be saved, while making sure not to affect the consumer's welfare. The municipal water consumption in 2004 in Israel reached approximately 700 MCM, and estimates suggest that it will increase to some 850 MCM per year.



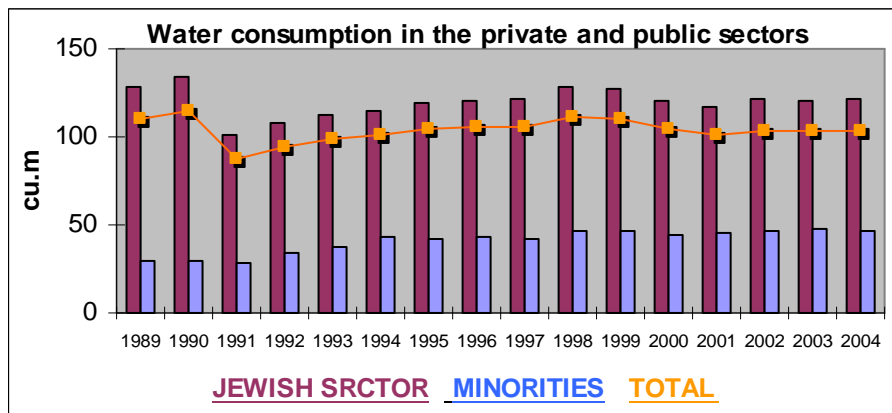
It is important to conserve water due to the following observation:

- Water conservation and efficient usage of it is the cheapest most available source of water. This may be used as a measure of reducing the gap between water supply and demand in Israel. Significant saving in the municipal sector may be attained in the immediate term and it requires no special infrastructure like those required for desalination facilities and usage of treated Effuents.
- The potential of saving is mainly related to municipal consumption, including domestic consumption, public sector consumption, and landscaping.

- **Water conservation is cost efficient for individuals and for the public as one. Intense investment of the state in an effort to save water in the municipal sector, and its integration as a reliable and vital component in future planning, may reduce the costs involved in water system development .**

Water saving may be considered a fixed component in the Israeli water system

This conclusion is based on the water consumption evolvment over the last decade as not only that the consumption has not risen parallel to the rise in the standard of life, but also in 2001 it was equal to the consumption of 1994. (The municipal consumption in 2001 was about 101 cubic meter per capita per year).



- **Residential consumption per capita per year**
Residential consumption per capita (in local authorities) total residential consumption and private gardening in local authorities (municipalities and local councils) for a certain year, divided by the number of inhabitants in the local authorities in that year.
- **Municipal consumption per capita per year**
Municipal consumption per capita (in local authorities) total water consumption in local authorities (municipalities and local councils) except for agricultural and industrial consumption for a certain year, divided by the number of inhabitants in the local authorities in that year.
- **Water consumption in the private and public sectors**
Water consumption in the private and public sectors (national) – total water consumption for a certain year, in local authorities (municipalities and local councils) kibbutzim and cooperative settlements, minority villages, army camps except for agricultural and industrial consumption divided by the number of inhabitants in the country in that year.

The statute of water conservation encouragement may be used more efficiently

The Israeli law attaches great importance to this matter. In recent years, the Water Conservation Division of the Water Commission has been dealing with the promotion of regulation and standardization in the area of water saving.

The division's main tasks are in the policy field concerning water saving in the private and public sectors, initiating and promoting activities in the sphere of standardization and enforcement, promotion of local and national projects on the subject of efficient water usage, water shortage and expanding the up-to-date technological solutions.

Likewise, the division deals in the concentration and distribution of up-to-date information in the sphere of water saving for the relevant public, both in the municipal sphere (including private and public gardening) and in the agricultural and industrial sphere.

In addition, the division deals with the initiation of surveys and researches within its professional responsibility.

The division deals with introduction of advanced irrigation methods; supervising and responsible for development of irrigation system, water supply and automation in agriculture and landscape. The ongoing activities of the division's staff also include advice to planners' engineers and manufacturers on all the division's spheres of activity and professional training (courses workshops and seminars, etc.).

