

Stream rehabilitation, wastewater treatment and associated pollution prevention in Israel



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Ministry of Environmental protection



The Division goals and vision

- Protect water resources from pollution.
- Rehabilitate streams to be natural habitats, with water flowing from natural sources to be used as leisure resorts for public welfare.
- Prevent the spill of sewage and effluent into streams or the environment.
- Treat sludge and reuse it in agriculture.
- Treat Wastewater to higher quality and reuse it as a significant water resource in agriculture, while preserving the environment and human health.

Water Availability (& scarcity)

Israel: 160 m³/capita/year

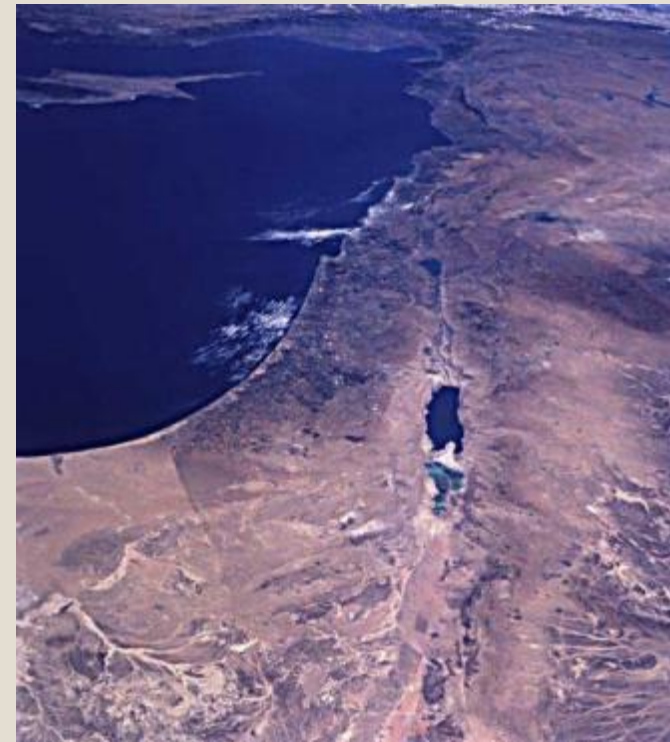
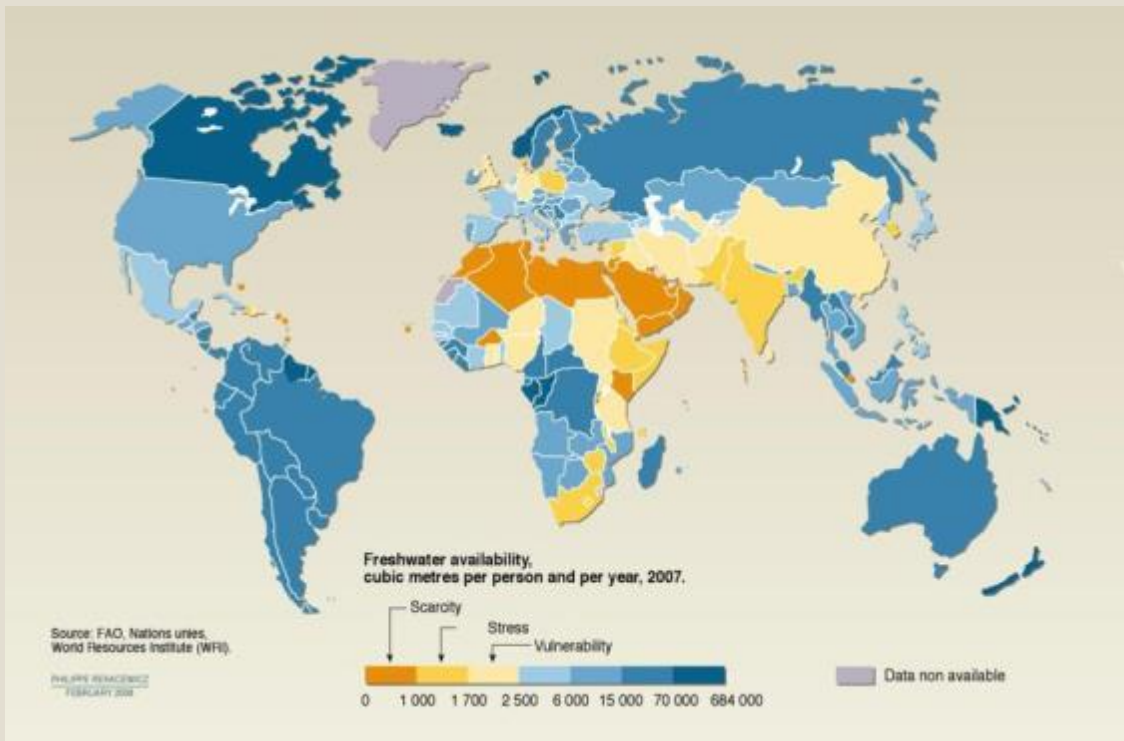
'Water scarcity' as defined by the UN: (0-1000 m³/capita/y)

