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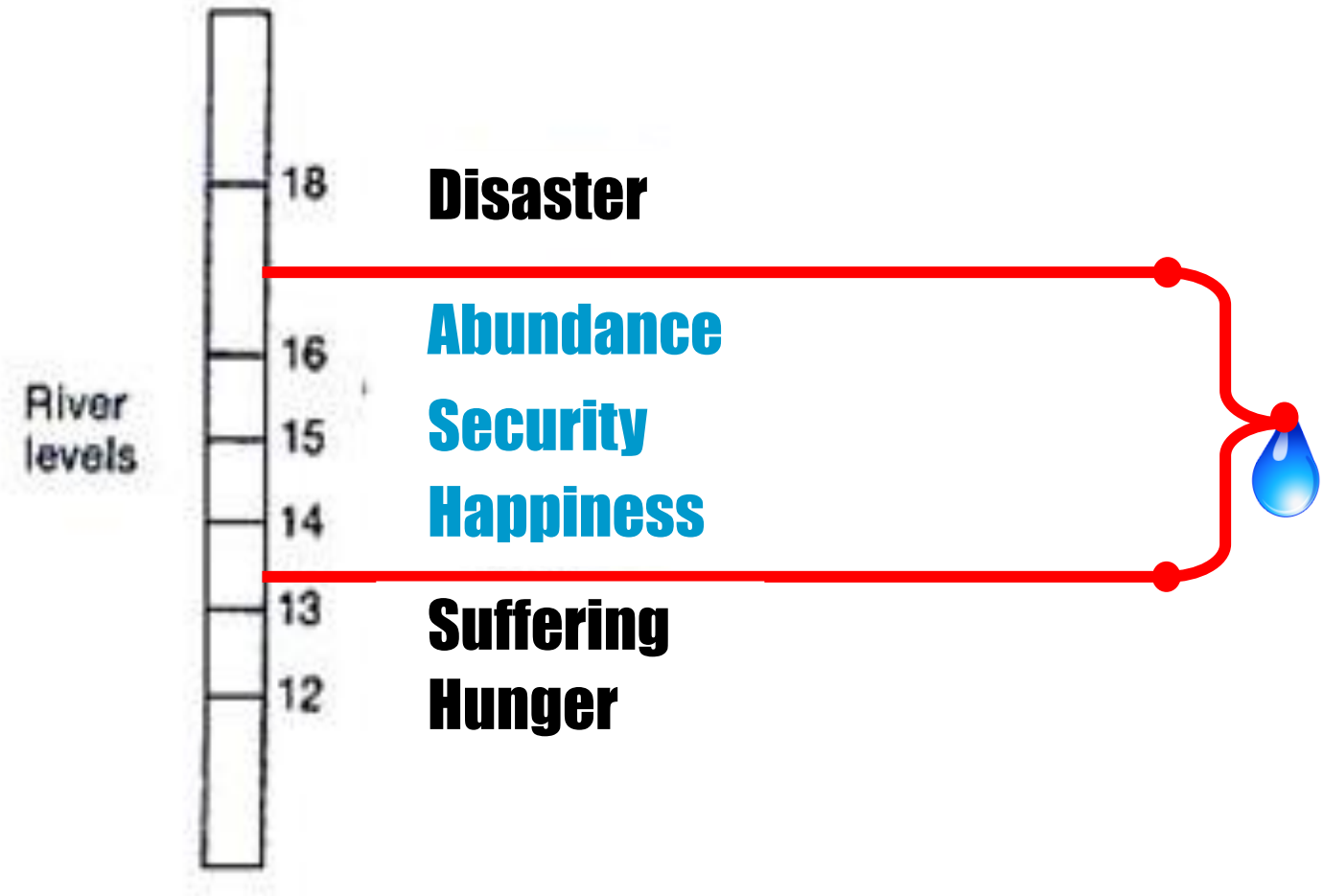
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Water Sector in Israel

IWRM Model

Nilometer in the ancient Egypt



Water Level = Social Prosperity Level

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Water

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A basic commodity for humans and environment!

If so,

Every person should have a right for water.

Is the water a FREE commodity?

YES, in its natural shape



BUT…

Water Supply

Do we want water in its natural shape? - NO

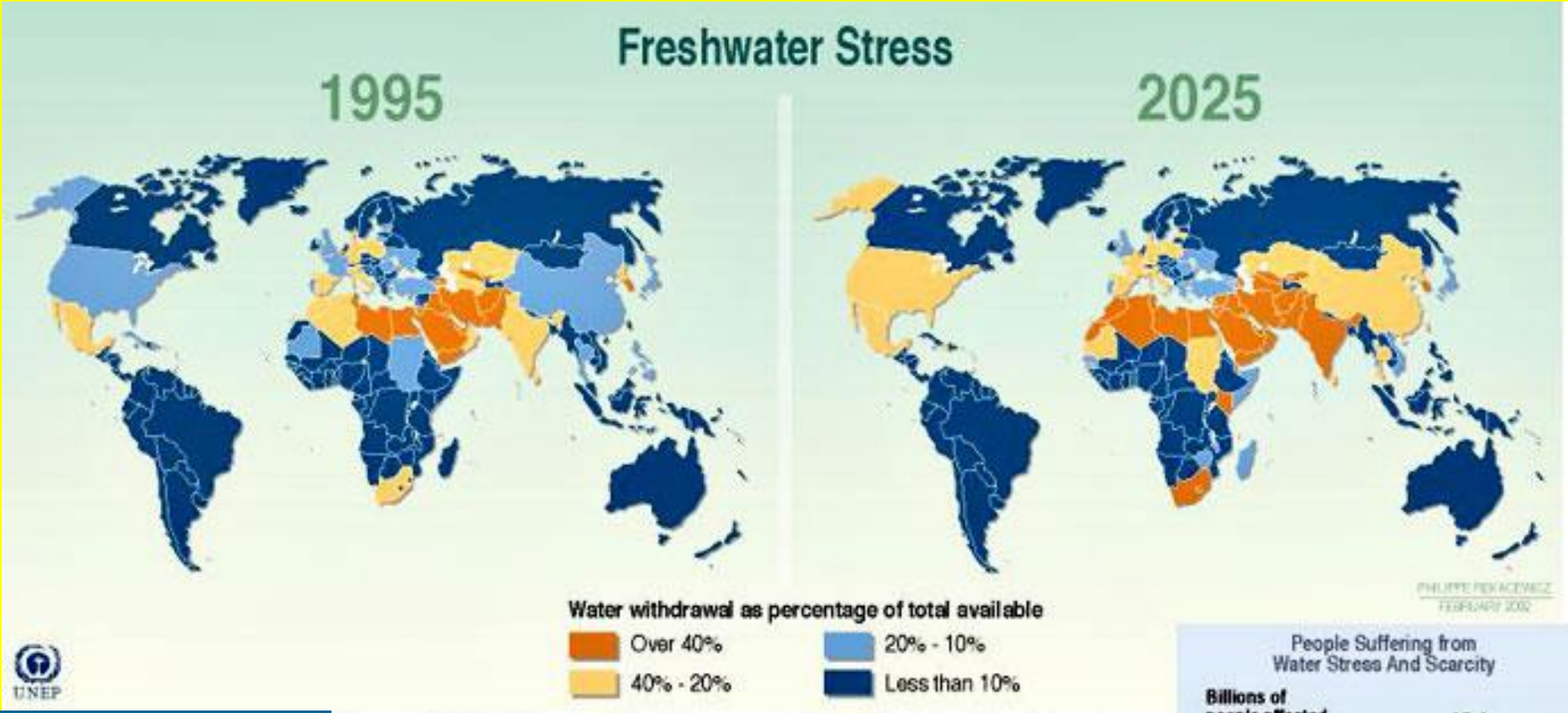


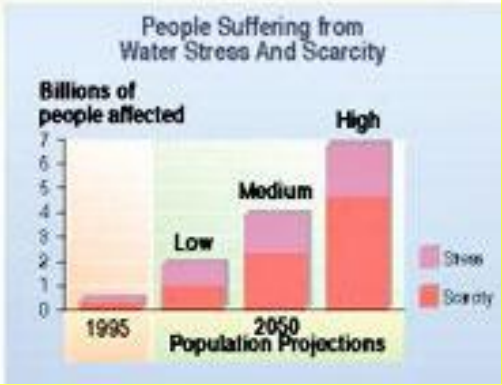
Today the right for water is – to open the tap, to splash the water in the toilet, to operate an irrigation system, to connect water to the production line, to live in proper sanitary, unpolluted and healthy environment.

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CHALLENGES





45%
of the world population will be living in countries chronically short of water by 2050

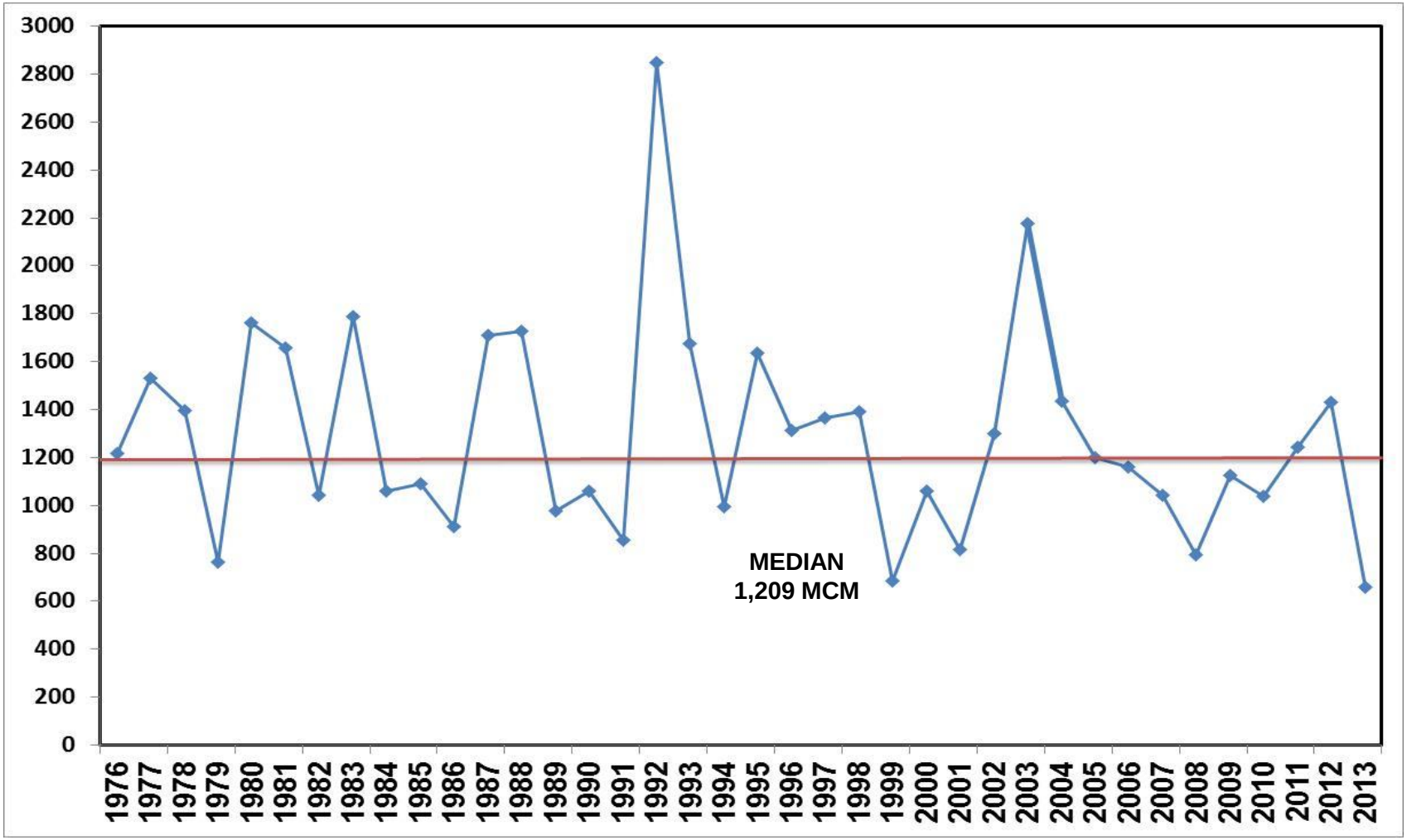
In the Middle East it is a well known reality!