The flexibility of water demand in the domestic sector in Israel is low

- The reasons for that are as follows: the current residential water consumption in Israel is relatively low, the water expense out of total household expense is low since our area is characterized by a dry and hot climate.
- The residential consumption in 2004 was 59.5 cubic-meter per capita per year, and the average municipal consumption was about 84.3 cubic meter per capita per year. (Municipal consumption includes the residential water consumption and the public water consumption, e.g.: education, sports, public gardens, health, hotels, commerce etc.)

There is a vast variety of technical devices for water saving

- Water saving devices – the Water Commission is interested in encouraging the usage of water saving devices and make sure they fulfill the water saving requirements. The purpose of the Blue Mark is to encourage the public of consumers to use water saving devices on the one hand, and the public of importers and manufacturers to import/produce water saving devices, on the other.

A permit for marking with the Blue Mark (Sign) will be given to products, but only if the product meets the specific requirements of the specifications of the Water Commission and the manufacturer operates a quality control system.

*The Water Conservation Division concentrates the activities connected with granting the Blue Mark.

- The Blue Mark system is the foundation of the wide-scale standardization operation using the Water Commission's written specifications according to which the permits for marking with a Blue Mark will be given.
- A Blue Mark was a prerequisite in a project for the installation of water saving devices in public buildings in local authorities.

TECHNOLOGICAL MEANS TO INCREASE SAVING

W.C. flushing cistern IS 851 and Ceramic W.C. pans with attached flushing cistern IS 1385

The usage of a dual flushing cistern (3/6) liters instead of flushing with a quantity of 9/4.5 liters or of 9 liters. Cisterns of 9/4.5 liters can be manufacturers for the renovations market.

Flow rate (discharge) regulators and restrictors – IS 1483 and Water Commission Specification (WCS) 003

discharge regulators – a device intended to permit a steady supply, by restricting the water that flows through it.

discharge restrictor – a narrow device that reduces the diameter and brings about a reduction of the supply that flows through it.

Discharge regulator for Sink tap – IS 1483

A device intended to enable a steady supply, by restriction, of the water flowing through a hand basin or kitchen sink.

The water supply will be 4 – 8.5 liters / per minute and it is recommended that the hand basin will be 4 – 6 liters / per minute and the kitchen sink will be 7 – 8.5 liters / per minute.

Discharge regulator for Shower - IS 1483

A device intended to enable a steady discharge, by restriction, of water flowing through a shower head or a hand shower.

The discharge regulator's supply will be 8 – 11 liters / per minute.

Economical shower head and hand shower

IS 1482

A shower head and hand shower in which an integral discharge regulator has been installed which is intended to enable a steady flow rate. The discharge will be 4.5 – 11 liters / per minute.

Plastic uniral fixtures - Waterless urinal – IS 5091

A waterless acrylic or porcelain urinal which is coated with a liquid repellent material. At the bottom of the urinal there is a filter containing a special liquid, which serves as a barrier between the urine and the air. Changing / adding liquid according to the manufacturer's instructions (\$ 25-30 a year). The urinal does not use water at all.

Sanitary tapware- automatic opening and closing valves – IS 5120

A single tap and a mixer tap with automatic opening and closing which is operated by a sensor system (usually electronic), without being touched by a human hand on any part .

Garden volumetric valve 1” – 4/3”

A device which enables a prior allocation of the water quantity required for certain irrigation. The volumetric valve automatically shuts off the flow of water the moment the pre-determined amount of water has flowed through it.

There is high awareness among the municipal public in Israel of water saving issues

According to surveys:

- About 85%, among all population groups, is aware of the severe state of the water system and agrees that water saving in the residential sector may contribute to improvement in the matter.
- About 70% of the public is interested in learning more about water saving options.
- About 30% have declared that they take water saving steps, like irrigation of gardens at night/evening hours and continuous fixing of leaks.