Current population ~ 8 million and growing

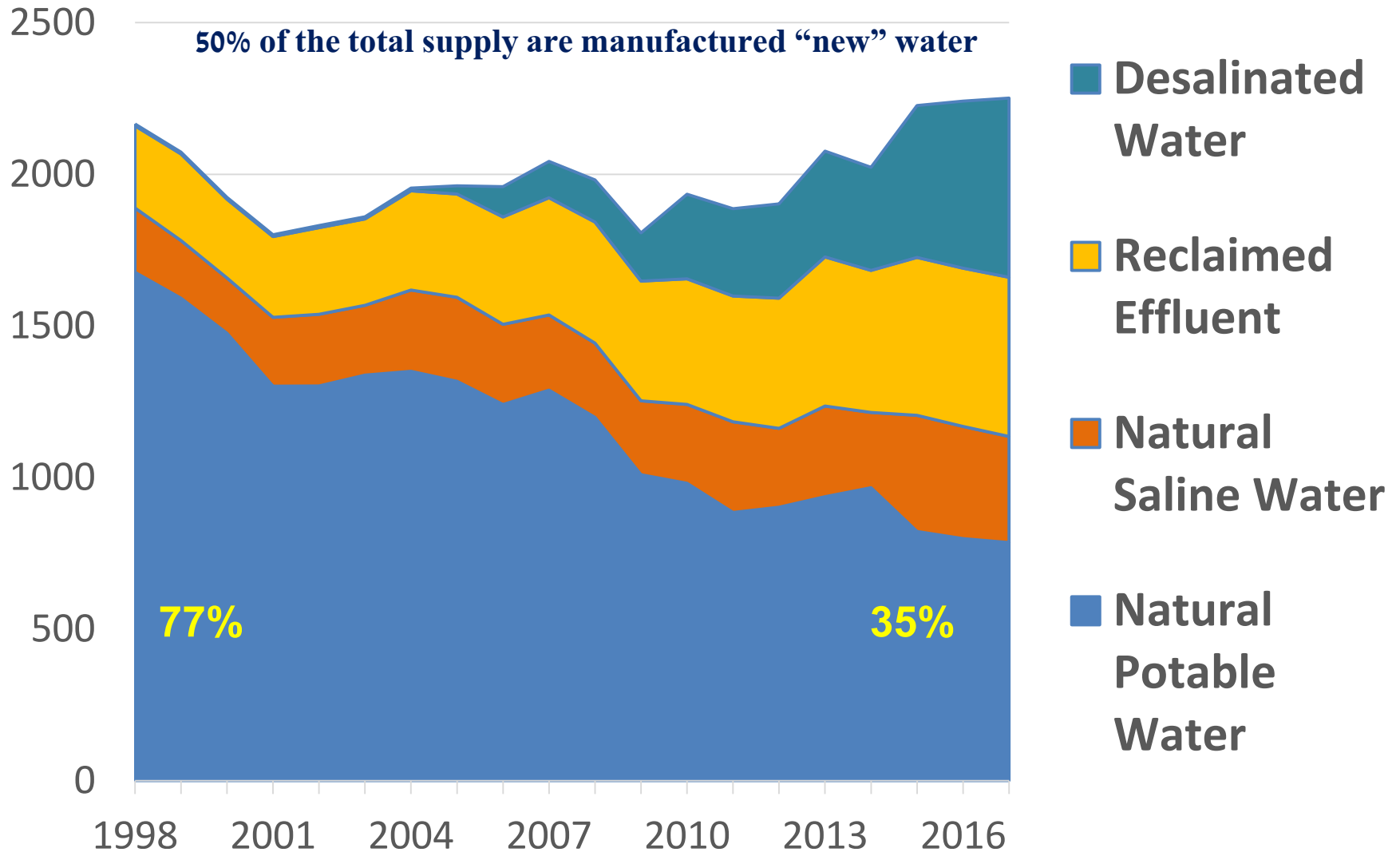
Natural water refill: 1170 MCM (per year)

Water consumption: 2150 MCM (per year)

