WATER AUTHORITY

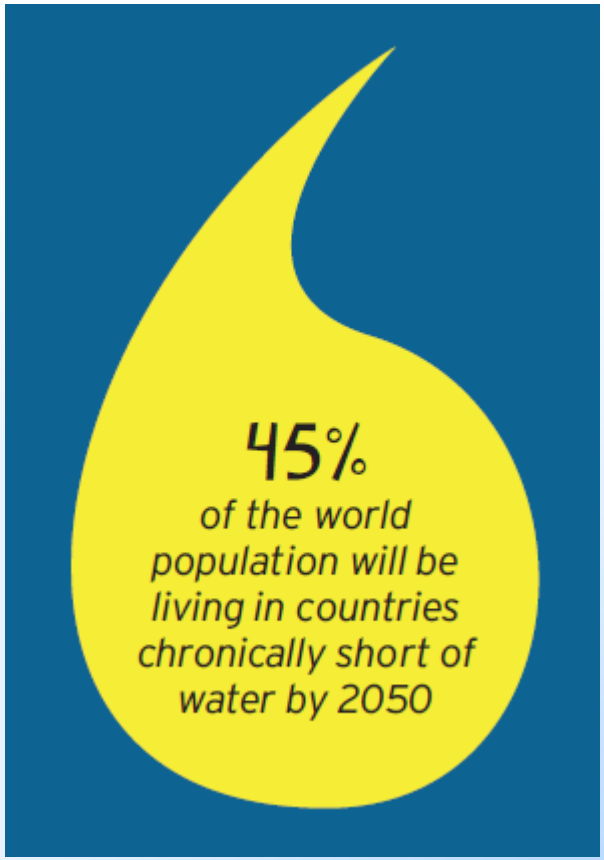
STATE OF ISRAEL

Challenges and Solutions for the Water Sector in Israel and the Region

Amir Givati, Israeli Hydrological Service – Water Authority

WATER AUTHORITY

STATE OF ISRAEL



In the Middle East it is a well known reality!