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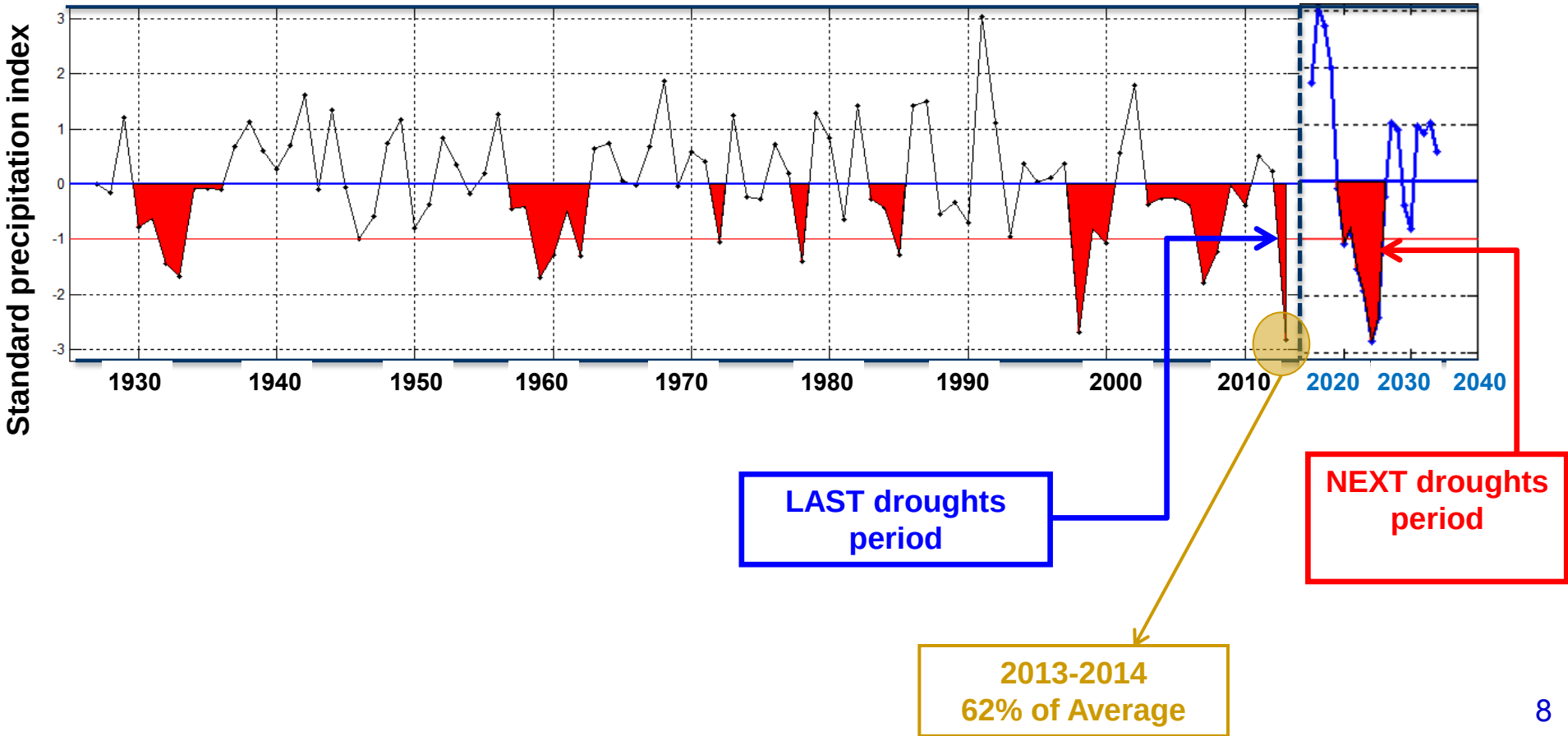
Recharge from Rainfall along years: 1975-2013

MEDIAN: 1209, STD: 456 MCM
Min. : 659 MCM Max. : 2,929 MCM



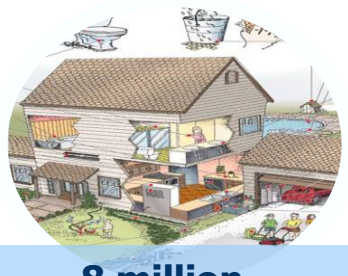
Simulated and Expected Droughts

Drought magnitude, intensity and duration are expected to increase in the future



Israel Water Sector - Visit Card

Annual Water Supply
2 billion m^3



8 million residents



200,000 Ha irrigated fields

To 14,000 farms



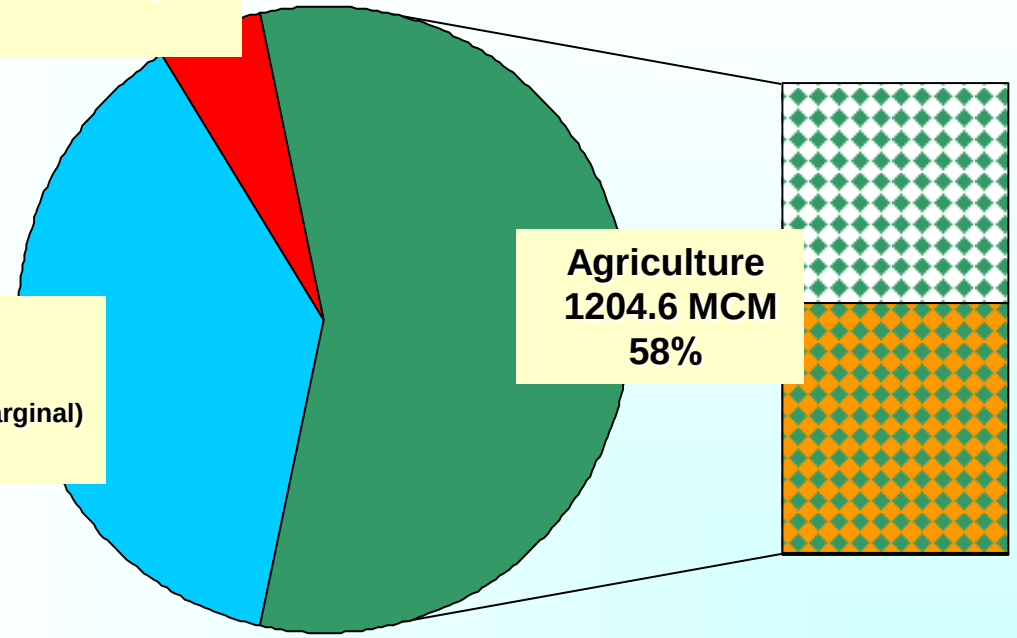
Over 1,000 Industrial plants



Annual financial volume
9 billion NIS

Water Consumption in Israel

According to sectors
Data for 2013



Total: 2,187.1 MCM
(including 23.4 MCM for Nature)

Supply to PA – 53.8 MCM (West Bank) + 4MCM (Gaza Strip);
Supply to Jordan – 53.2 MCM



- Average total natural enrichment – 1.170 billion m^3/annum
- Water demand – more than 2 billion m^3/annum
- Current potable water demand ~ 1.2 billion m^3/annum
- Forecast for potable water demand:

2020 ~ 1.7 billion m^3/annum
2030 ~ 1.95 billion m^3/annum
2040 ~ 2.2 billion m^3/annum
2050 ~ 2.45 billion m^3/annum

FIGURE 4.10

Global physical and economic water scarcity



Water Management Scarcity

Definitions and Indicators

- Little or no water scarcity. Abundant water resources relative to use, with less than 25% of water from rivers withdrawn for human purposes.
- Physical water scarcity (water resources development is approaching or has exceeded sustainable limits). More than 75% of river flows are withdrawn for agriculture, industry, and domestic purposes (accounting for recycling of return flows). This definition—relating water availability to water demand—implies that dry areas are not necessarily water scarce.
- Approaching physical water scarcity. More than 60% of river flows are withdrawn. These basins will experience physical water scarcity in the near future.
- Economic water scarcity (human, institutional, and financial capital limit access to water even though water in nature is available locally to meet human demands). Water resources are abundant relative to water use, with less than 25% of water from rivers withdrawn for human purposes, but malnutrition exists.

Source: Comprehensive Assessment of Water Management in Agriculture (2007, map 2.1, p. 63, © IWMI, http://www.iwmi.cgiar.org/).

SOLUTIONS

Governance & Regulation

Integrated Water Resources Management

Reuse of treated effluents

Brackish water for agriculture and industry

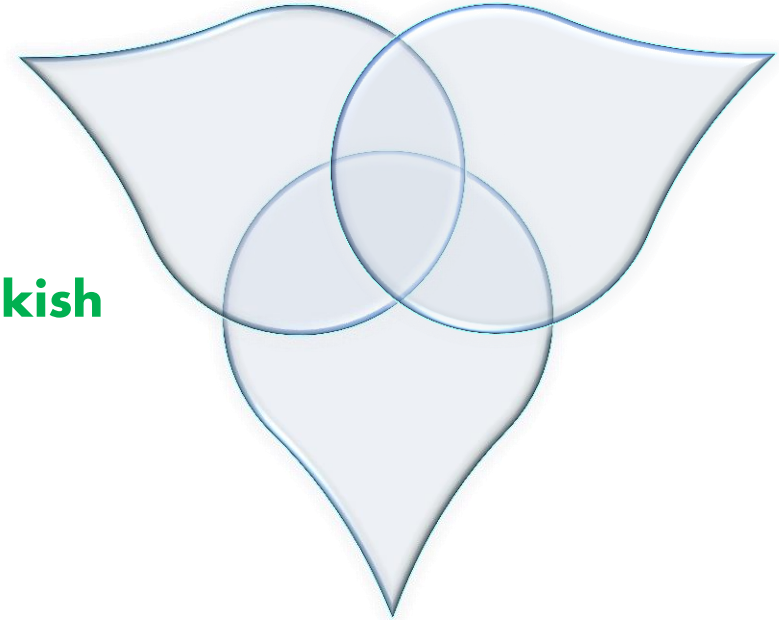
Seawater and brackish water desalination

Development of the national and regional infrastructure

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Water Resources Pillar



Manufactured:

- Wastewater Reuse
- Seawater and brackish Desalination

Natural:

- Precipitations
- Enrichment

Integration:

- National water grid
- Total sewage collection and reuse
- Semiannual operational plan
- Preservation and Recovery constraints