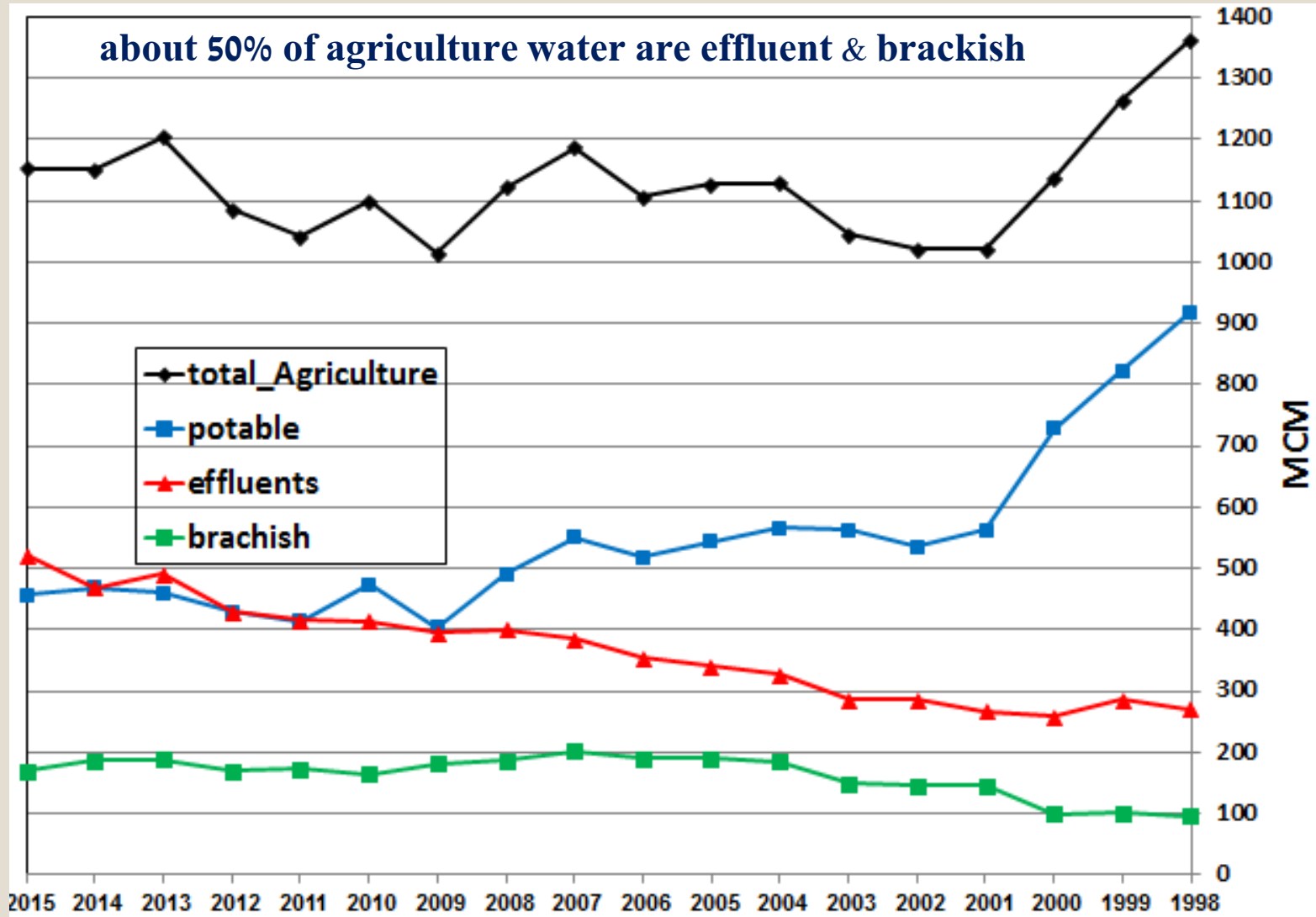
**water deficiency
of 45%**



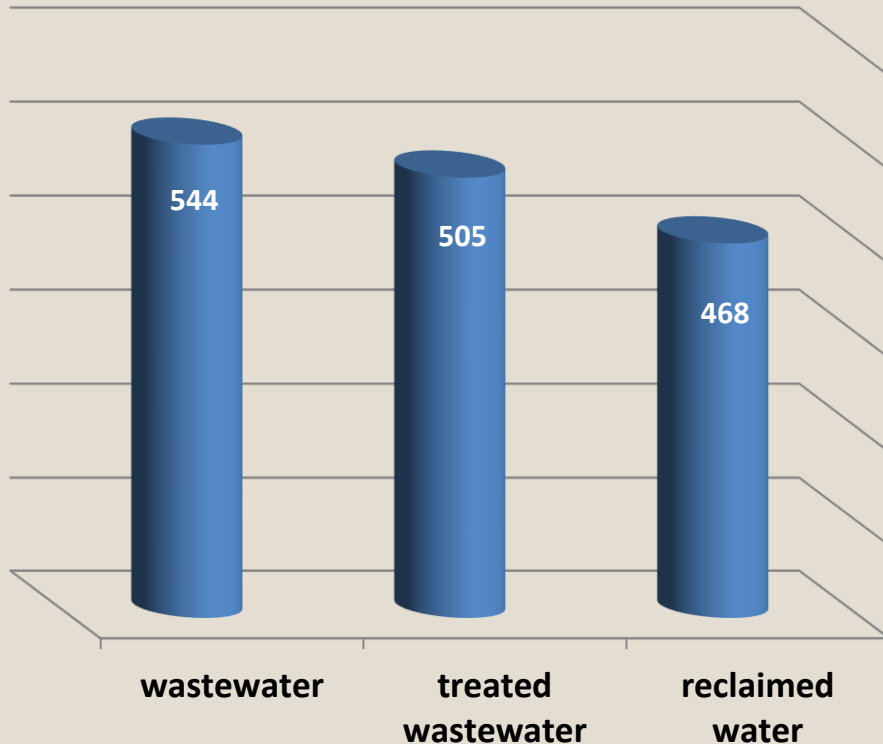
Water Supply by Resources (MCM) in Israel 1998 -2017



Water Sources in the Agriculture Sector



Wastewater, Effluent Qualities and Quantities



About 50% of the effluent are tertiary

With time all the big WWTP will produce tertiary effluent

544 million m³ → 93% is treated → 86% reused

World's leader in treating and reusing effluent!