WATER AUTHORITY

STATE OF ISRAEL

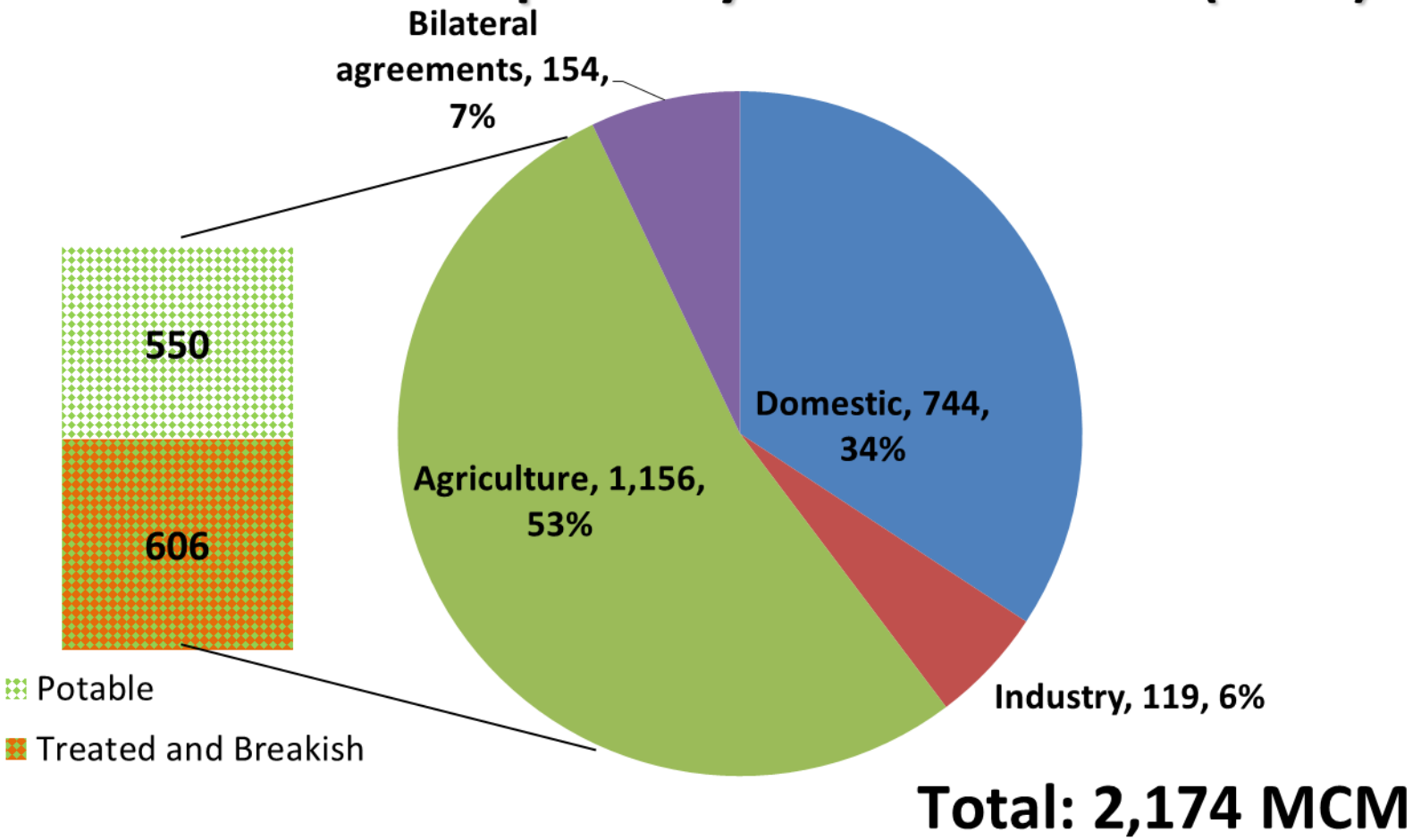
CHALLENGES

WATER AUTHORITY

STATE OF ISRAEL

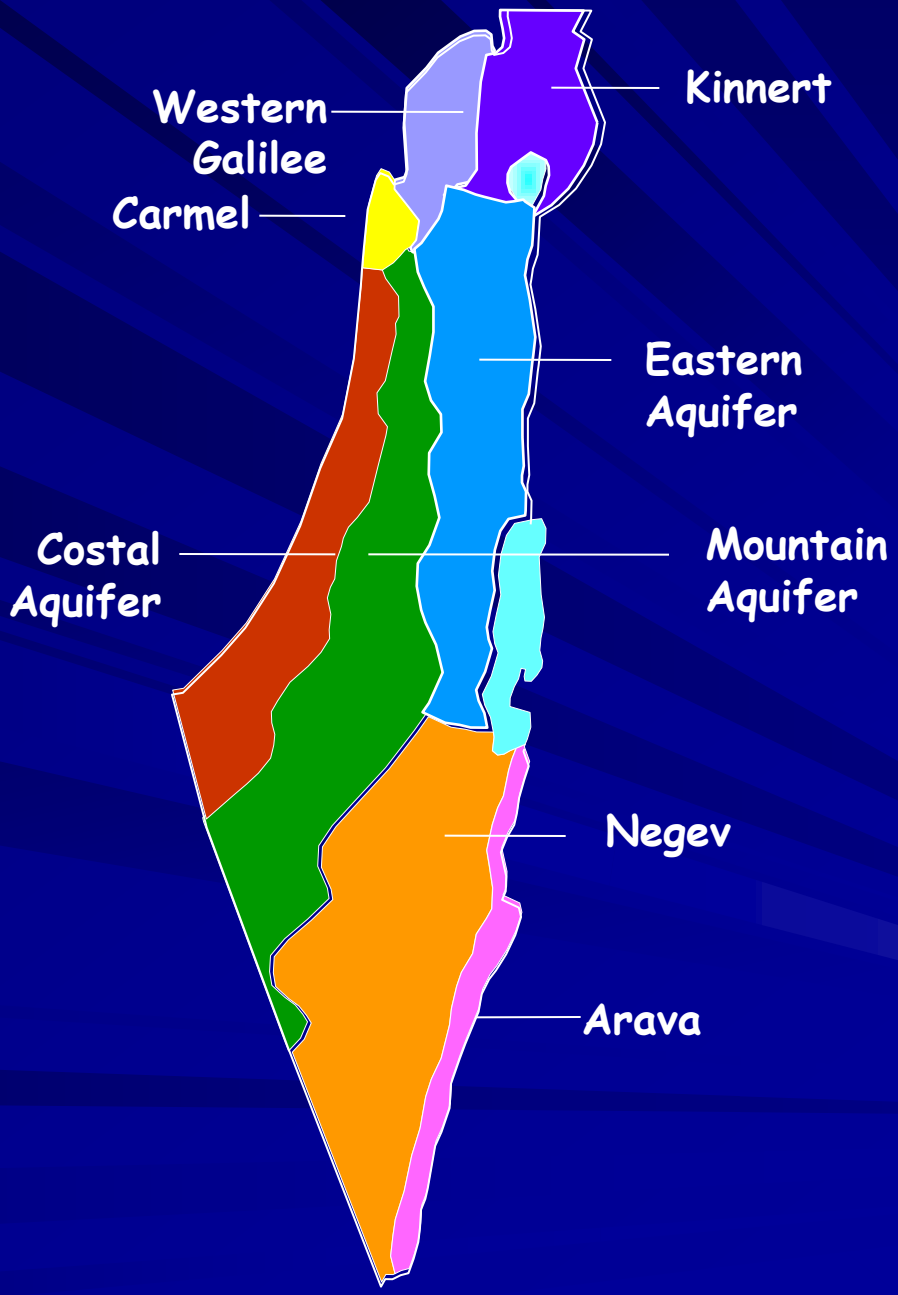
- Average total natural enrichment – 1.170 billion m^3/annum
- Water demand – more than 2 billion m^3/annum
- Current potable water demand < 1.2 billion m^3/annum
- Forecast for water demand 2020 ~ 1.7 billion m^3/annum

Water Consumption by Sector in Israel (2014)