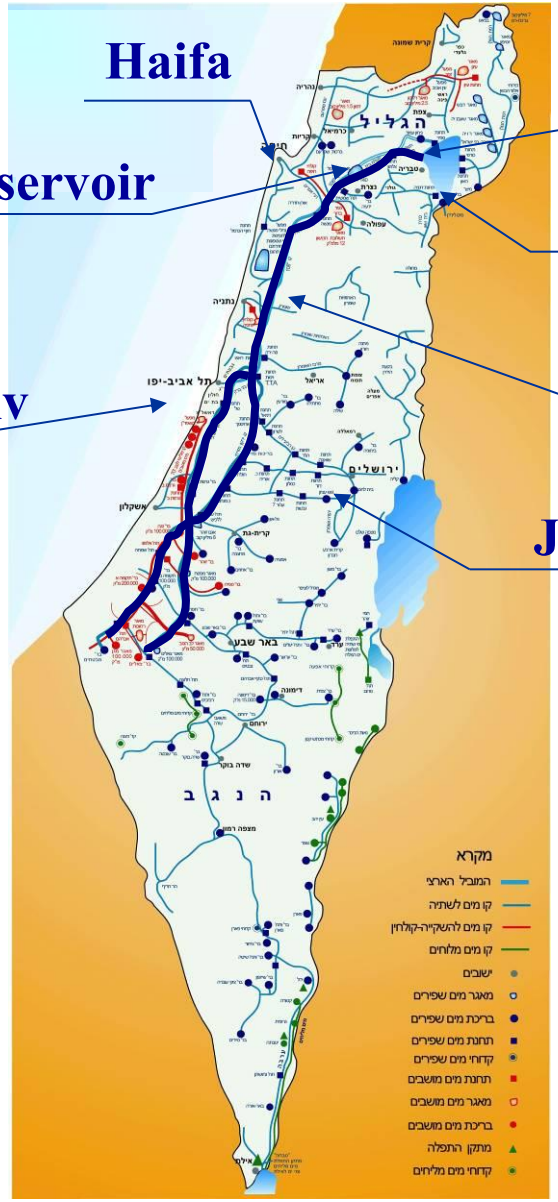
WATER SUPPLY CHAIN



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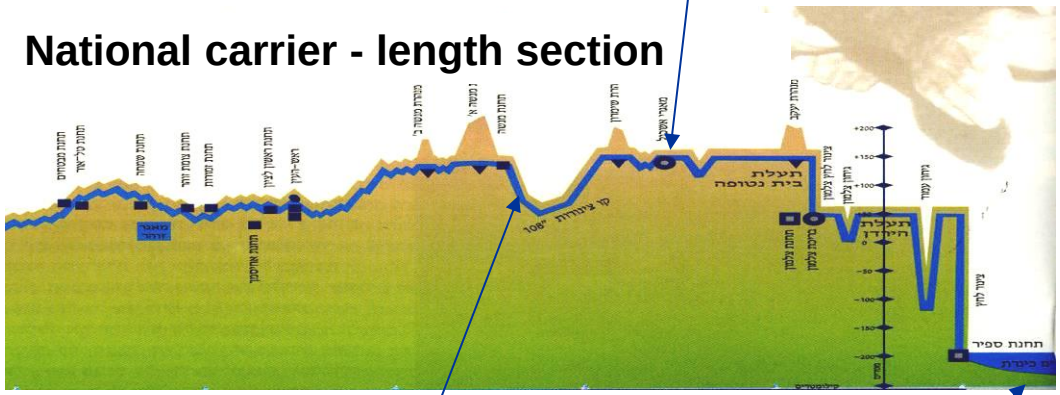
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Main Water Supply System





National carrier - length section

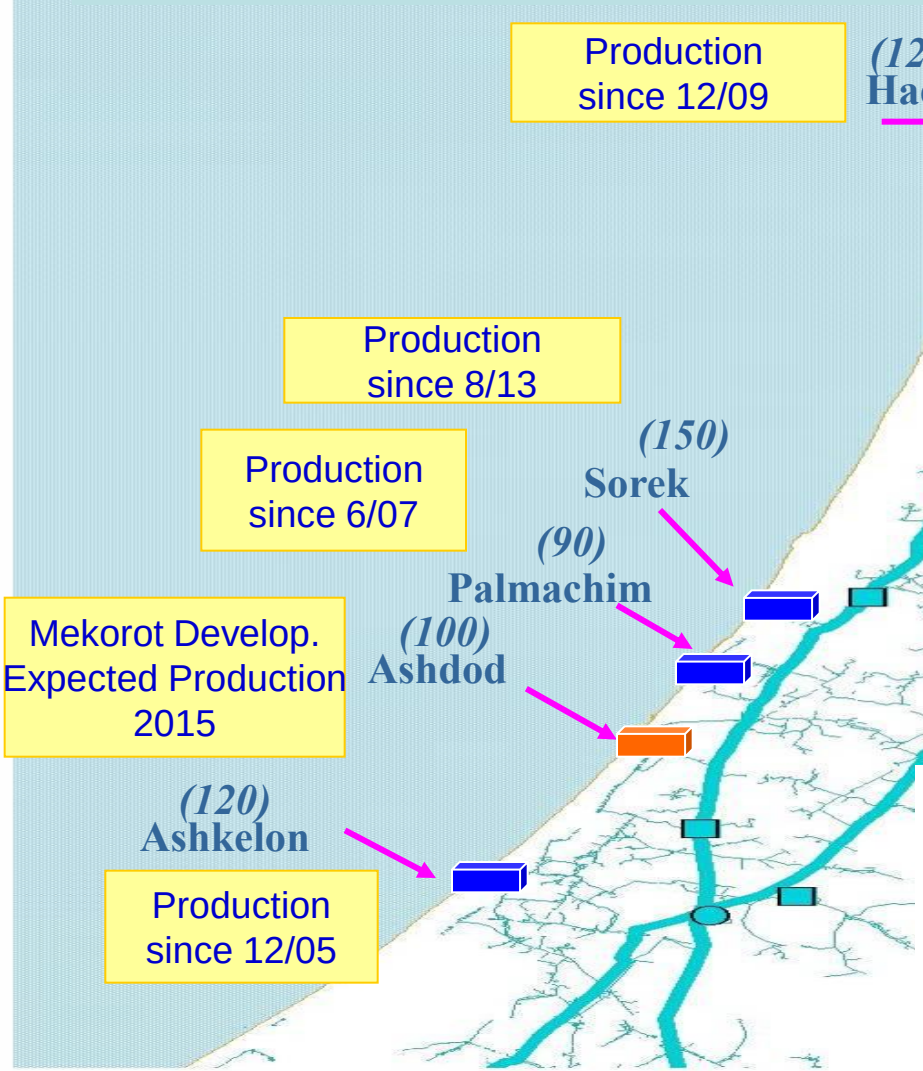


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Sea Water Desalination

In accordance with the Government decisions since 2001 large scale seawater desalination facilities are being built:



Completed facilities
Ashkelon -BOT 120 MCM/Y (VID)
Palmachim -BOO 90MCM/Y (Via Maris)
Hadera- BOT 127 MCM/Y (H_2ID)
Sorek – BOT 150 MCM/Y (SDL)

Under Construction
Ashdod – 100 MCM/Y (TK Mekorot)

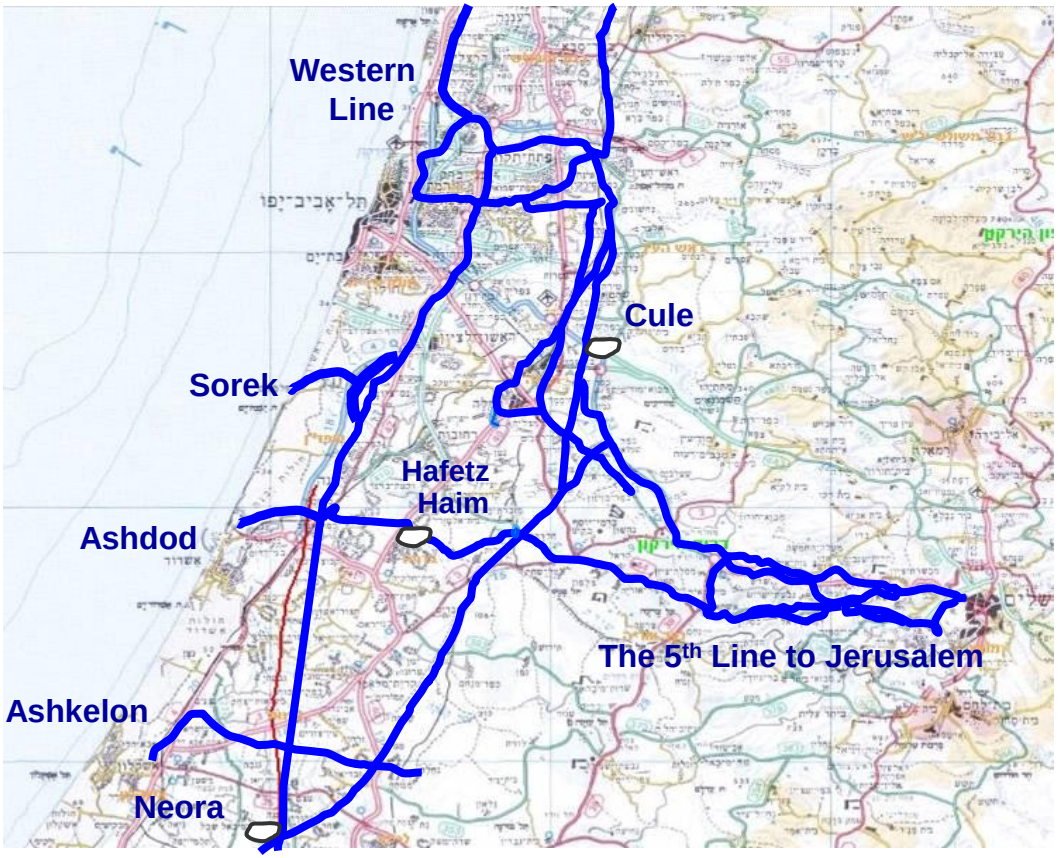
Another 50 MCM facility in planning

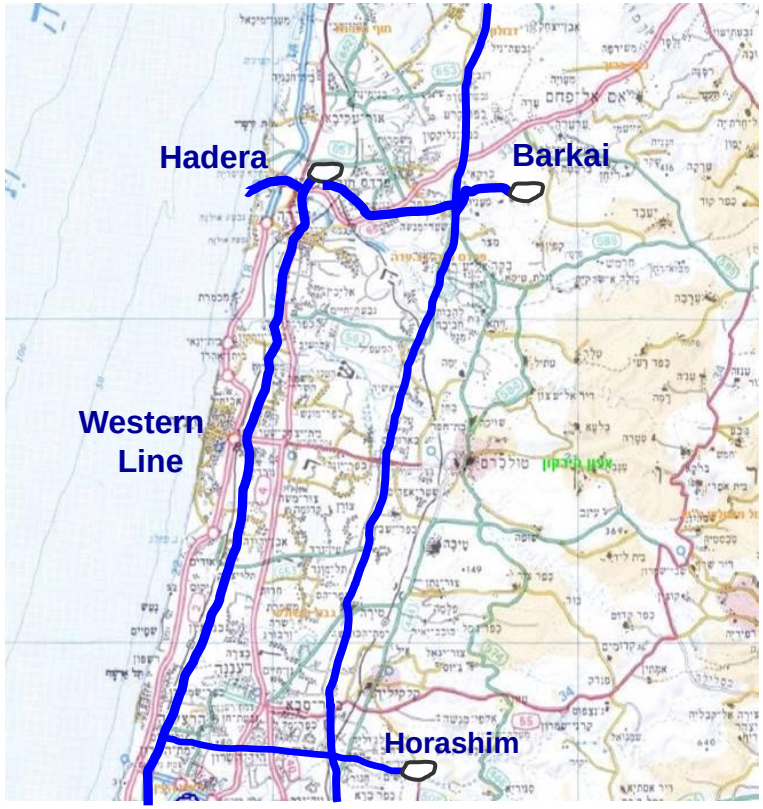
Water Management Tool:
Enlarge or reduce the quantities of desalinated water production in accordance with the annual water balance requirements!