- Conservation of water must become a way of life in our region. Efficient methods such as water saving devices and advanced technologies for irrigation should be used. Appropriate legislation must lead people to water saving activities. Education and explanation will ensure long-term results.

Current policies, plans and programs aimed at improving the water-use efficiency specifically in urban areas

- There are many diversified ways to save water.
- The strategy for applying the policy of water consumption reduction and its efficient usage in the domestic and municipal sectors, has been lead and will be lead by an intensive explanatory and advertising campaign.

Education and publicity

- The projects and activities for water saving education and explanation over recent years have begun with the decision of the ministerial committee for financial affairs to pursue an immediate potential saving of approximately ten percent of the domestic water consumption through a national explanatory campaign.
- In order to implement the decision, an interoffice explanation headquarters was established.
- In 2001-2003, the annual budget allocated for the headquarters' activity was \$2.2 million.
- Most of the advertising campaigns so far have focused on the national motivation in order to assist the nation in coping with the crisis in the water sector. It is estimated that explanatory actions alone may save 3-4% of the domestic water consumption (meaning 20 MCM in Israel).
- In order to attain, in the coming years, saving of 10-15% (in absolute values this means about 70-100 MCM of water per year), several activities are required except for explanatory actions.

We recommend on the following engineering projects:

- Installation of water saving fittings in the various sectors.
- The usage of a dual flushing cistern (4.5/9 liter) results in saving of about 12% of daily consumption per capita, the usage of a standard dual flushing cistern (3/6 liter) results in saving of some 20% compared with a single flushing cistern. It should be noted that across the country there are still some million single flushing cisterns (9 liter) installed.
- Saving Devices – the installation of water economizing fittings in all domestic consumption points: kitchen sink, washbasins and showers, will result in saving of some 18% of daily consumption per capita.

Public buildings in local authorities

- the project has been conducted between 2002 and 2004 during which water saving devices were installed in public buildings of local authorities, meaning schools, kindergartens, local youth culture centers, municipal/local council buildings etc.
- Only fittings labeled with the Blue Mark, were installed.
- The installation operation was applied across all 203 municipalities and local councils in Israel with a budgeted investment of NIS 29 million.(\$ 6,4 million)
- About 62,000 dual flushing cisterns, 3,000 waterless urinals, 105,000 sink and shower economizing fittings and 2,000 garden volumetric valve and local irrigation controllers were installed.
- From data collected from 30 authorities it transpires that the average water saving in a building where water saving devices were installed is 25%.

Sectorial projects

- **Water recycling in car washing facilities**
there are some 600 such facilities in Israel. A non-recycling washing facility consumes 180-250 liter of clean water as against 15-40 liter of clean water in a recycling washing facility.
A national enforcement operation that was conducted shows that there is a very high percentage of recycling facilities of various kinds.
- **Landscaping**
the landscaping areas are estimated at some 20,000 hectare, out of which about 13,000 hectare are lawns. The annual growth is estimated at 3.5%. The average consumption of all landscape areas in Israel is about 9,000 CM/hectare, yet according to professional recommendations, 6,000 CM/hectare may suffice. Hence, the annual consumption of total landscaping operations totals some 180 MCM of water. But through wise irrigation, we estimate that it is possible to save 30-35 MCM of Potable water a year.

**NATIONAL TENDER FOR SAVING OF POTABLE WATER
CONSUMPTION IN THE RESIDENTIAL SECTOR IN THE LOCAL
AUTHORITIES**

■ **General**

The State of Israel is situated in an accumulative deficit of potable water which continues to grow every year due to an increasingly large gap between the annual supply (annual refilling of reservoirs) and the increasing demand (due to population growth and a rise in the standard of living). The gap can be closed by a combined process of increasing production (desalination and import) and reducing demand (saving water).