Total: 2,174 MCM

The major Aquifers in Israel

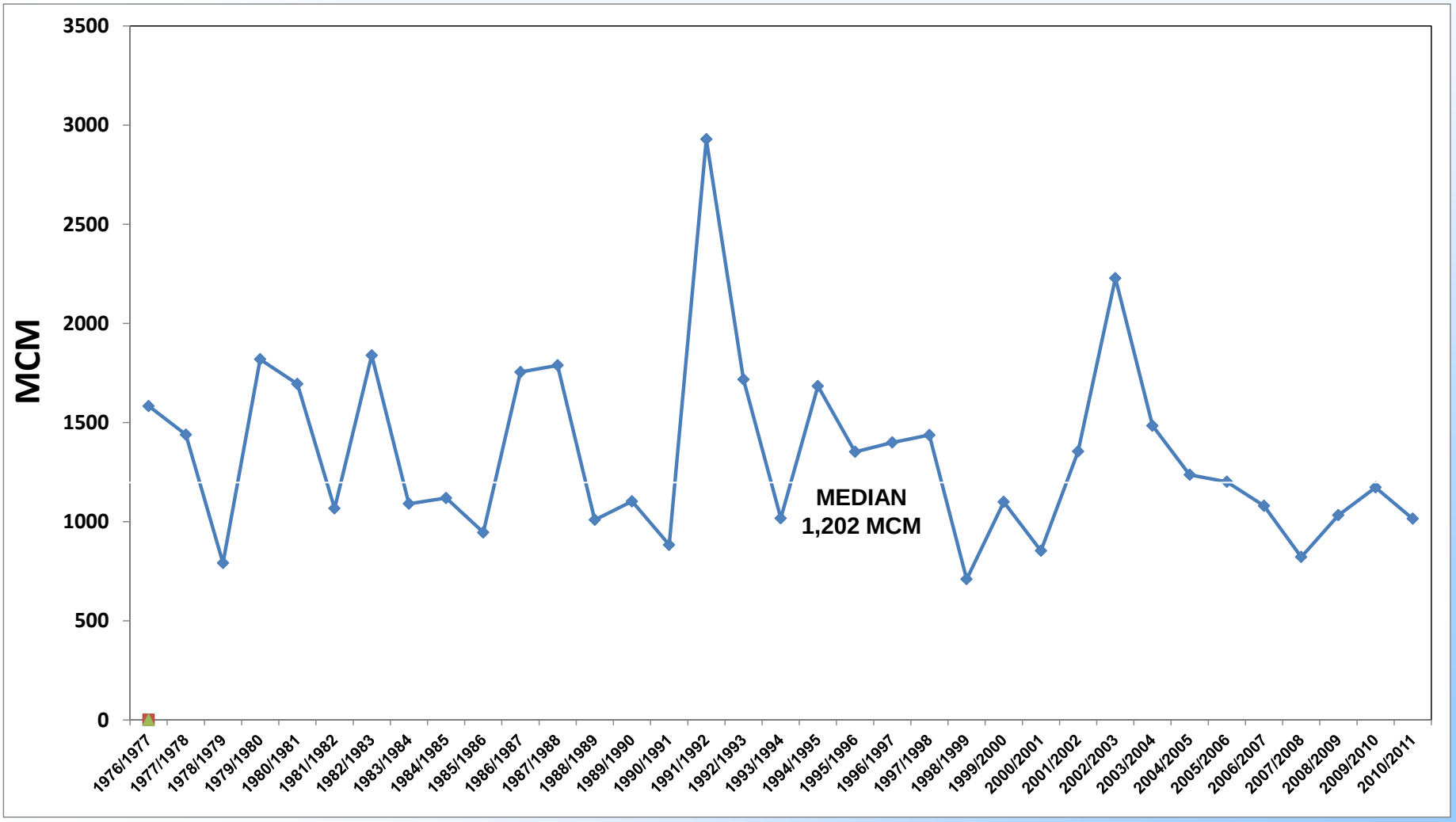


WATER AUTHORITY

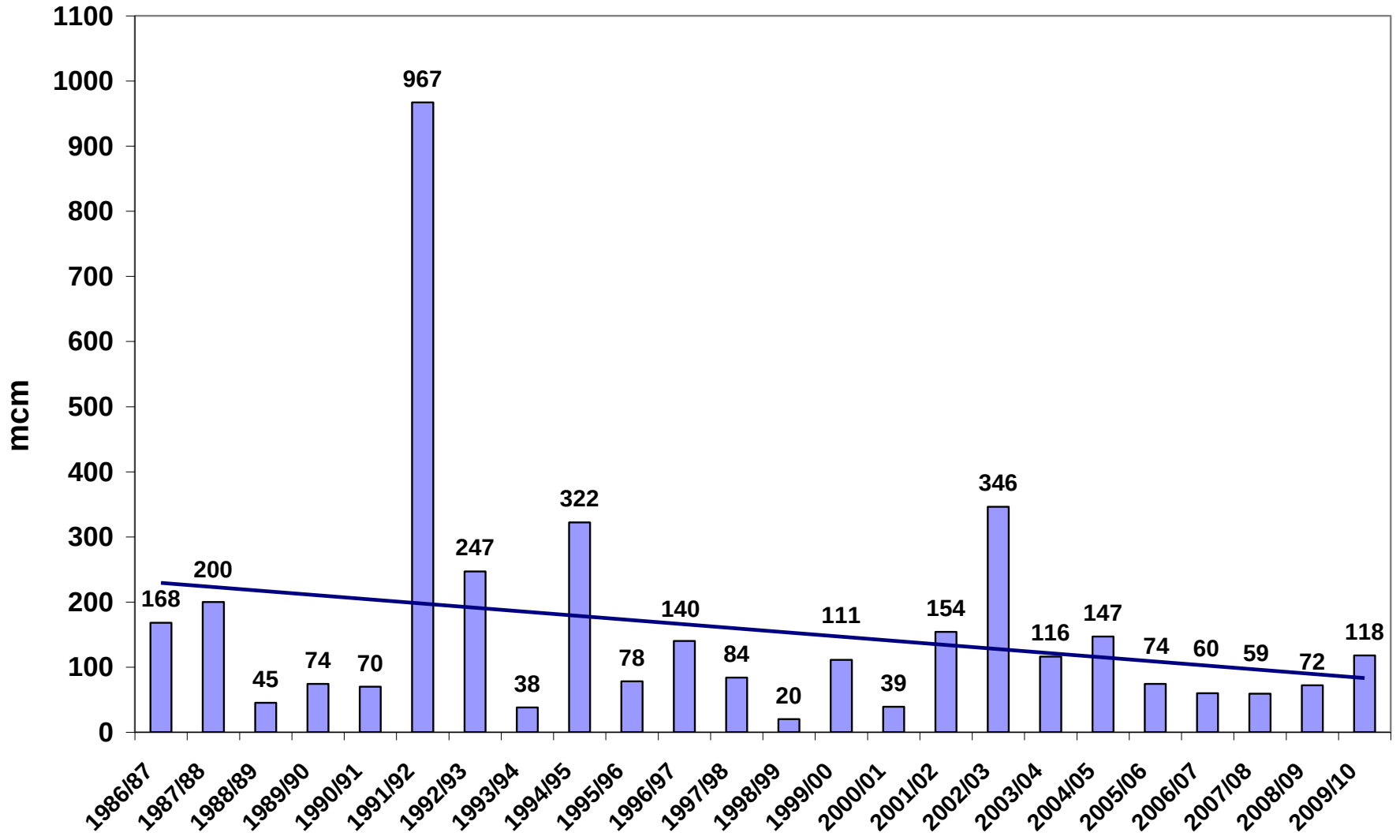
Recharge from Rainfall along years: 1975-2011

STATE OF ISRAEL

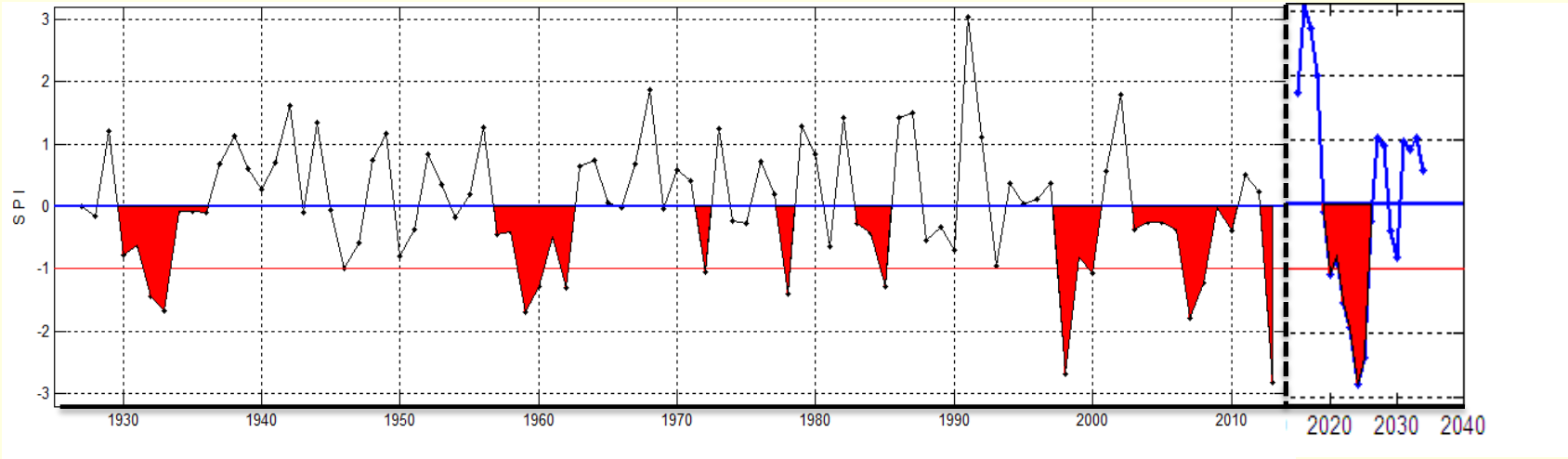
AVERGE: 1,336 MCM , MEDIAN: 1202, STD: 456 MCM
Min. : 710 MCM Max. : 2,929 MCM