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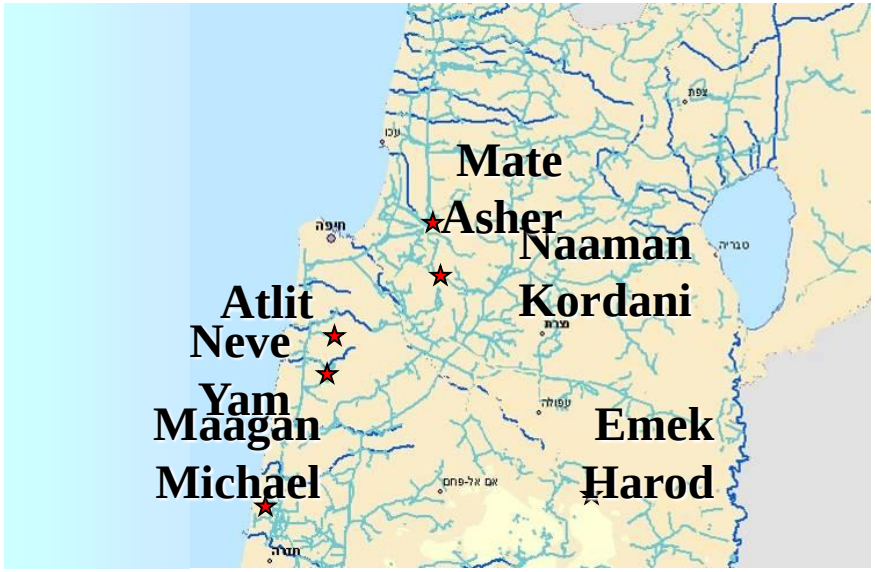
SWRO facilities connection - Revolution in the National System operation



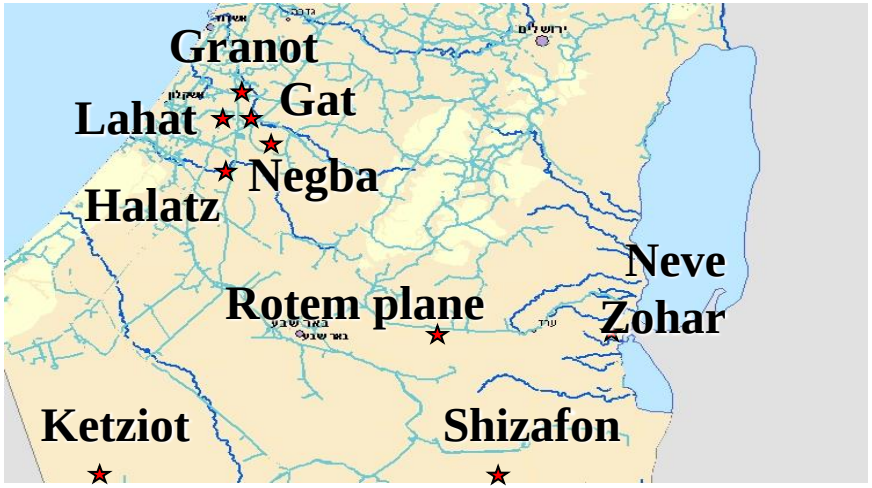


Brackish Water Desalination

- Private sector
- Mekorot Co.



Brackish water desalination facilities – 50 MCM/Y



Reuse of All Sewage Effluents

With governmental support, sewage infrastructures have been developed and upgraded nationwide, what enabled to turn the environmental hazard to valuable resource.

Reuse of ≈ 450 MCM/Y

Sewage effluents for Agriculture – 50% of allocations in 2014.

Tertiary treatment – unrestricted irrigation. New stringent standards for effluents quality (37 parameters).

Nutrients and Salt Removal.

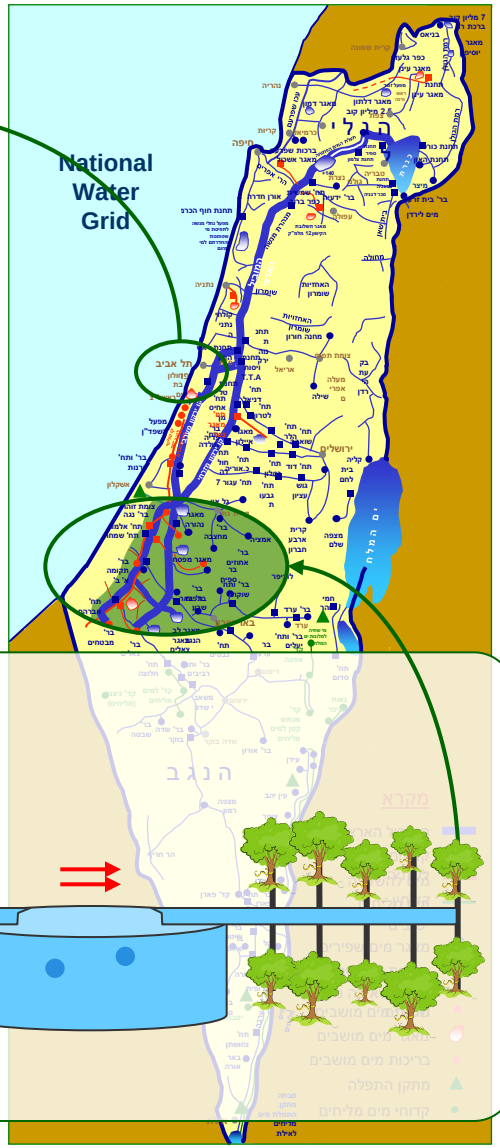
Methods of agricultural cultivation in Israel are constantly modernized and innovated.

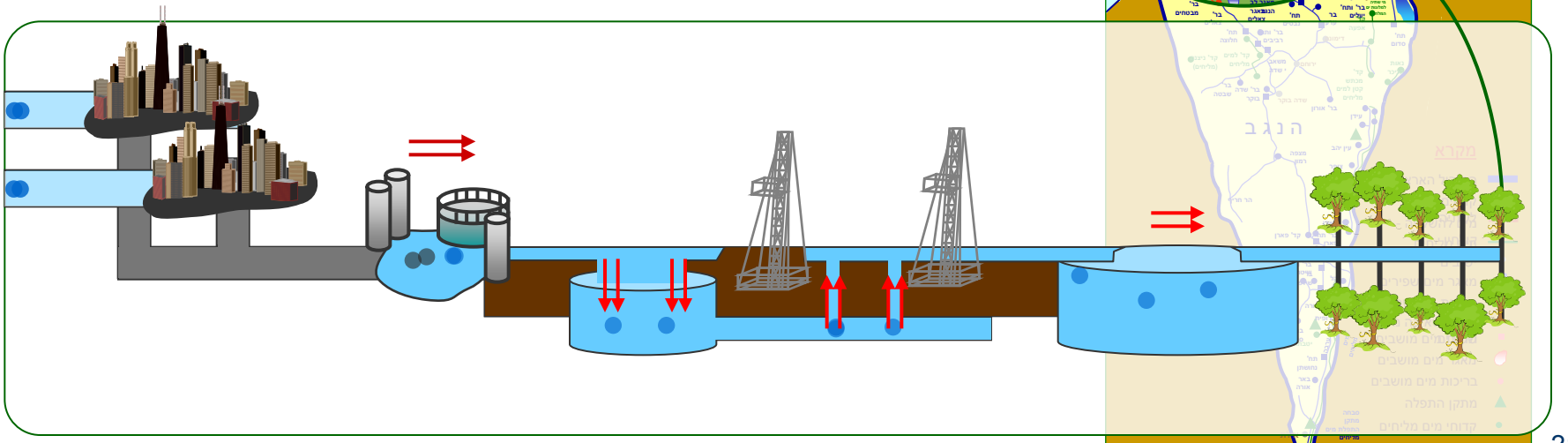
Israel became an international leader in developing water saving technology in agriculture.



Reuse of all sewage effluents in Dan Region (Greater Tel Aviv) Wastewater Treatment plant (Shafdan) and the pipeline to Negev

- Sewage from the Greater Tel Aviv area – 125 MCM/Y (2010)
- Large-scale WWTP – secondary treatment quality
- Six infiltration fields
- Over 150 production and monitoring wells (quality permitted for “occasional drinking”)
- 90km pipeline to Negev
- 32 pumping stations, operational storages (0.51MCM) and seasonal storages (17.2 MCM)



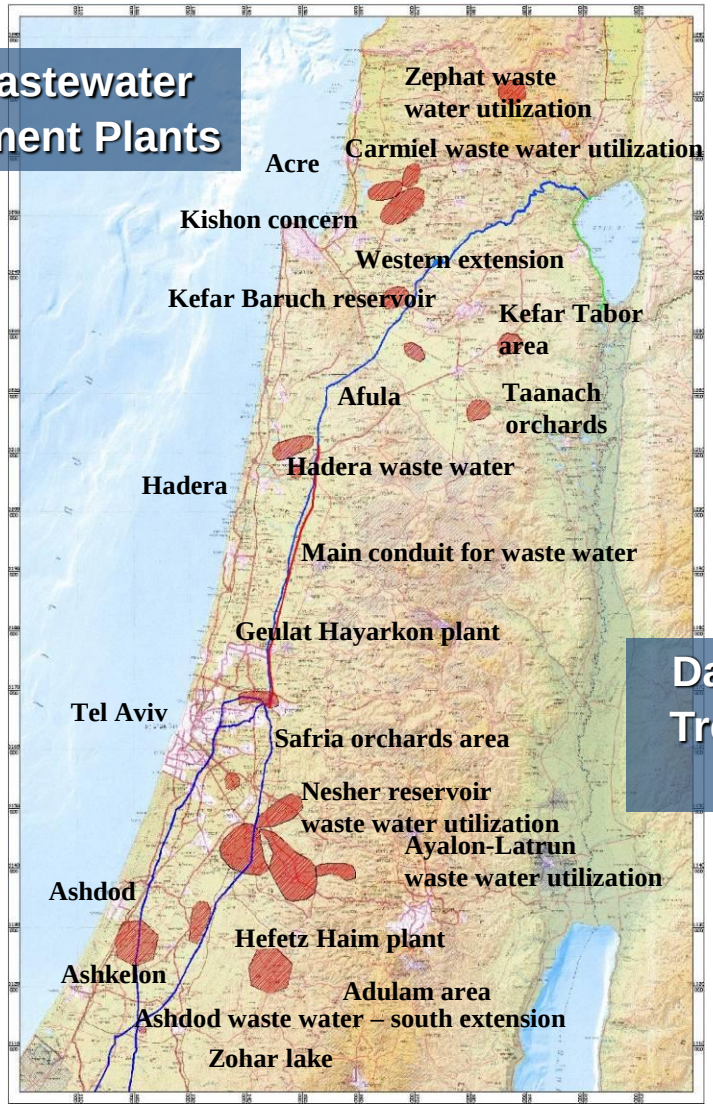


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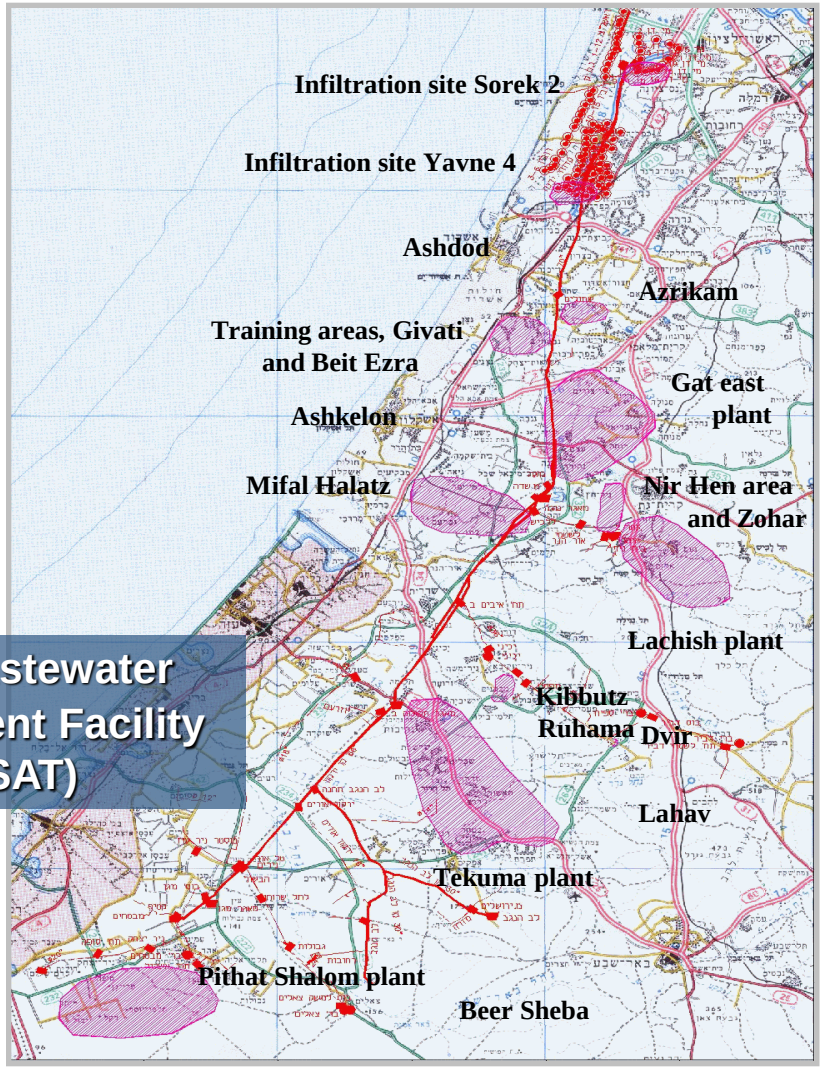
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Reuse of All Sewage Effluents