The recent past: most Israeli streams were polluted

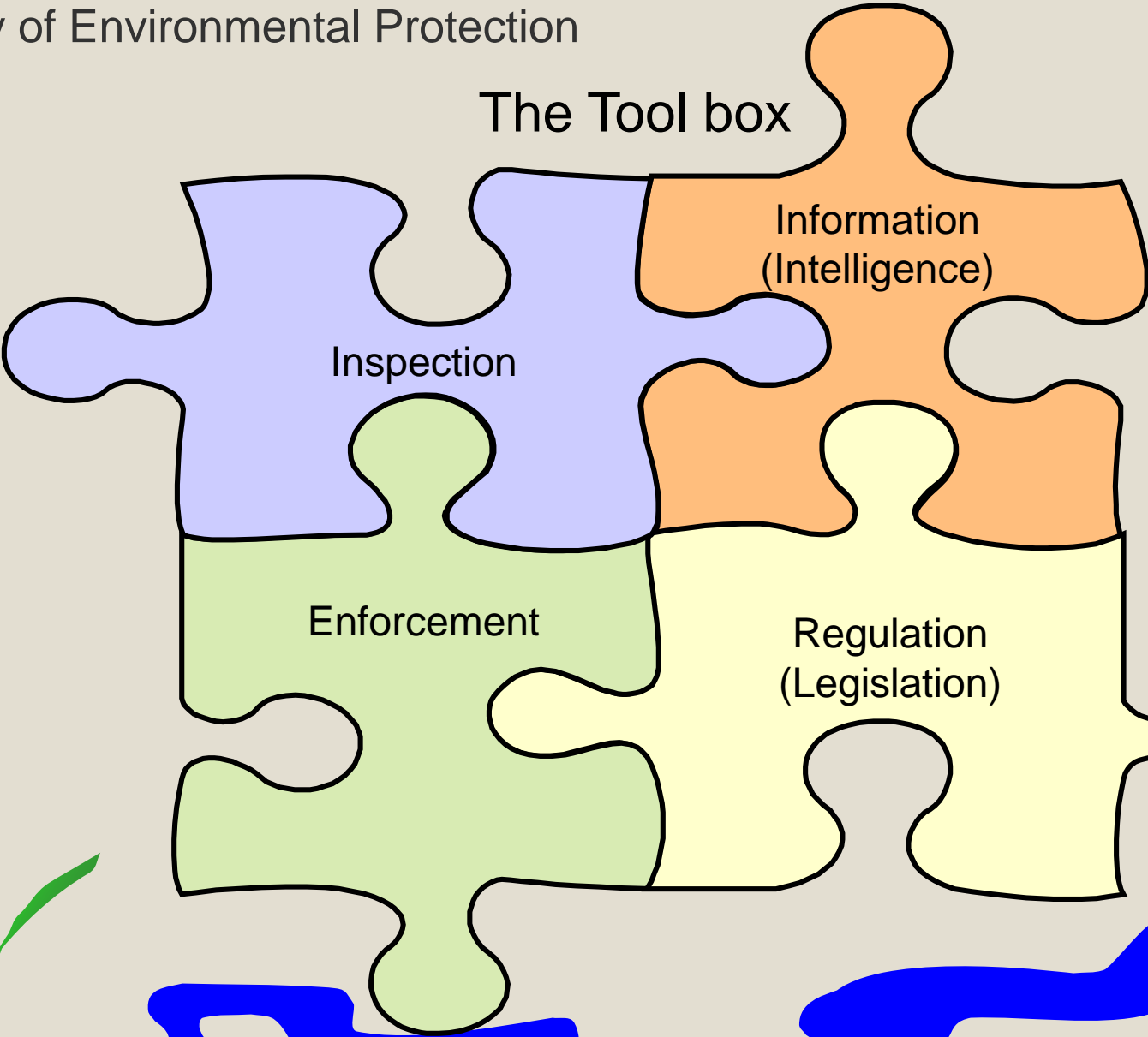
The main causes:

- Using streams as canals to discharge sewage and effluent.
- Utilizing water springs for drinking water and agriculture.
- Outdated technology for collecting and treating sewage.
- Incompatibility between the sewage capacity and the waste treatment plants and the effluent reservoirs.
- Flow of sewage from the Palestinian Authority.
- Contaminated agricultural runoff.
- Fish ponds output.
- Lack of awareness to the importance of rivers and streams.



Ministry of Environmental Protection

The Tool box

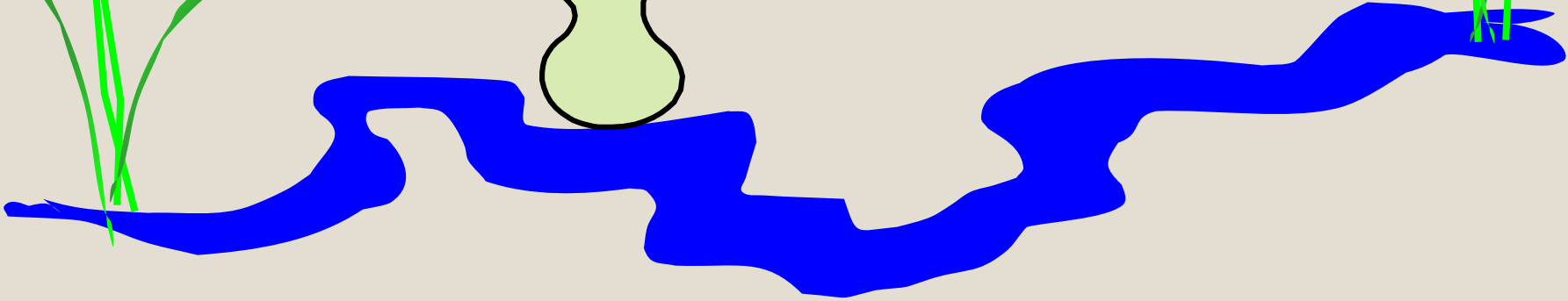
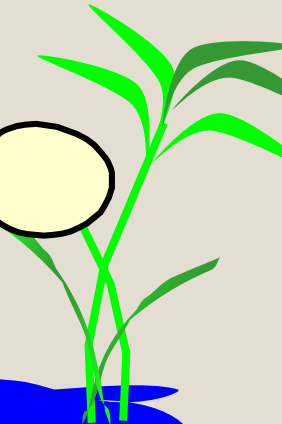
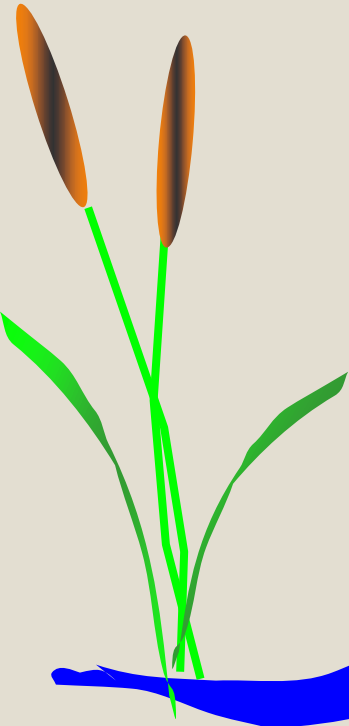