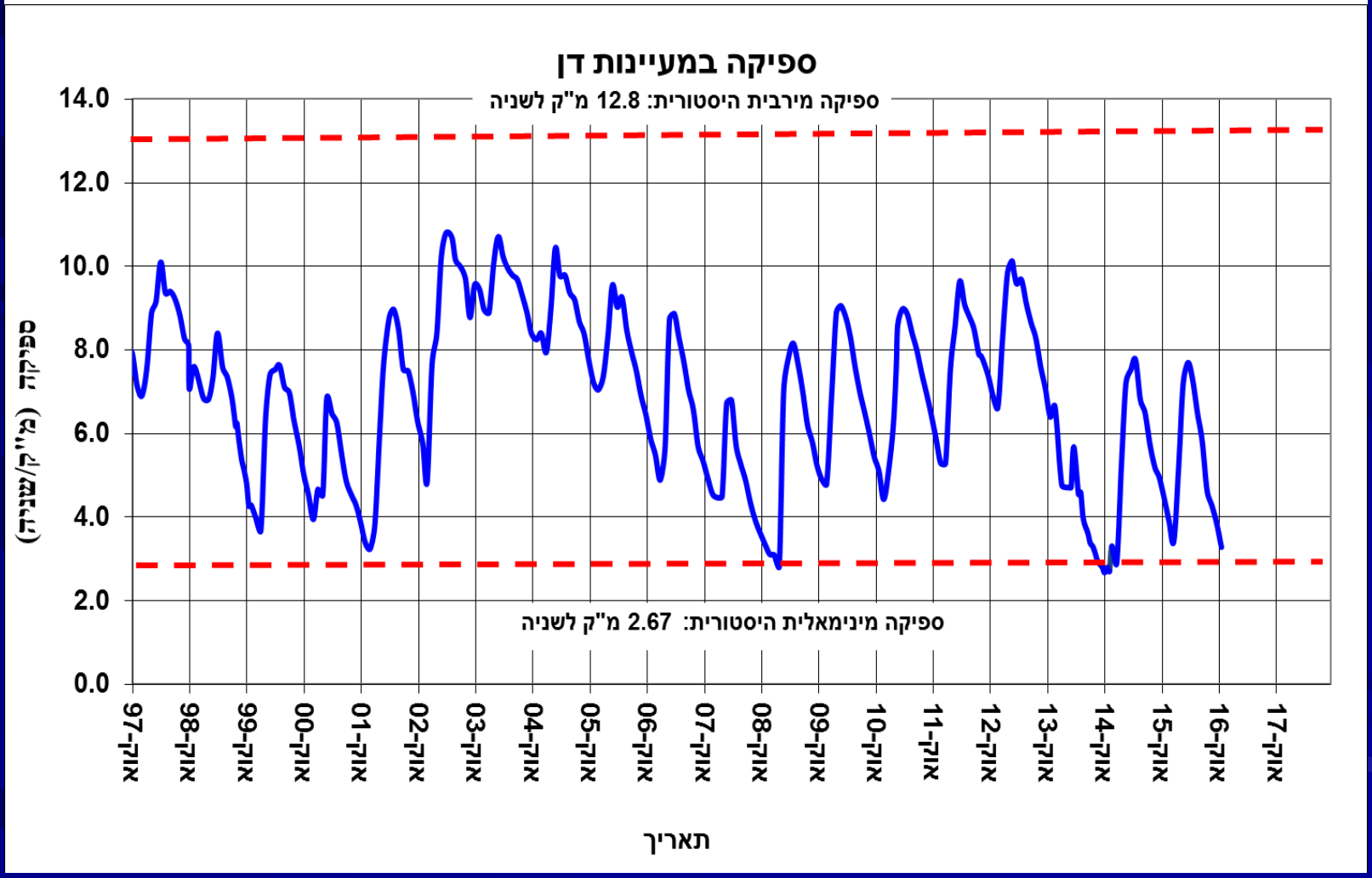
Annual runoff volume in the Western drainage area