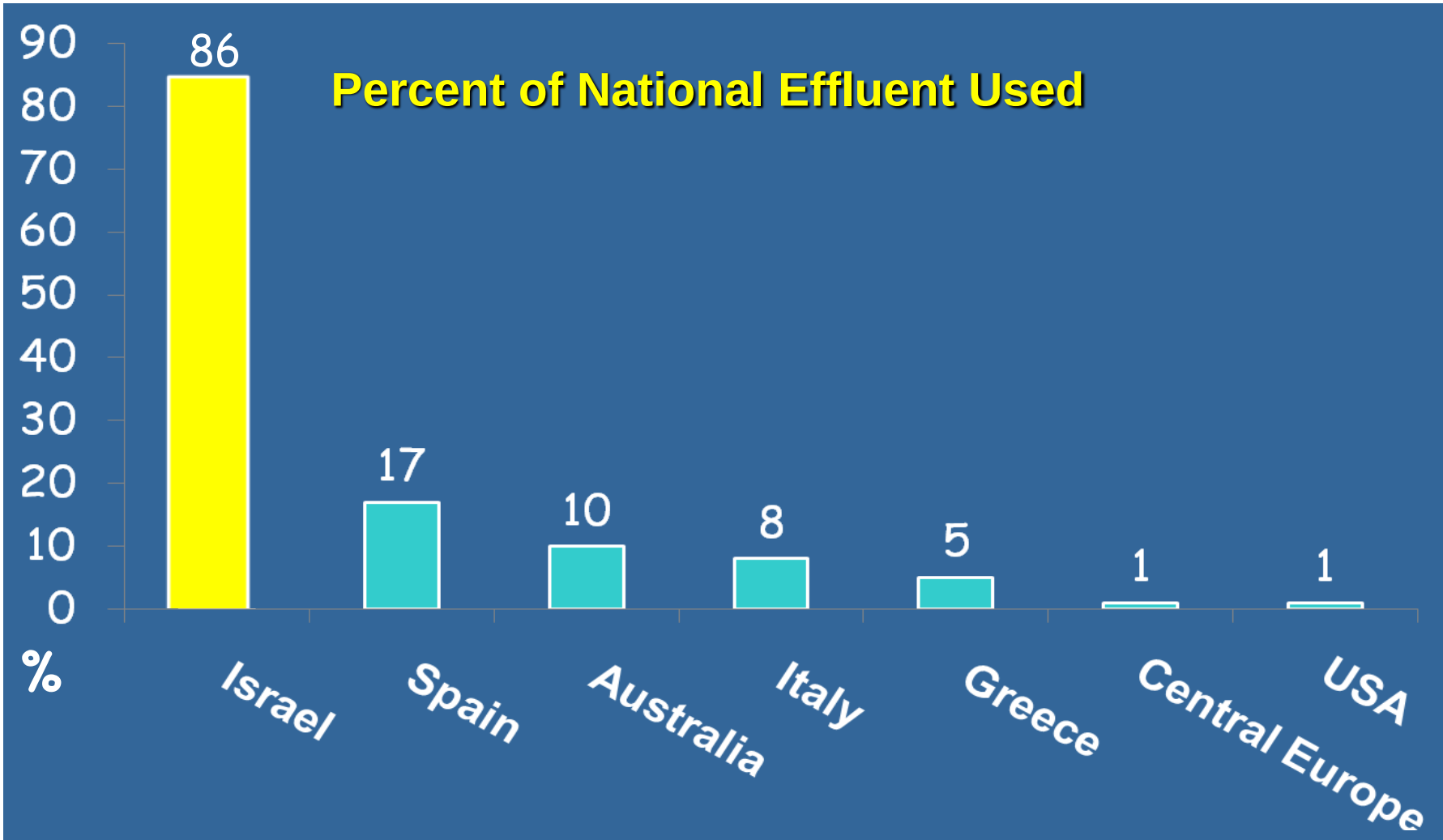
Wastewater Treatment Plants



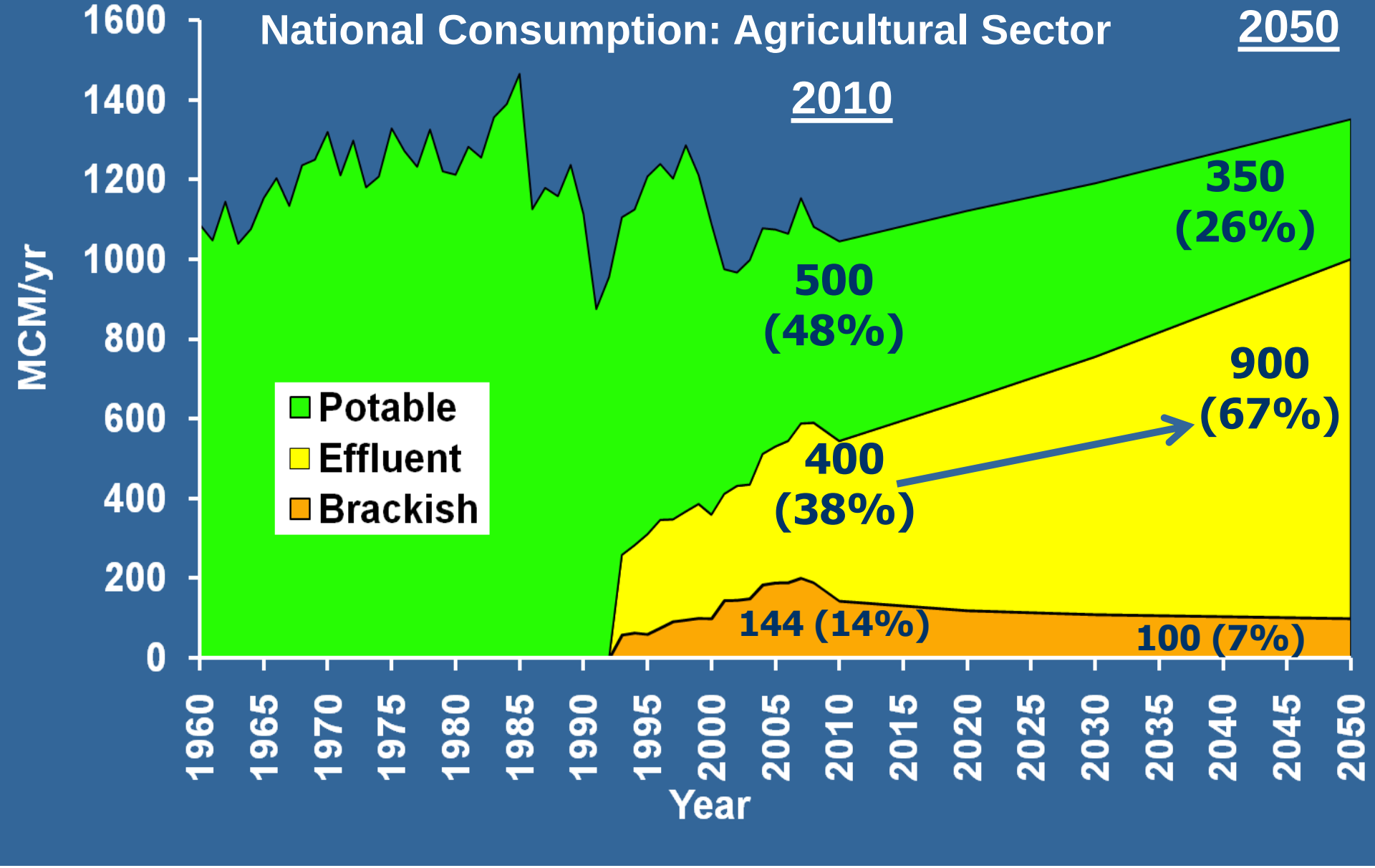
Dan Wastewater Treatment Facility (SAT)



Effluent Quantity for Irrigation:

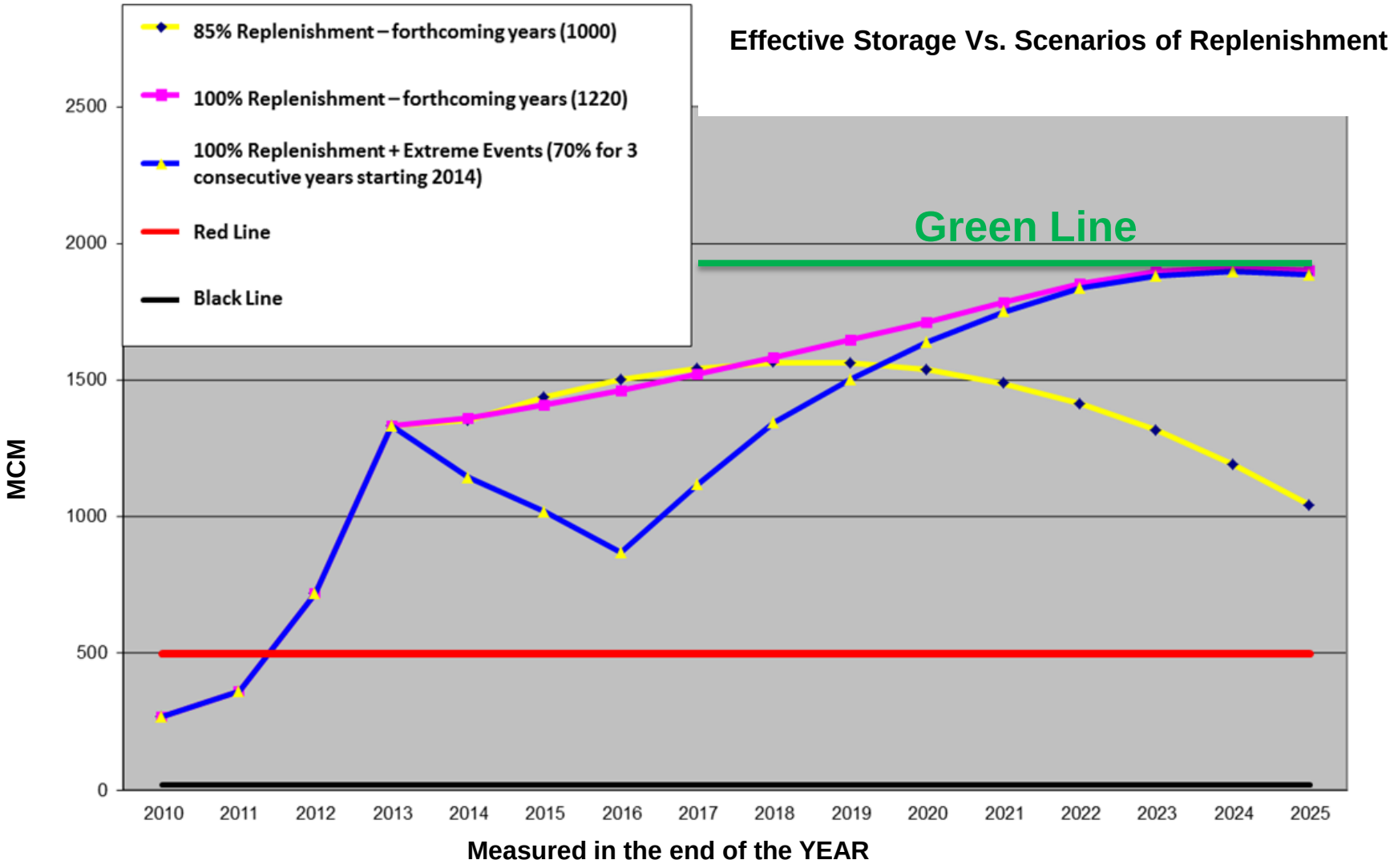


Next Steps (Improvements Within 5-7 Years):
Israel will increase use of the total national effluent produced each year from 86% to 90%



If effluent were not used in agriculture, desalinated water production would be required (a more costly alternative) to supply the agricultural sector's needs.