- Saving water and its efficient usage are the cheapest and most available water source known.
- The saving potential is mainly in urban use which includes household consumption and consumption in the public sector, including gardening. The cost of the saving, which includes irrigation and current costs, is considerably cheaper than the alternative source (desalination).
- Campaigns for saving that were held in the past showed, without a shadow of a doubt, that it is possible to save more than 20% of the aggregate amount of water consumed in the urban sector, while placing emphasis on the principle of retaining the consumer's wellbeing.
- Hence the importance that the Ministry views in taking measures to save water.
- In the meantime, the Water Commission sees great importance in carrying out water saving as a permanent way of life and not as a temporary means only, and this is in light of past lessons, according to which when intensive information is cut down per capita consumption gradually rose back to its original level.
- In view of that stated above the Water Commission, in cooperation with the Ministry of Finance, decided to examine the possibility of achieving a substantial saving in the consumption of potable water, by operating private initiatives.

Due to the limited experience in the subject on the one hand, and the obvious financial potential for the state (if a saving is achieved) on the other, it was decided to examine using a trial project (pilot), as to whether it is possible to achieve a saving in the consumption of potable water by household sector consumers.

In light of the trial results the authorized bodies will decide whether and to what extent to continue with the process.

Principles of the tender

- **In order to put the pilot into effect within the framework of this tender the Water Commission defined 3 clusters of settlements, with an inclusive consumption of potable water for the household sector of approximately 30 – 35 million cu. m. of water per annum in each cluster. The entrepreneur that will win the tender for a specific cluster will have to apply a plan of action that will be planned by it with the aim of achieving the maximum saving in water consumption.**
- **The license to apply the project will be granted by the Water Commission against a permit of license fees.**
- **The competitors will be classified, on a basis of criteria of quality, professional experience and financial vision, and according to the license fees which they will offer in remuneration for receipt of the license to carry out the project.**
- **The financial range of the tender stands at (\$ 3.3 million) per annum while at the end of the license term the licensees will be recompensed on the basis of success.**
- **The parameter for measuring success will be the annual water consumption per capita (residential) according to reports of the Water Commission, as the saving calculation will be done on a yearly basis.**

- **The license period will be for one year and the Water Commission reserves the right to extend this license year by an additional year up to an inclusive extension of two extension periods, at its sole discretion.**
- **The selection of franchisers (licensees) was be accomplishing in two stages:**
- **Stage A - publication of a Request For Information (RFI) intended for potential groups to participate in the bid .**
- **Stage B - publication of a public tender.**
- **Due to the fact that such a project has not yet been carried out in Israel, comprehensive control over the activity of franchisers (licensees) will be required from the point of view of budget, accounting, documentation and prevention of misleading.**

- **Carrying out the project to achieve a saving in the consumption of potable water in the sector of freshwater consumers in the household consumers sector in the local authorities, constitutes part of the application of the policy of the government and the Water Commission in all that concerning the encouragement and promotion of urban water saving.**
- **It will be stressed, that the project is a trial project, which is intended to enable the Ministry to examine means of saving water and the efficiency of the said means.**

- **The project will focus on private households in the local authorities.**

- Tender documents have already been published and purchased by 8 potential candidates.
- A meeting of candidates will be held and a date will be set for submitting the bids for the tender.
- The start of the implementation of the project after the licensees have been selected is planned for January 2007.
- Sorting and grading the bids will be carried out fore each cluster separately and will be determined by two criteria:
 - The quality of the bid (80%)
 - Financial offer (20%)
- A candidate has the right to submit an offer for one cluster, to two clusters or to three clusters, but does not have the right to make more than offer for each cluster.
Despite that stated above, one candidate can win, at the most, a license for two clusters.

Institutional mechanisms, legal instrument and financial incentives for achieving water-use efficiency in urban areas

- The main instruments for assuring proper water consumption management is legislation and standardization.
- There is a wide variety of governmental regulations and municipal by-laws concerning water saving and water-use efficiency. The strategy is based, on the one hand, on activities and measures to encourage and raise the public awareness, and on the other, on supervision, enforcement and punishment.
- As part of the water-use efficiency promotion, in 2001 several regulations and instructions were published, as follows:

Irrigation of private and public gardens

Irrigation is only allowed since May 1st until October 30 st between 19:00 and 7:00 the next morning. It is allowed to irrigate by dripping with no limitation of hours.