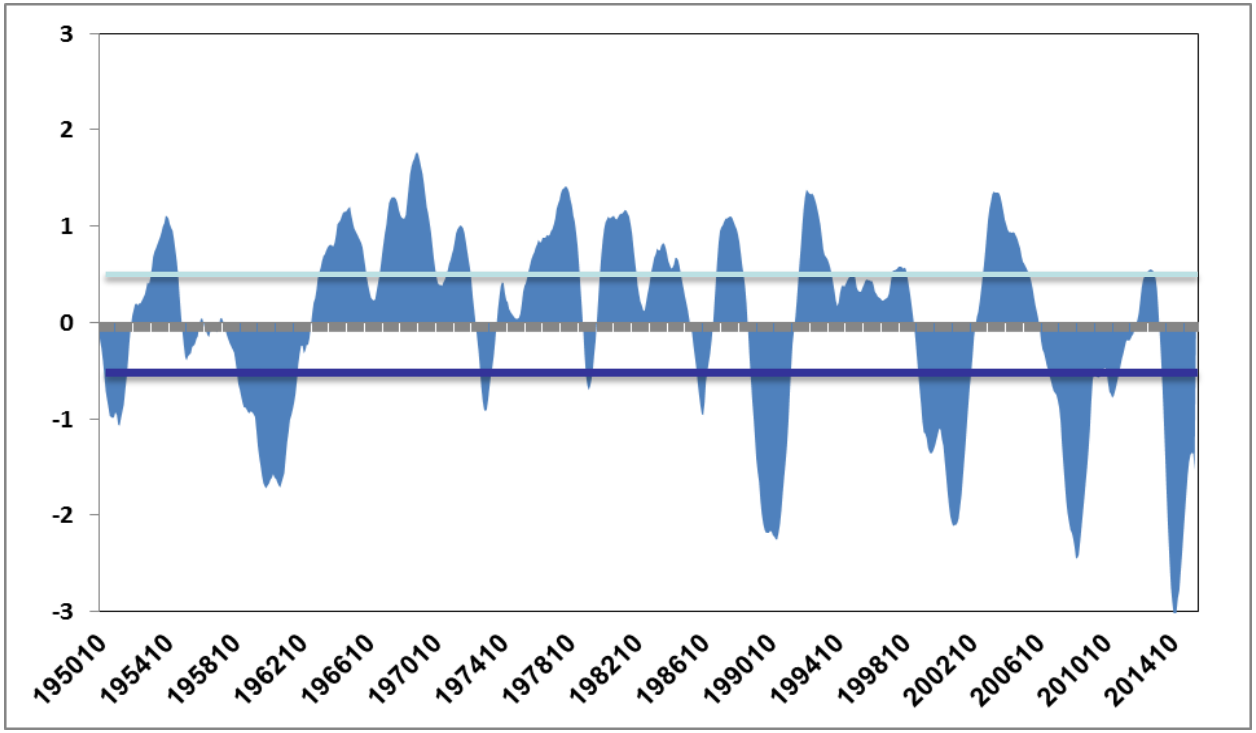
Drought monitoring using the SPI Index

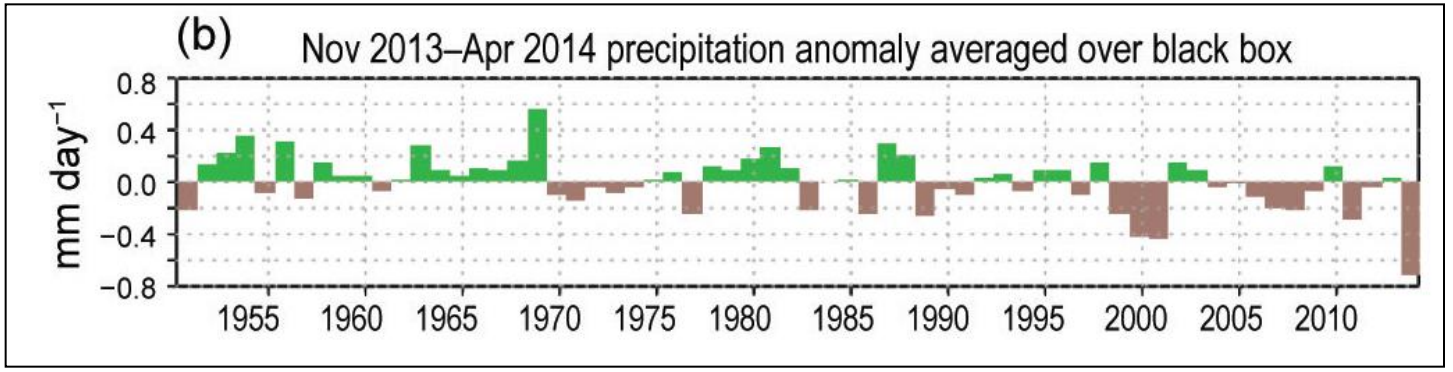


exceptionally dry	extremely dry	severely dry	moderately dry	abnormally dry	near normal	abnormally moist	moderately moist	very moist	extremely moist	exceptionally moist
-2.00 and below	-1.99 to -1.60	-1.59 to -1.30	-1.29 to -0.80	-0.79 to -0.51	-0.50 to +0.50	+0.51 to +0.79	+0.80 to +1.29	+1.30 to +1.59	+1.60 to +1.99	+2.00 and above


ספיקה במעיינות דן
ספיקה מירבית היסטורית: 12.8 מ"ק לשניה
ספיקה מינימאלית היסטורית: 2.67 מ"ק לשניה
ספיקה (מ"ק/שנה)
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
אוק-97
אוק-98
אוק-99
אוק-00
אוק-01
אוק-02
אוק-03
אוק-04
אוק-05
אוק-06
אוק-07
אוק-08
אוק-09
אוק-10
אוק-11
אוק-12
אוק-13
אוק-14
אוק-15
אוק-16
אוק-17
תאריך