Water Storage Recovery Plan



Assumptions: Agricultural Consumption in all scenarios: 550 MCM/Y
Seawater Desalination Production: ~600 MCM/Y

Water Sector Development

Development programs based on long term Master plan taking into consideration the population growth rate and its distribution and the rate of growth in consumption:

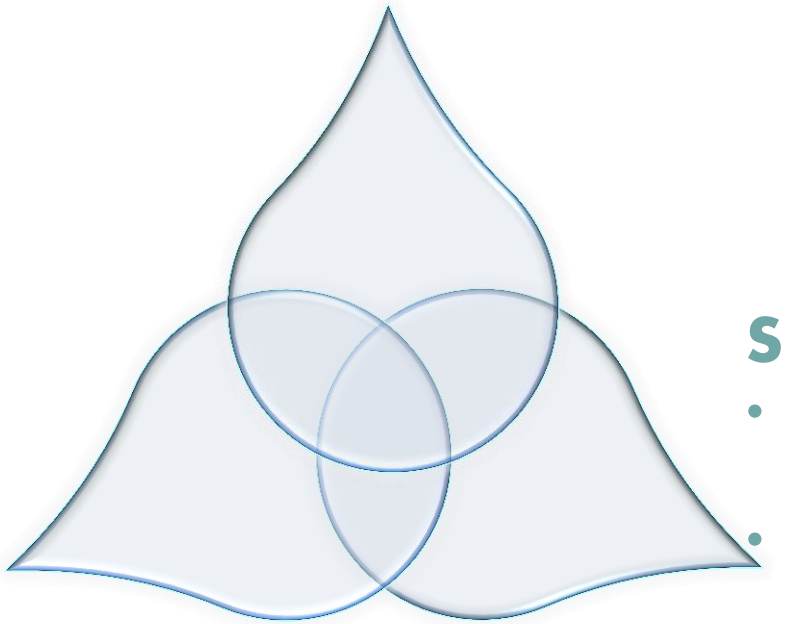
- **Increased living standards**
- **Water for nature utilization**
- **Agricultural distribution and water consumption**
- **Political arrangements**

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Regulation:

- One decision making regulatory body
- Professional (not political) level
- Integrative approach



Finance:

- Cost recovery for suppliers
- Fairness and uniformity for consumers

Service Standards:

- Investments in infrastructure
- High quality standards for end users

Governance Pillar

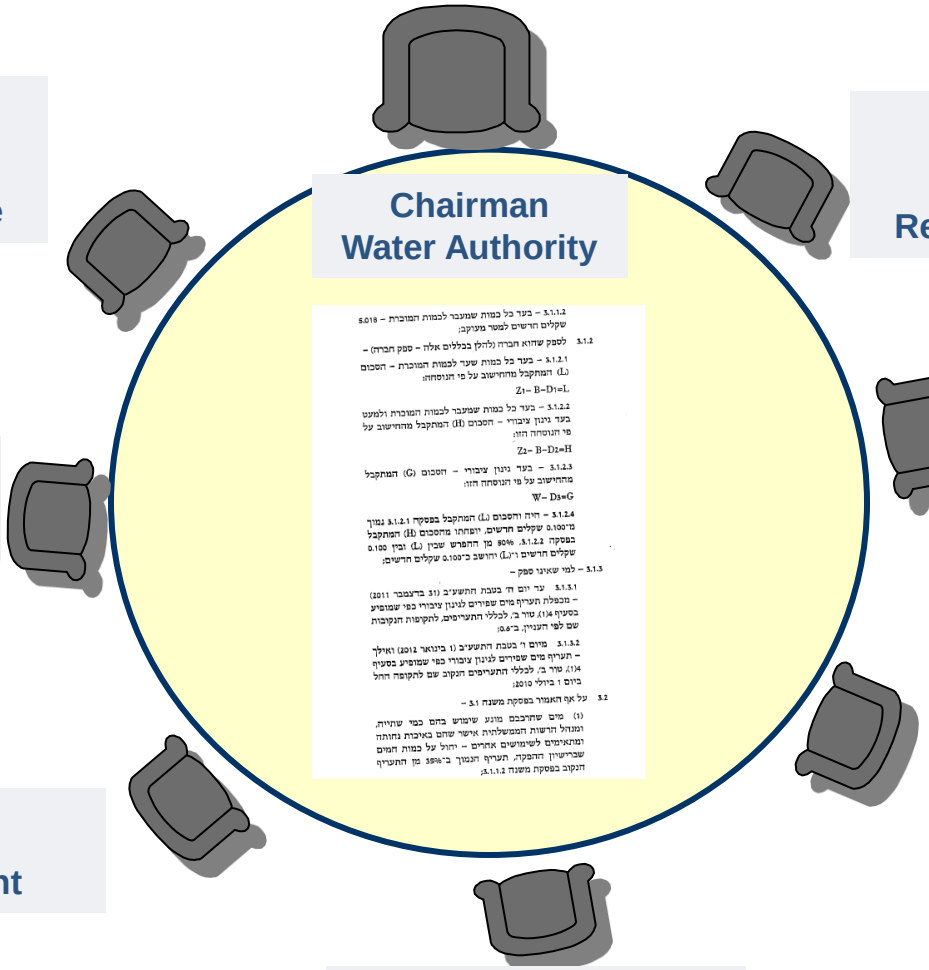
From The Israeli Water Law - chapter 1:

"The country's water resources are public property, controlled by the state and are designated for the needs of its residents and the development of the country.."

""Water resources", for the purpose of this law, include: springs, streams, rivers, lakes, reservoirs, either surface or ground water, natural or artificial, standing or flowing, including drainage water and sewage".

Water Authority Board

ONE table for decision making



Chairman
Water Authority

Member
Public
Representative

Member
Public
Representative

Member
Ministry of Finance

Member
Ministry of Agriculture

Member
Ministry of Environment

Member
Ministry of Infrastructures,
Energy & Water

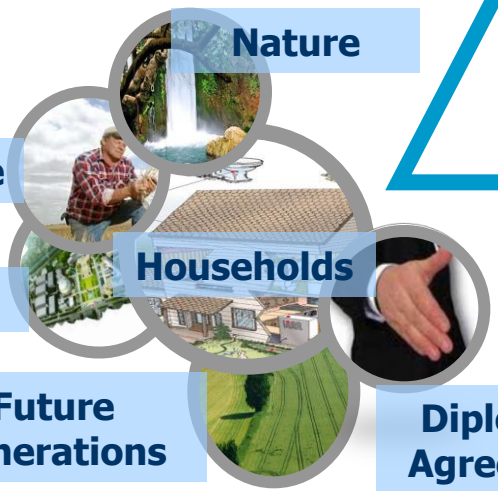
Member
Ministry of Interior

Water Playground

Regulator

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Consumers



Suppliers

MEKOROT
ISRAEL NATIONAL WATER CO.

55 Municipal Water Companies

1000 local suppliers in the rural sector

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Agriculture

Water for agriculture – 1,150 MCM/Y

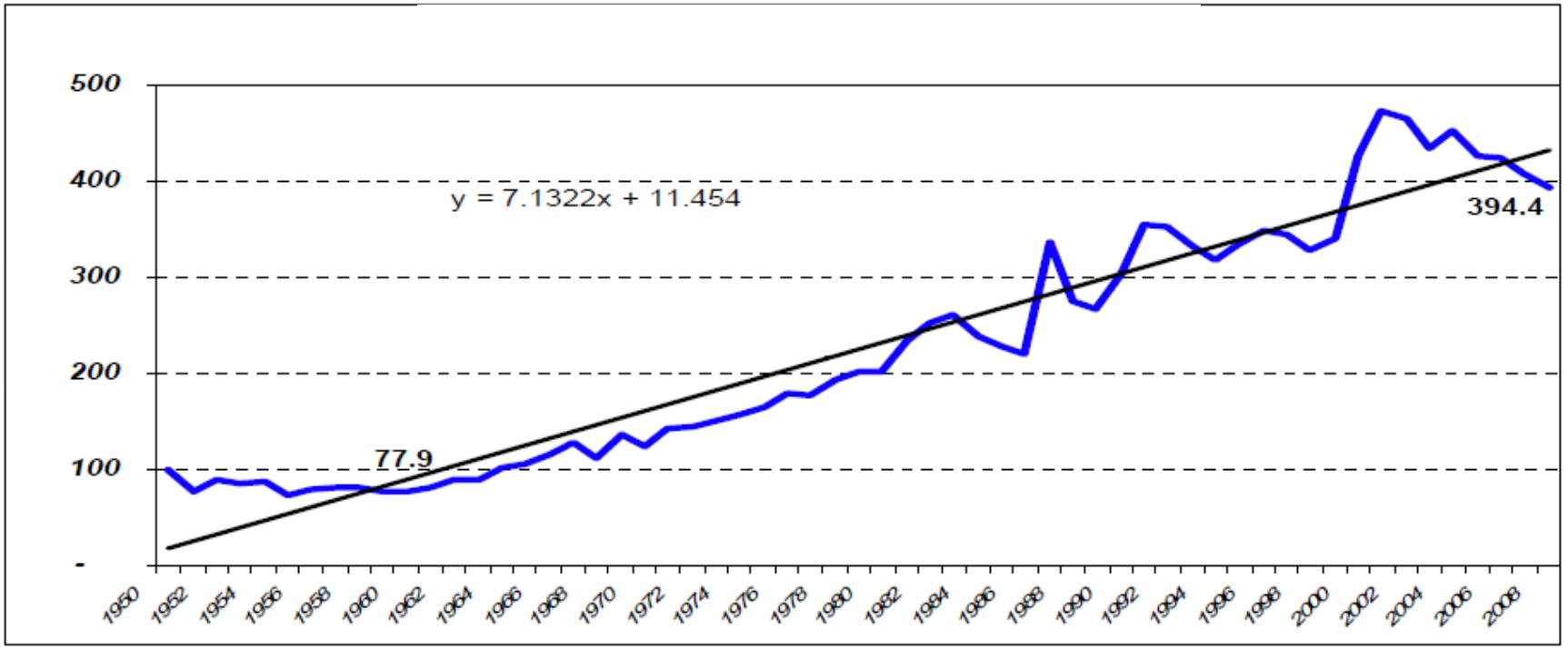
450-530 MCM/Y – constant quota (potable water)

Water Authority development plans:

- Irrigation with recycled effluents in exchange of potable water quota release;
- Reform in water tariffs for agriculture and graduate replacement of subsidy through water tariff towards direct subsidy to farmers;
- Brackish water suitable for irrigation at low tariff.
- Triennial water quotas – increased stability in planning.