Information
(Intelligence)

Inspection

Enforcement

Regulation
(Legislation)

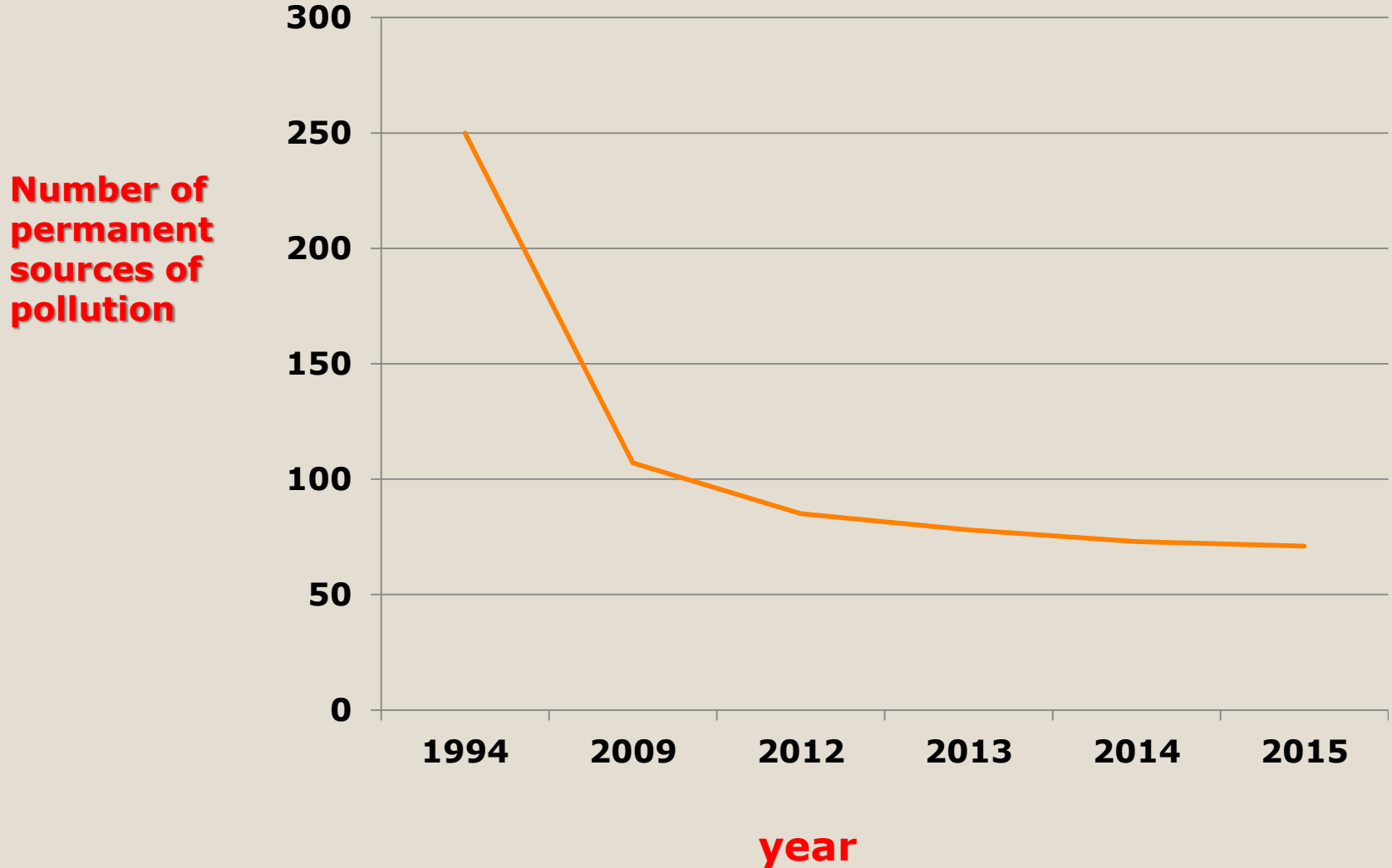


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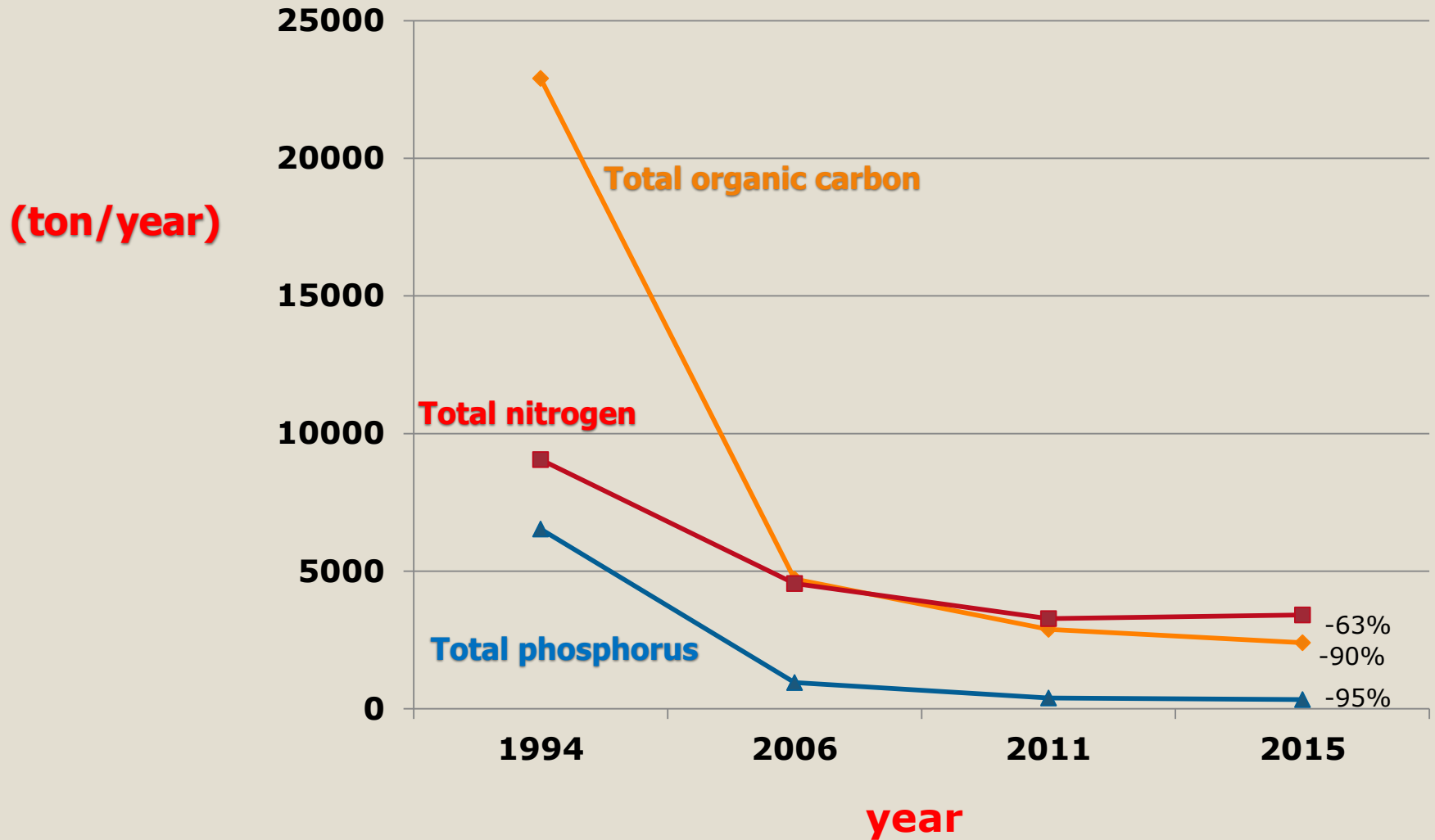
most Israeli streams are much cleaner

- **New regulations and enforcement.**
- **Long term monitoring and creating data base.**
- **Reform in the water sewage sector (water & sewage cooperation's) and huge investments.**
- **Effluents as a resource.**
- **Building many WWTP's and reservoirs.**
- **Pretreatments of sewage in industry.**
- **And more...**

Number of permanent pollutant sources to streams



Pollutant loads in streams

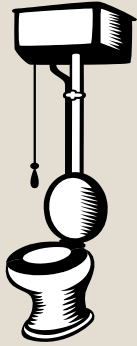


Water National policy

- Ensuring sustainable supply of water for agriculture, industry, public gardening and discharge to streams.
- Creating “new” water – large scale sea water desalination and reusing effluent from wastewater treatment plants.
- Gradual replacement of freshwater by reclaimed effluent for irrigation.
- Wastewater and sludge treatment in central treatment plants.