Car and paved surface washing with water

This regulation deals with the prohibition of washing and cleaning cars and paved surfaces with pressurized running water from the water mains. The owners of a car washing facility will not use any instrument and will not allow the usage of any instrument or devices, unless a water recycling system is installed in it, for reuse for the same purpose.

Instruction concerning the duty to install water saving fittings in new buildings:

- The instruction is included in the instructions for sanitary facilities as part of the Planning and Constructions law. The said fittings include dual flushing cisterns, shower heads and taps equipped with economizers (saving devices).

Water prices as a measure for efficient management of water demand

- The water prices in Israel are set by the government and are identical across all local authorities. The local authorities buy water mainly from the state (as of today for \$0.52). The price paid by an urban consumer to the local authority is higher than the price paid to the supplier. The difference is supposed to help in covering the service and maintenance costs of the system, yet in fact, it produces surplus income for the authority.
- The structure of water prices for residential uses in Israel is a rising graded price. This system consists of three price brackets according to the measured monthly water consumption: for the first 8 CM – \$0.67; for the following 7 CM - \$0.96; for any additional CM - \$1.35.
- To these prices, 3.3 cent per CM should be added for the Water System Rehabilitation Fund of the Local Authorities.
- Other municipal consumers, except for residential consumers, pay a fixed price (not graded) according to the type of use, for example commerce, education, crafts etc. – \$1.02
- Our estimate is that the residential water consumption in Israel tends to be rigid and its flexibility concerning the price of residential water is low.

Recommendations for action in the national level

- Water saving is the most available and cheapest approach for balancing the water sector in Israel and our main recommendation is to encourage water saving and increase its stability and reliability by taking relevant long-lasting continuous actions.
- The activity of the Water Commission, as a policy leader, is essential for establishing ideas for useful and efficient usage of water.
- It is recommended to encourage research on issues related to water saving.

Recycling domestic greywater

- greywater – sewage from a household source without toilet bowl waste. (Recommended to also avoid kitchen waste).
- There are two possibilities for recycling grey water:
 - * Recycling for irrigation.
 - * Recycling for flushing toilets.

- The Ministry of Health permits the repeat use of treated waste water of “excellent” quality for irrigating public gardens and for flushing toilets in office buildings and hotels.
- The Ministry of Health is opposed to the repeat use of grey water in the private sector.

Recycling water in sport centers

- There are about 200 – 300 sport centers in Israel.
- The annual water consumption in the sports centers comes to approximately 15 M cu.m.
- The saving could be effected in a number of fields:
 - * Repeat use of water in sinks and showers for irrigating garden areas.
 - * Economical gardening, upgrading irrigation systems and installing automatic systems.
 - * Installing devices that are economical in water.
 - * Recycling the water in the slides in swimming pools.
- The amount of water that can be recycled in each sport center stands at 10,000 – 20,000 cu. m. per annum, according to the size of the garden areas.
- The investment required for this stands at NIS 150,000 – 250,000. This investment pays for itself within less than 3 years.
- The potential saving comes to 3.5 – 4 M. cu. m.
- Installing water saving devices including water savers in sink taps and showers, two quantity flushing cisterns and waterless urinals will enable a saving in a range of approximately 15% of the consumption.

STUDIES AND PILOTS

- **Reuse of grey water in the household sector for irrigation** – the study carried out in Sde Boqer by Ben Gurion University came to an end. The results show that the household installations in use do not meet the requirements of the Ministry of Health.
- **Reuse of grey water for flushing cisterns** – the second year of the study carried out in the Technion came to an end. A pilot was carried out in the Technion’s dormitories which is examining, at this stage, the quality of the water.
- **Reuse of grey water and air-conditioning water in the Rabin Building in the Technion** – the installation works and at this stage is pouring the treated water into the sewage.