Water Saving in Agriculture

Water use efficiency
(production output / water use)
1950-2008



Source: CBS and Planning Authority, MARD

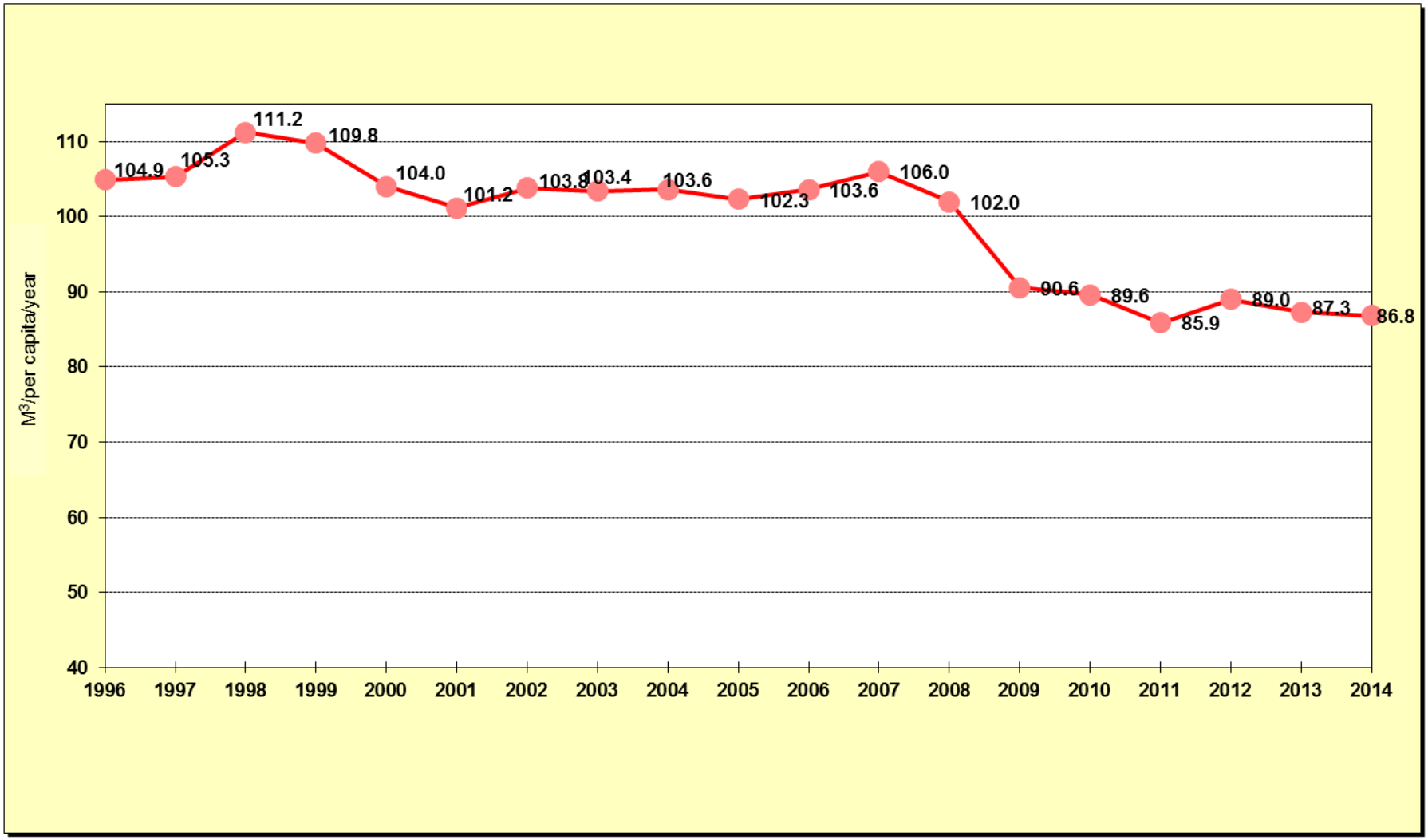
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Domestic Water Consumption

1996-2014*

Per capita / annum



*2014 – estimated data

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Economic Policy:

Methodology for recognized costs of water suppliers

1. The Goal – creating a "**transparent**" methodology for analyzing recognized costs that enable an **efficient** supply of water.

2. Providing resources for infrastructures needed for water supply and defining normative expenses components (& profit) essential for providing services whilst enhancing efficiency.

3. Creating regulatory environment that enables non-discriminatory consumers competition.

4. Creating regulatory environment that encourages the use of efficient water technologies.

The Reform in Water Tariffs

The water tariffs were raised by approximately 40%.

- **The principle of covering all costs**
  providing resources for infrastructures needed for water supply and encourages water conservation.

- **The principle of fairness or uniformity**
  As a rule, all users of water in a given sector pay the same price, regardless of their location.

Water tariffs for the domestic sector:

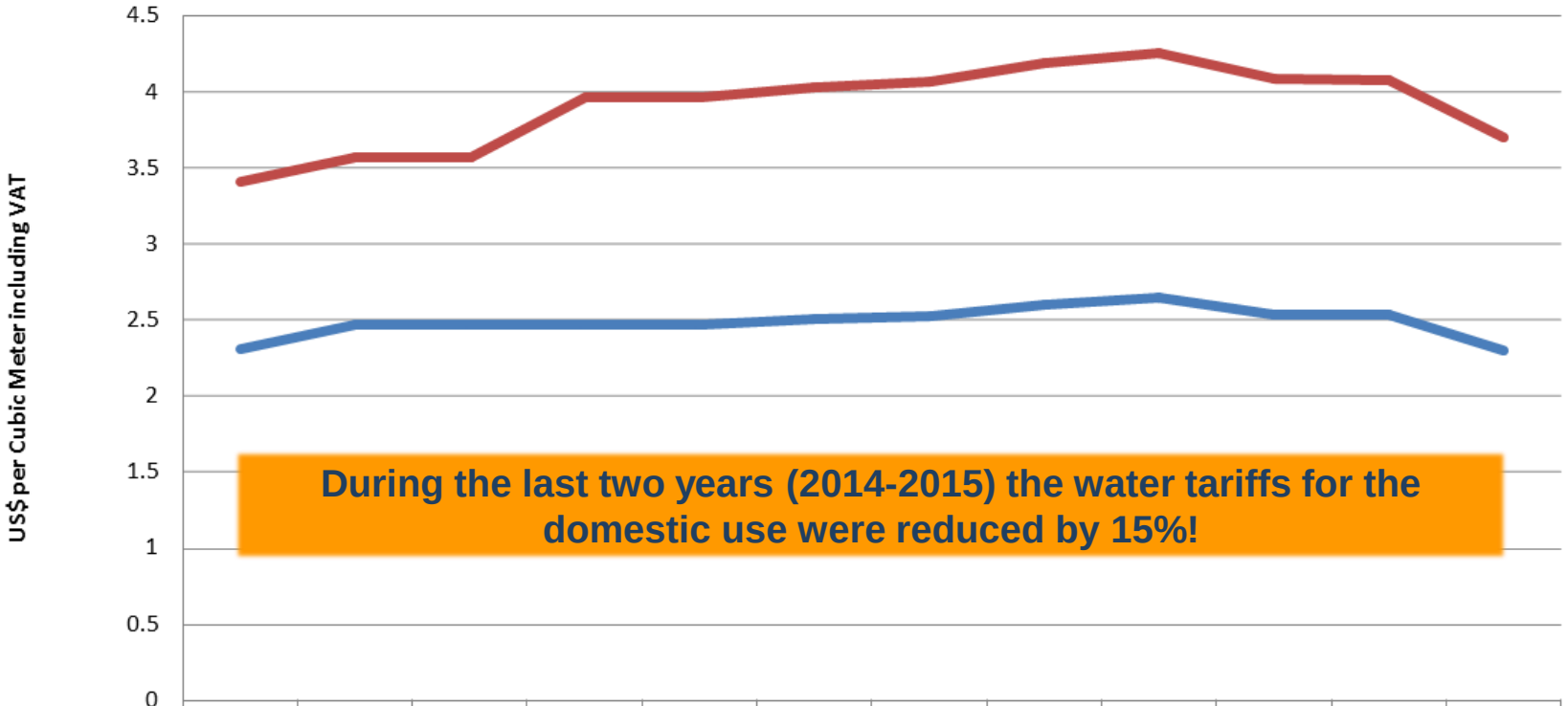
Two-block tariff system:

- **Below 3.5 m3/person/month - the rate is USD 2.3/m3**
- **Above 3.5 m3/person/month - the rate is USD 3.7/m3**

- ❖ **Progressive pricing**
- ❖ **Encouraging conservation**
- ❖ **Cost recovery**



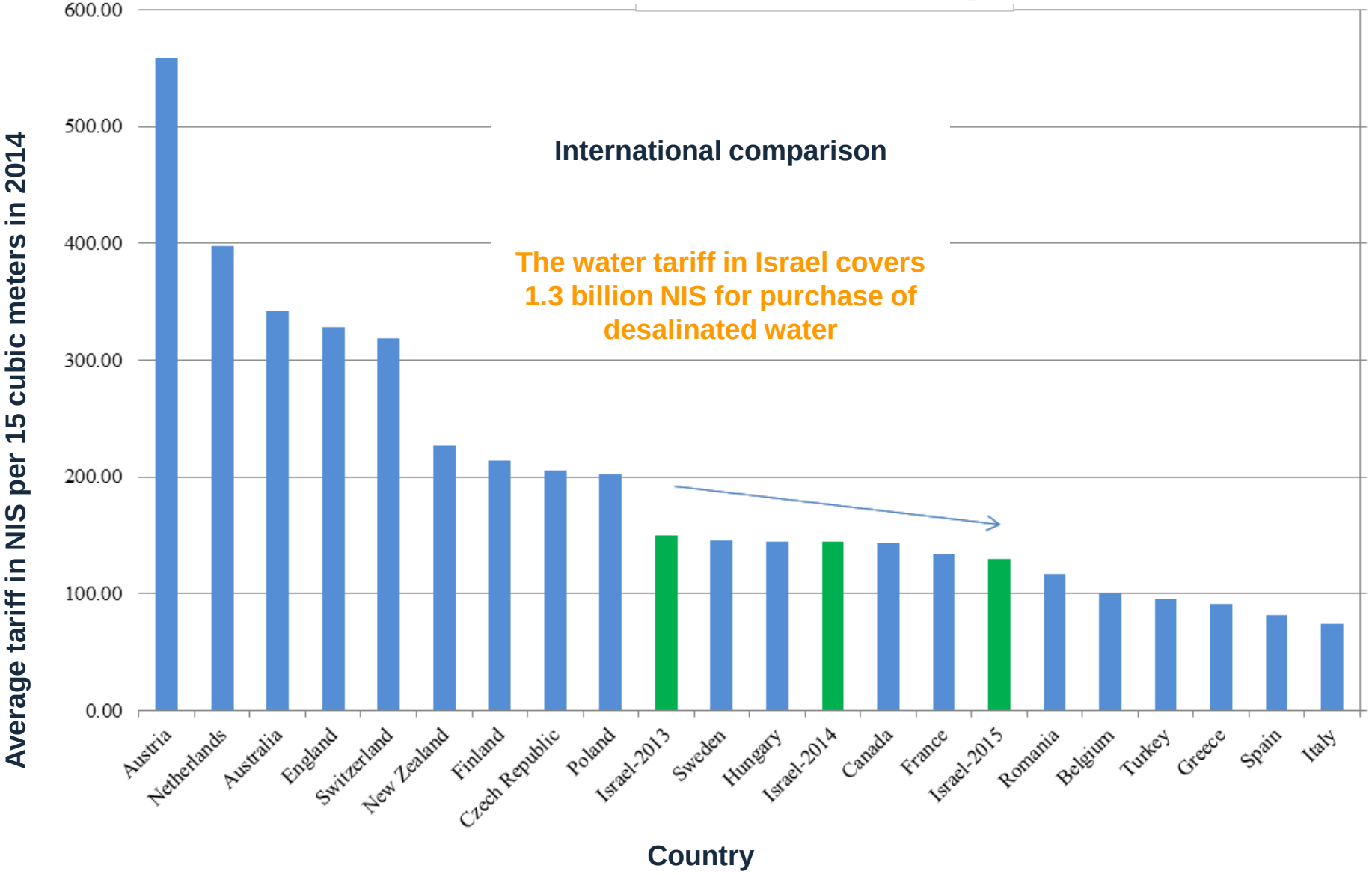
Water tariffs for the domestic sector
Since the reform in 2010:



	01-Jan-10	01-Jul-10	01-Jan-11	01-Jul-11	01-Jan-12	01-Jul-12	01-Sep-12 (VAT changes)	01-Jan-13	01-Jul-13	01-Jan-14	01-Jul-14	01-Jan-15
Low Rate	2.31	2.47	2.47	2.47	2.47	2.51	2.53	2.6	2.65	2.54	2.54	2.3
High Rate	3.41	3.57	3.57	3.97	3.97	4.03	4.07	4.19	4.26	4.09	4.08	3.7

The tariffs are in US$ per M³ including VAT (1US$=3.5NIS)