- Cost-effective water supply.

The challenge

From nuisance to asset



500 BOD



10 BOD



Policy, Regulations and Standards

WATER LAW: WATER IS PROPERTY OF THE STATE

Sewage, according to the Israeli Water Law, is defined as a water source.

Water price shall reflect its cost to ensure effective water use.

Wastewater quality for unrestricted irrigation (2010)

- *Standards for 36 parameters.*
- *The standards take into consideration: Environmental, Agricultural, Flora, Public Health & Hydro-geological Aspects.*

Wastewater quality for disposal to streams (2010)

Require stringed quality (more then for irrigation) and also a special permit.

Effluent quality standards (Average)

Parameter	Units	Irrigation	Stream
BOD5	<i>mg/L</i>	10	10
TSS	<i>mg/L</i>	10	10
COD	<i>mg/L</i>	100	70
Total Nitrogen	<i>mg/L</i>	25	10
Ammonia	<i>mg/L</i>	10	1.5
Total phosphorus	<i>mg/L</i>	5	1.0
Dissolved Oxygen	<i>mg/L</i>	>0.5	>3
pH		6.5-8.5	7.0-8.5
Fecal Coliforms	<i>MPN/100mL</i>	10	200
Residual Chlorine	<i>mg/L</i>	0.8-1.5	0.05