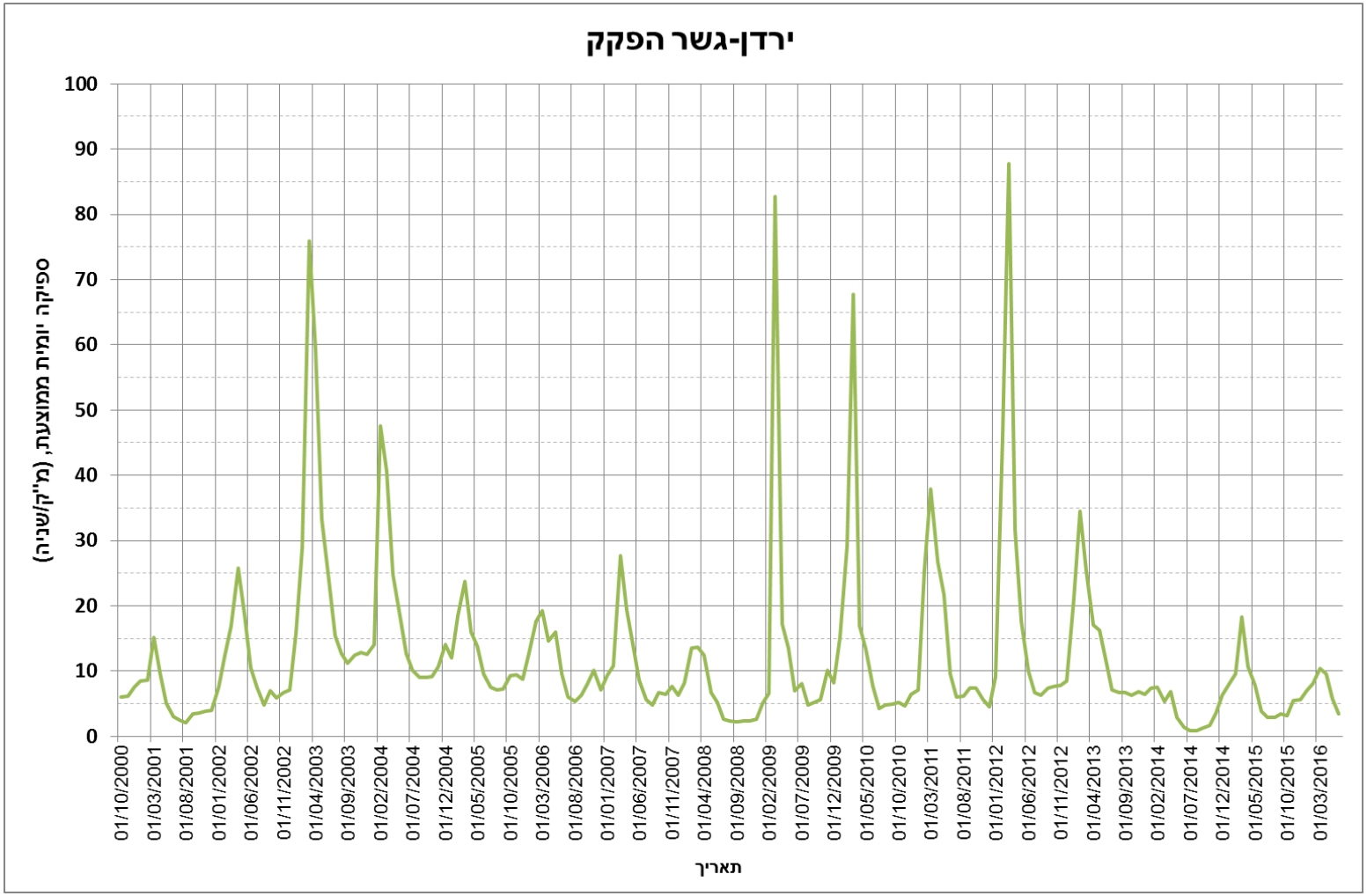
Drought index for the Dan spring





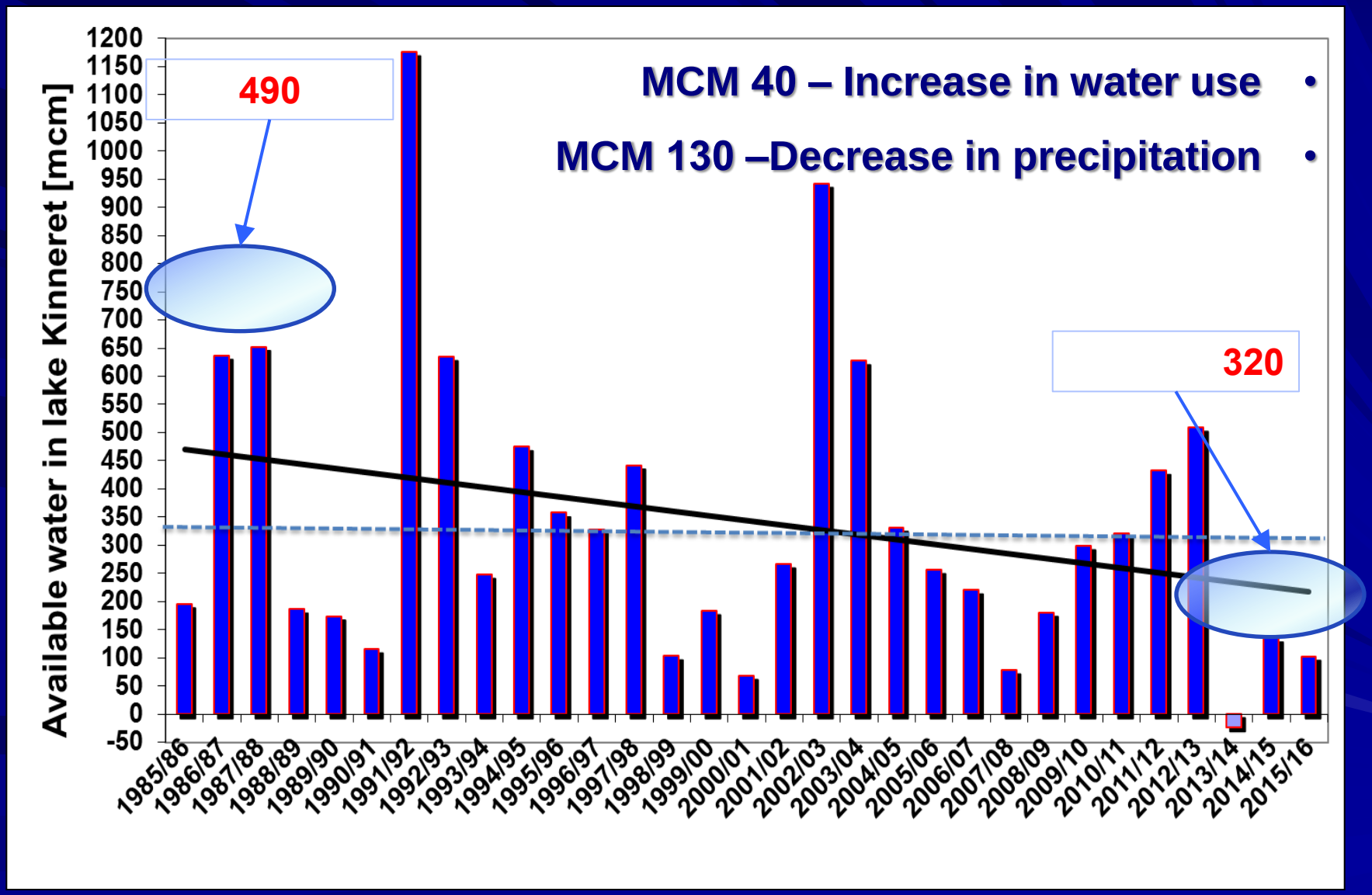
Petersen et al., 2016: DROUGHT IN THE MIDDLE EAST AND CENTRAL – SOUTHWEST ASIA DURING WINTER 2013/14, BAMS

הספיקה היומית הממוצעת בנהר הירדן (גשר- הפקק)



סיכום עינות דן:

Incoming water to the lake of Galilee



CLOSING THE GAP

- Water saving and efficient use of water.
- Water wells purification and aquifers water quality improvement.
- Increasing capacity of waste water treatment and upgrading effluent quality.
- Desalination.

Water demand forecast (MCM/Year)

Year	2008	2013	2015	2020
Agriculture	430	530	530	530
Industry	85	95	100	110
Urban	730	840	880	980
Aquifer rehabilitation	0	120	130	150
Neighbors	130	130	150	150
Nature	7	50	50	50
Total demand	1,382	1,765	1,840	1,970

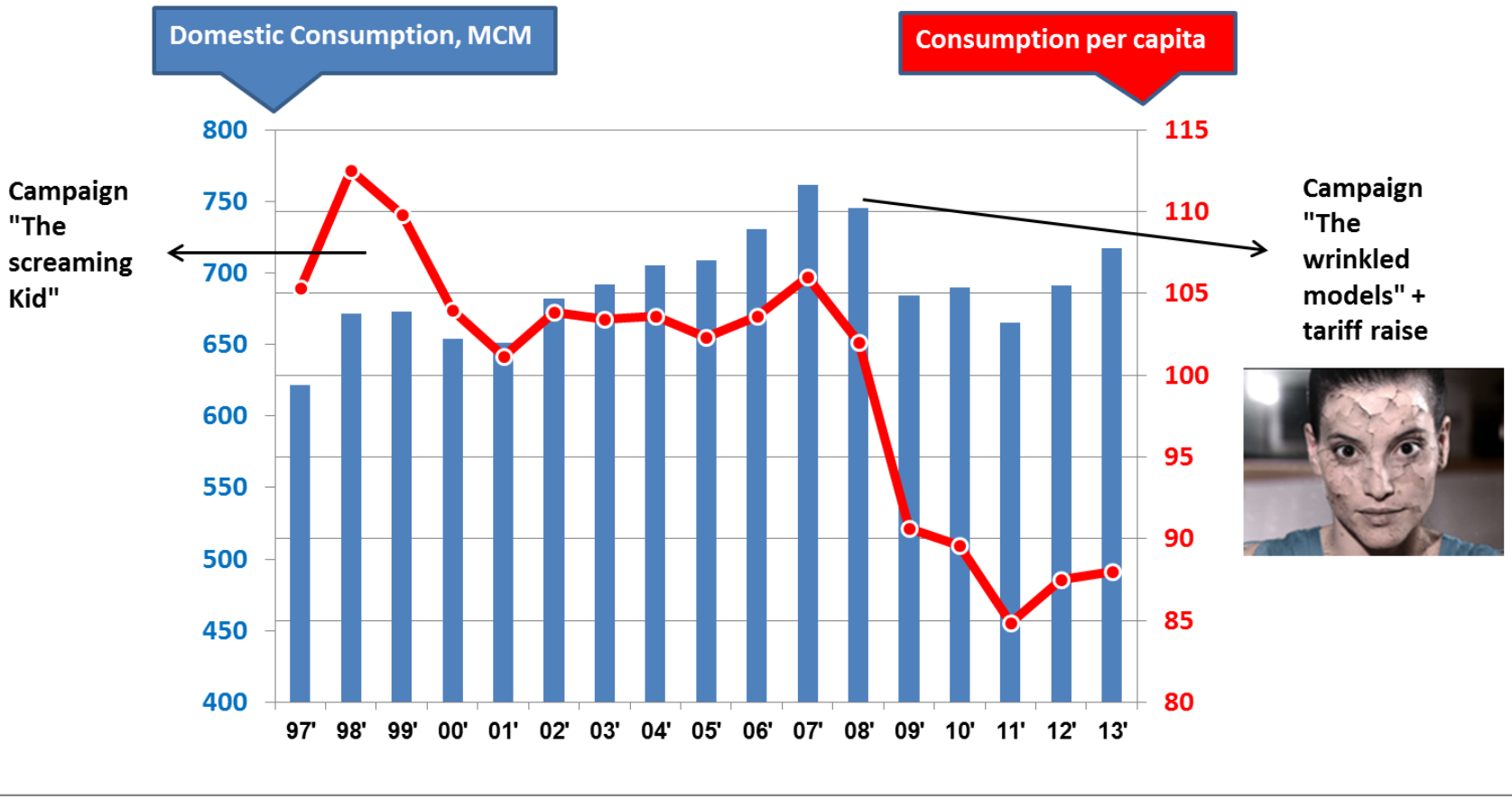
These figures do not include effluents, storm water and brackish water for irrigation in the amount of 500 MCM/Year.