Tariffs for water and sewage services



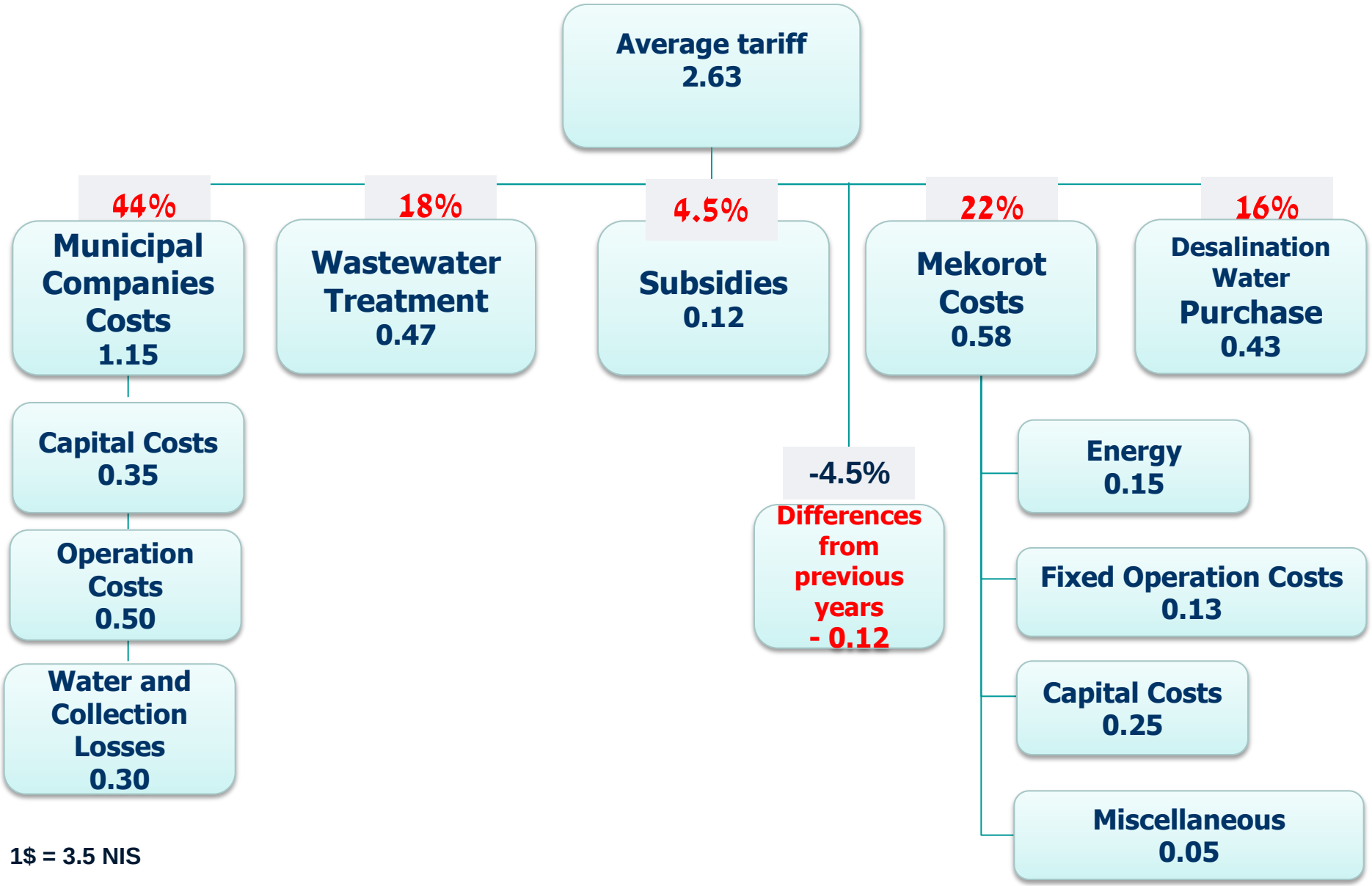
1$= 3.5 NIS

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Water Tariff Components – 2015

(in US$ without VAT):

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1$ = 3.5 NIS

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Principals and Goals of the Israel Water Sector Reforms

Consumers

Water supply is a valuable commodity. The water tariffs enable the sustainability of reliable water supply, preserving the natural water resources and keeping clean environment.

Suppliers

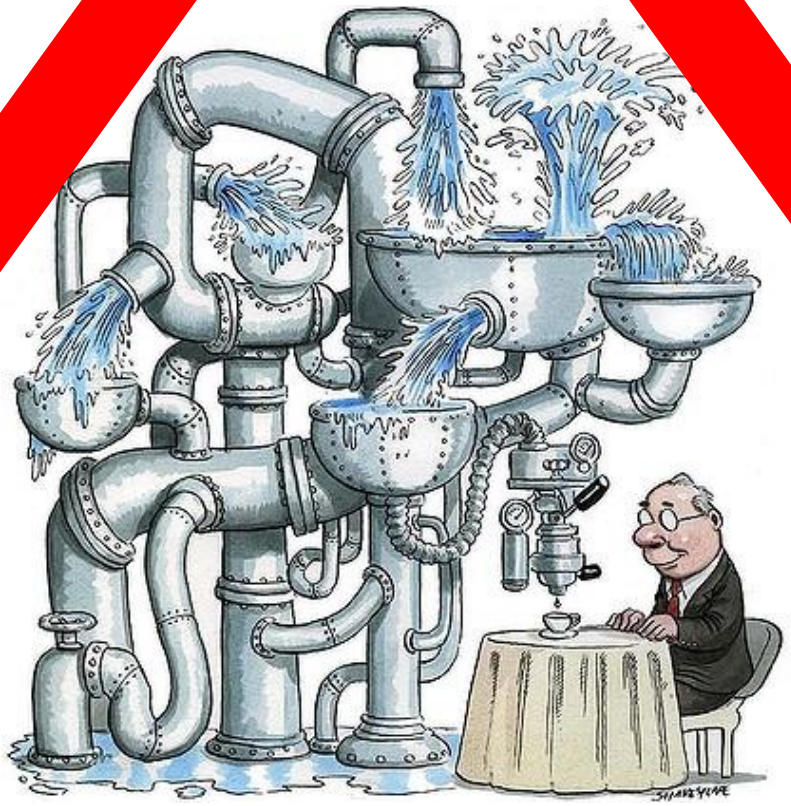
Reliable water and wastewater services; infrastructure development, efficiency and high service standards.

Regulator

Simple and transparent regulatory system that enables development and operation of the water sector.

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Attention – OVER-Regulation AHEAD!



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ONE STOP SHOP:

Plan

Manage

Develop

Supply

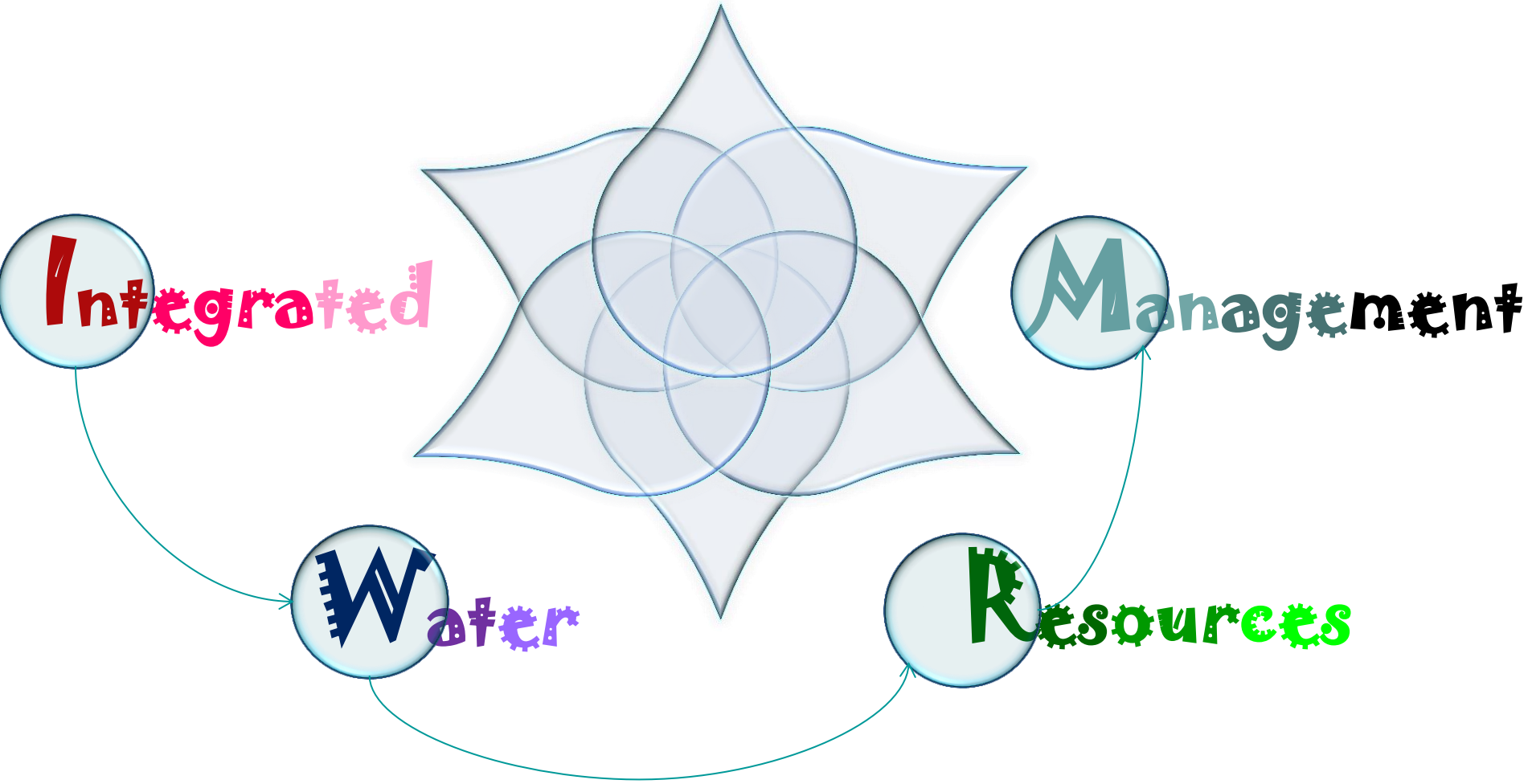
Preserve

Regulate

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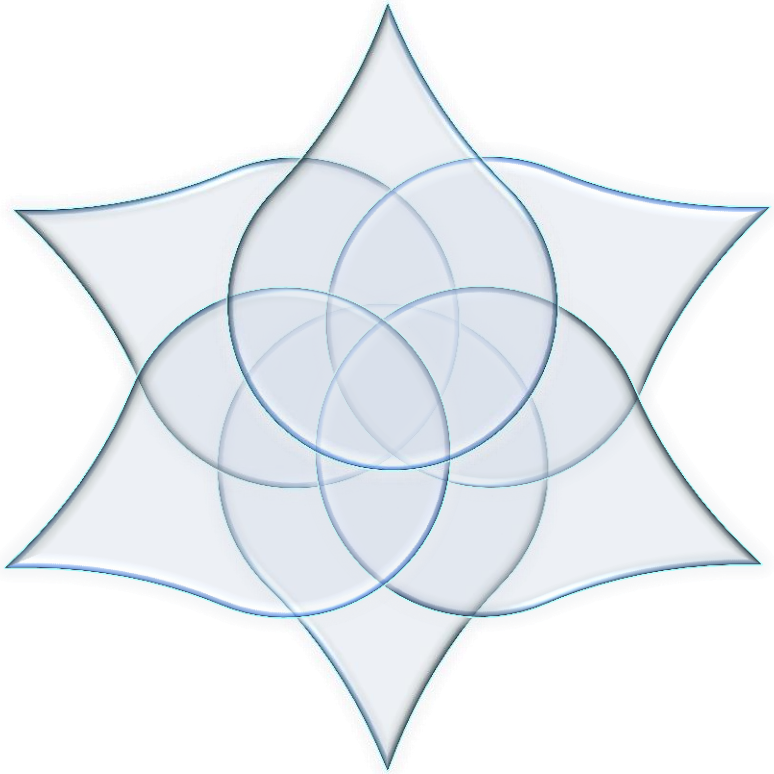
Israeli Model



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Always a drop ahead