*** 26 more standards for metals and other parameters**

The way to achieve the new standards

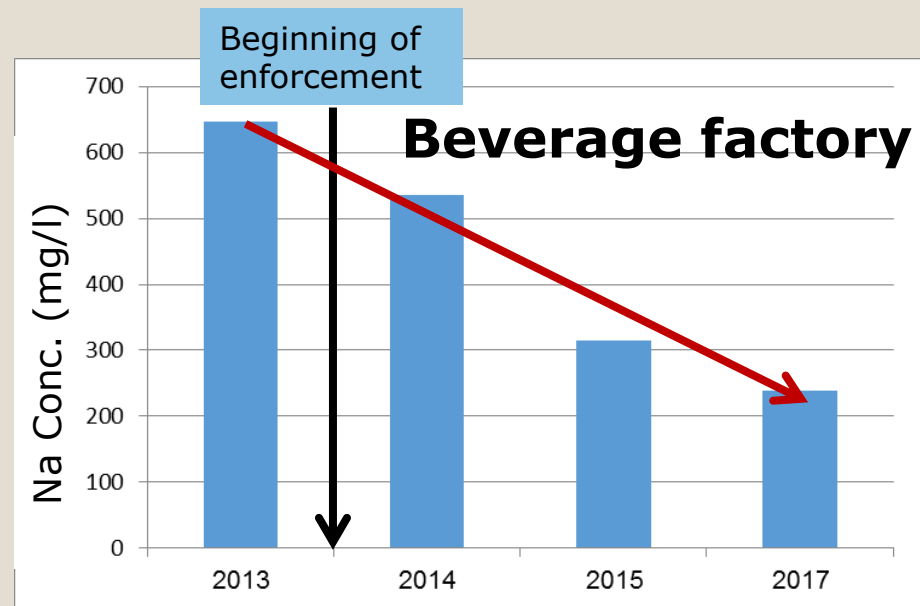
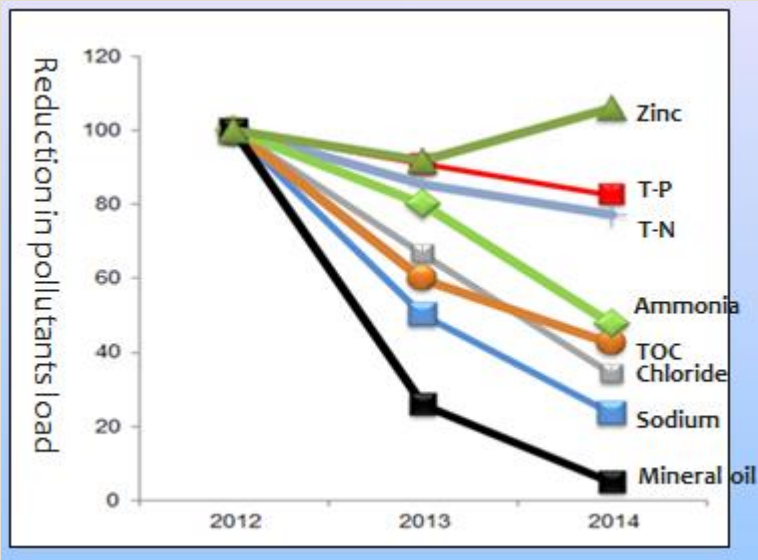
- *Organics, TSS, N & P* - *Tertiary Treatment (WWTP)*
- *Pathogens* - *Disinfection (WWTP)*
- *Metals* - *Treatment at the source
(Industrial pre-treatment)*
- *Salt Removal* - *Treatment at the source; Industrial pre-treatment & sea disposal of the brine*

Policy, Regulations and Standards

Industrial effluent quality (2014)

Require pretreatment at the plant before discharging to the public sewerage.

- ❑ Protect the sewage system from damage and clogging
- ❑ Protect the biological process in the WWTPs
- ❑ Reduce contaminants from sewage and effluent