Water resources including desalination (MCM/Year)

Year	2008	2013	2015	2020
Natural resources	675	1,170	1,170	1,170
Brackish water desalination	30	50	70	70
Sea water desalination	140	545	600	600
Total resources	845	1,765	1,840	1,990
Total demand	1,382	,1765	,1840	1,970
Gap	537	0	0	-20

These figures do not include effluents, storm water and brackish water for irrigation in the amount of 500 MCM/Year.

DOMESTIC CONSUMPTION



WATER AUTHORITY

STATE OF ISRAEL

SOLUTIONS

WATER AUTHORITY

Decisions

STATE OF ISRAEL

Water supply increase :

⇨**Drilling (including water sources monitoring);**

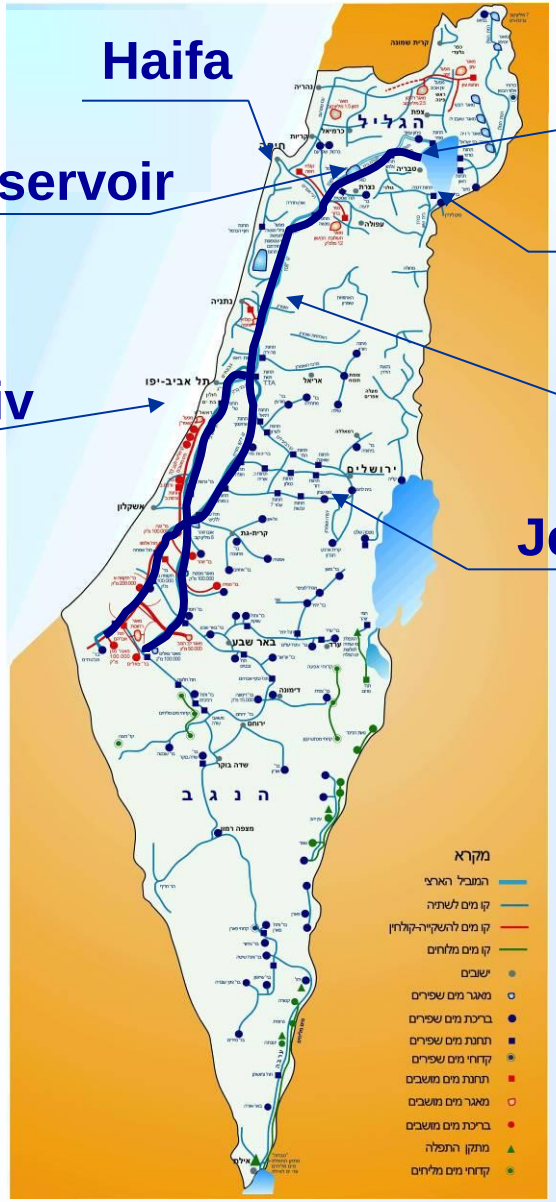
⇨**Treatment of underground polluted water sources;**

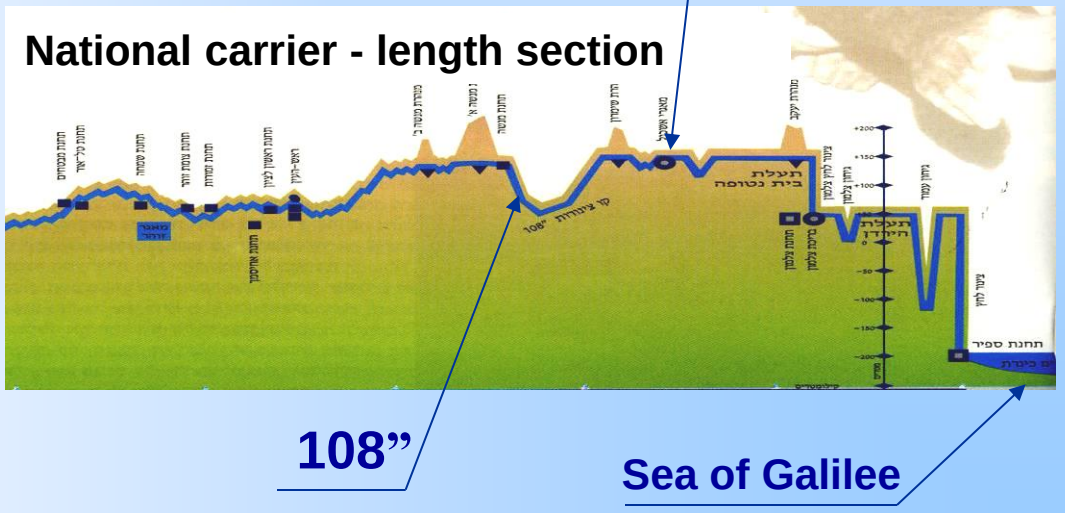
⇨**Development of new water sources :**
desalinated seawater, desalinated brackish water, treatment of wastewater.