Intensive large (>1000 m³/day) municipal WWTP

1994: 7

1998: 20

2002: 29

2007: 35

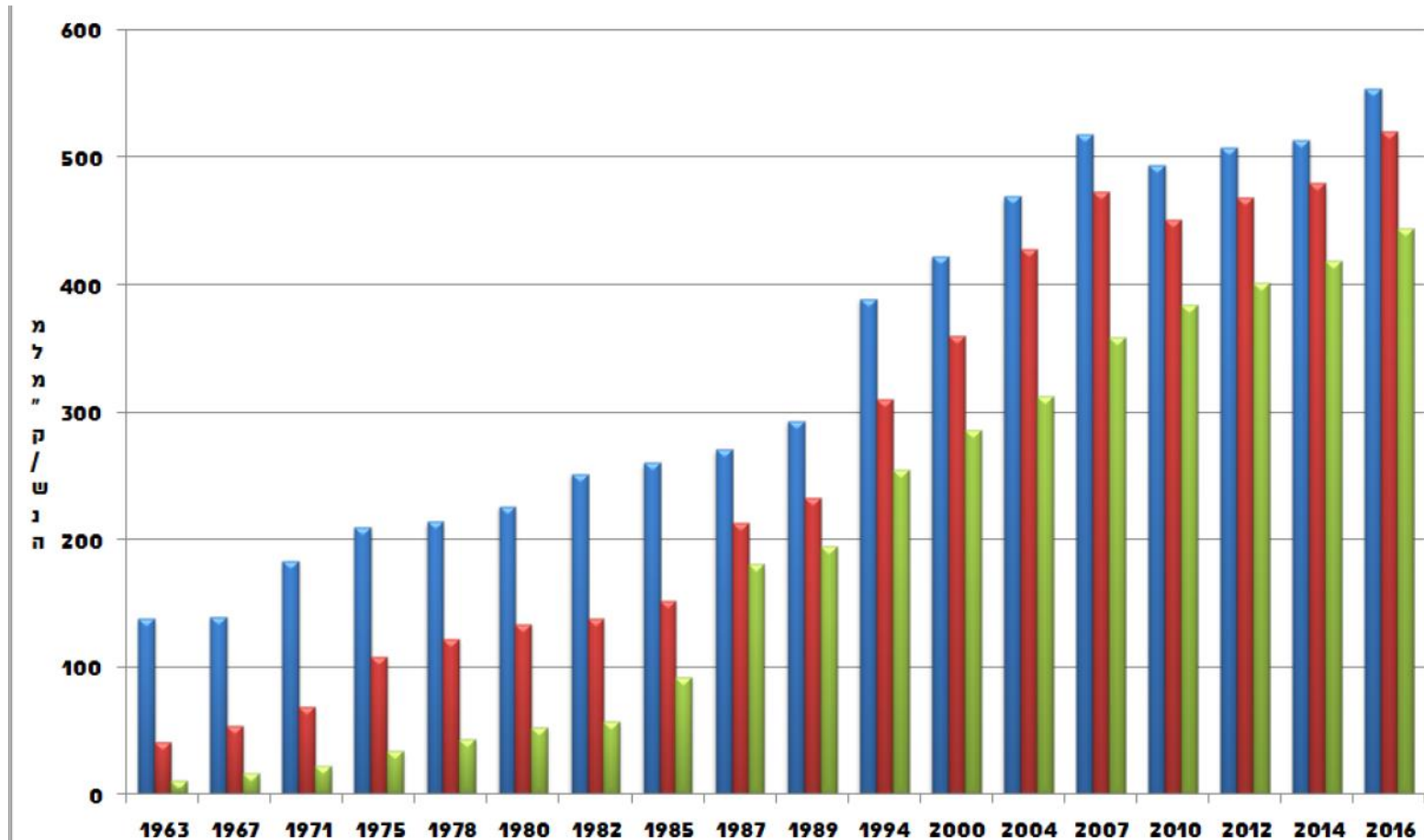
2010: 48

2017: 88

investment of over 5 billion \$ in sewage collection, treatment & reuse in 20 years



Treated and utilized wastewater over time

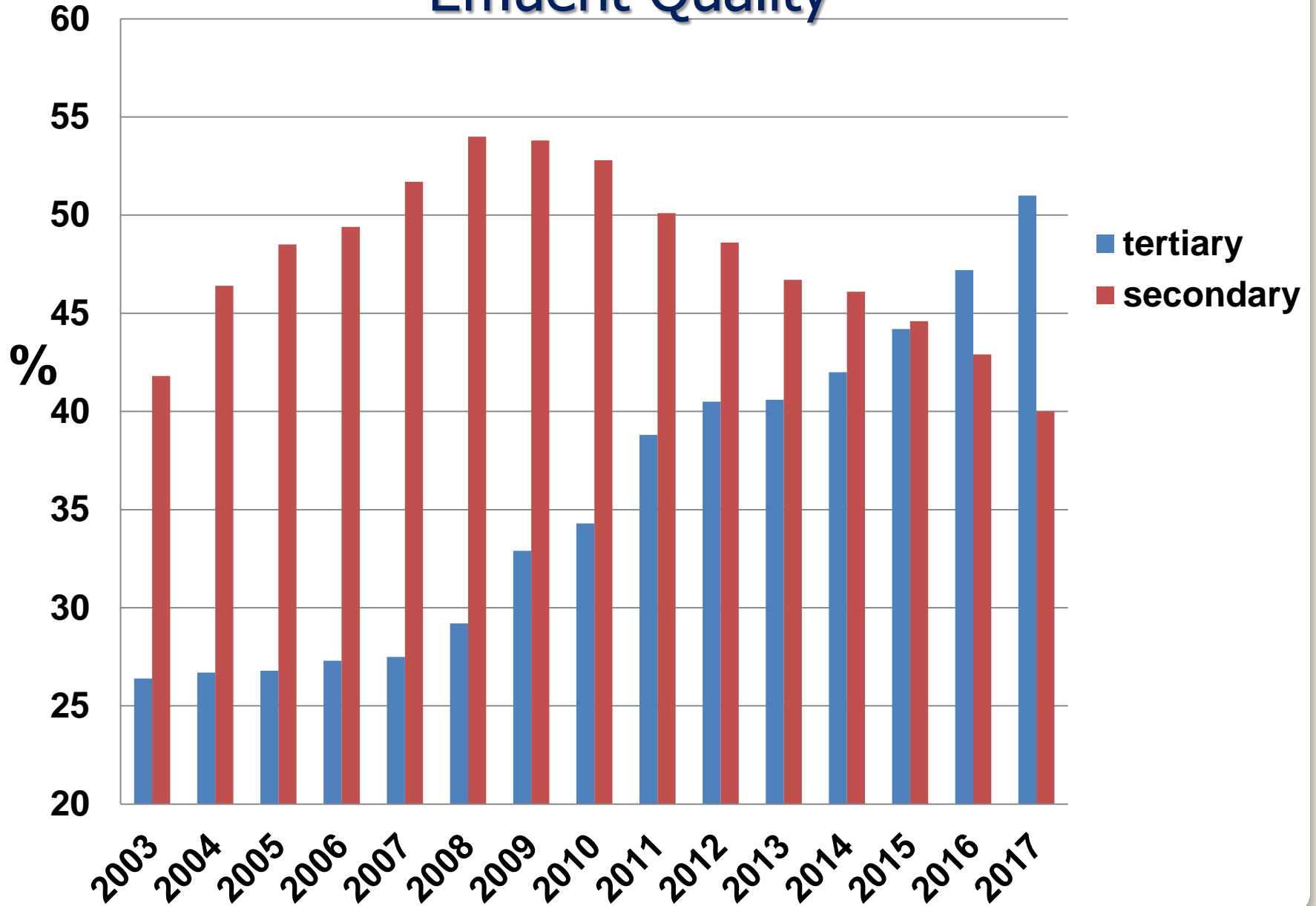


Total wastewater

Treated effluent

Utilized effluent

Effluent Quality



Municipal Wastewater Treatment in Israel

Total municipal sewage - 540 MCM

99% of the sewage is centrally collected

1% is discharged to cesspools in rural areas

97% is treated:

82% is reclaimed for reuse

18% is released to the rivers or sea

Conclusion

Israel is the leading country in the world utilizing treated wastewater for irrigation.

The quality of treated wastewater is high.

The reuse of treated wastewater for irrigation serves two main goals:

- reliable water source for agriculture even in drought years.
- protecting water resources and prevent stream pollution.

The high reuse of effluent in Israel led to new innovative technologies for wastewater treatment.

Thanks

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