WATER AUTHORITY

Main Water Supply System

STATE OF ISRAEL



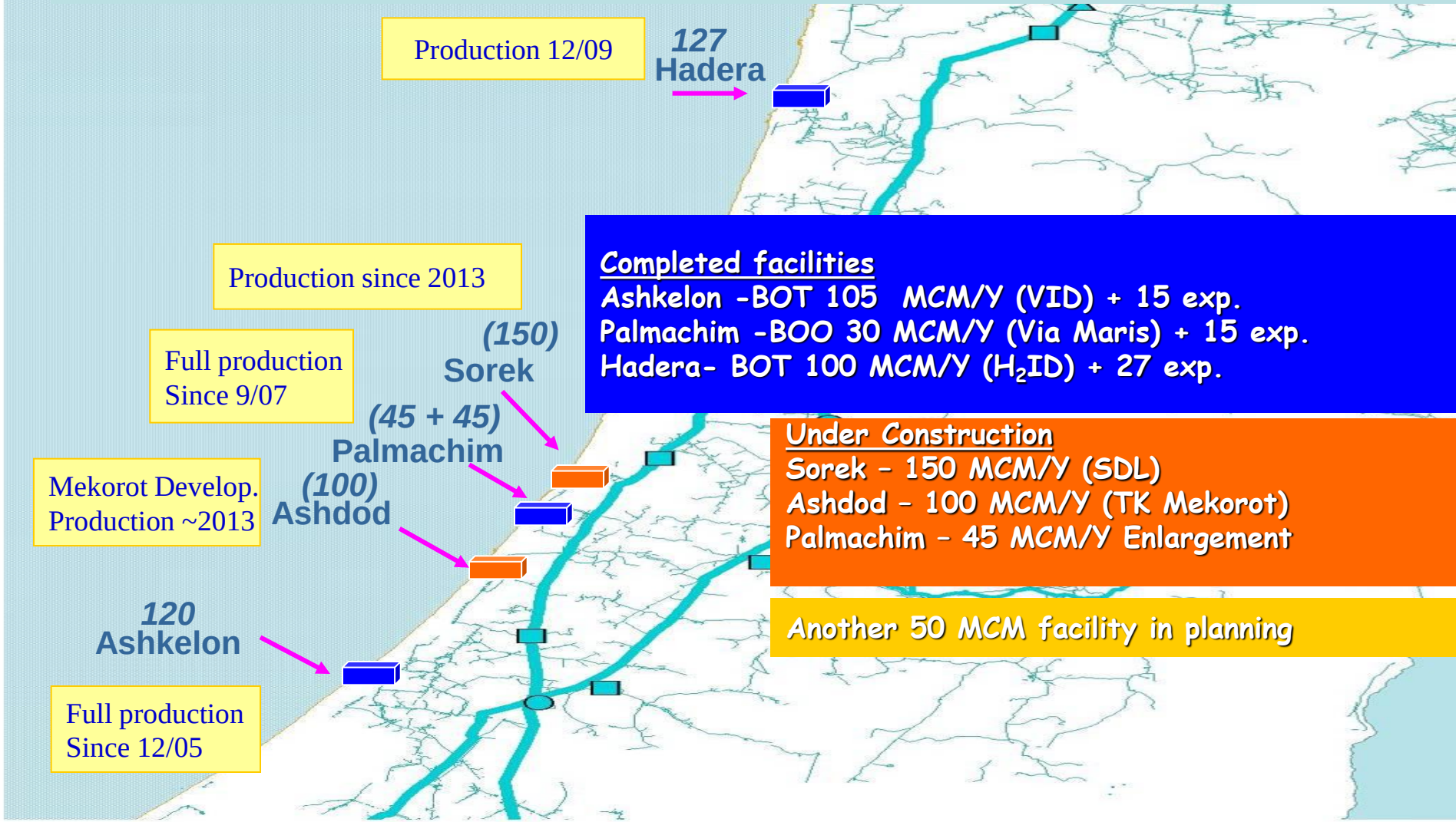


WATER AUTHORITY

Sea Water Desalination

STATE OF ISRAEL

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



Reuse of All Sewage Effluents

⇨Reuse of 500 MCM/Y in 2014.

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

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

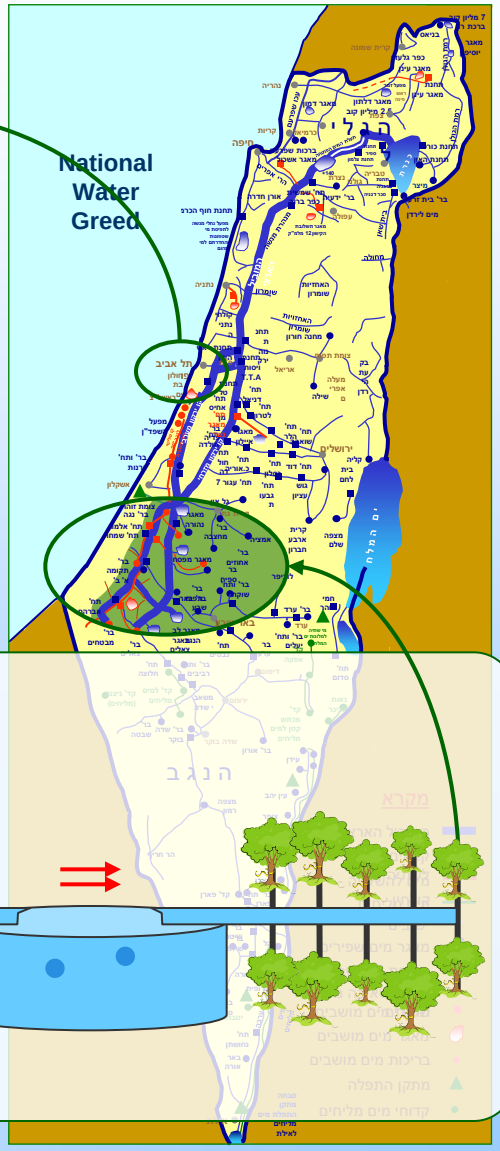
⇨Nutrients and Salt Removal.

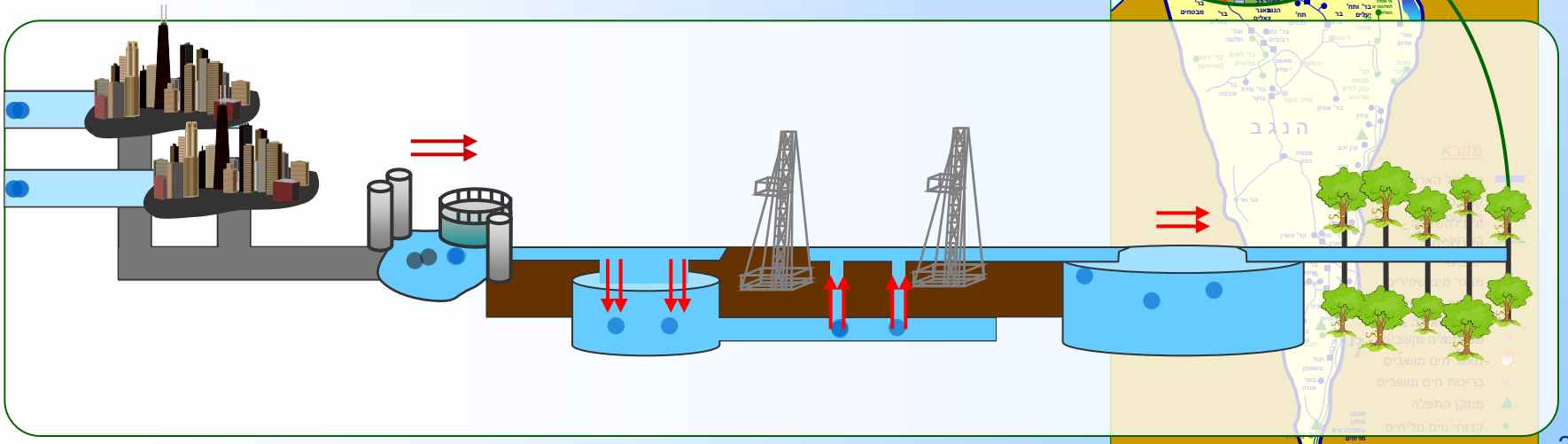
⇨Methods of agricultural cultivation in Israel are constantly modernized and innovated.

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

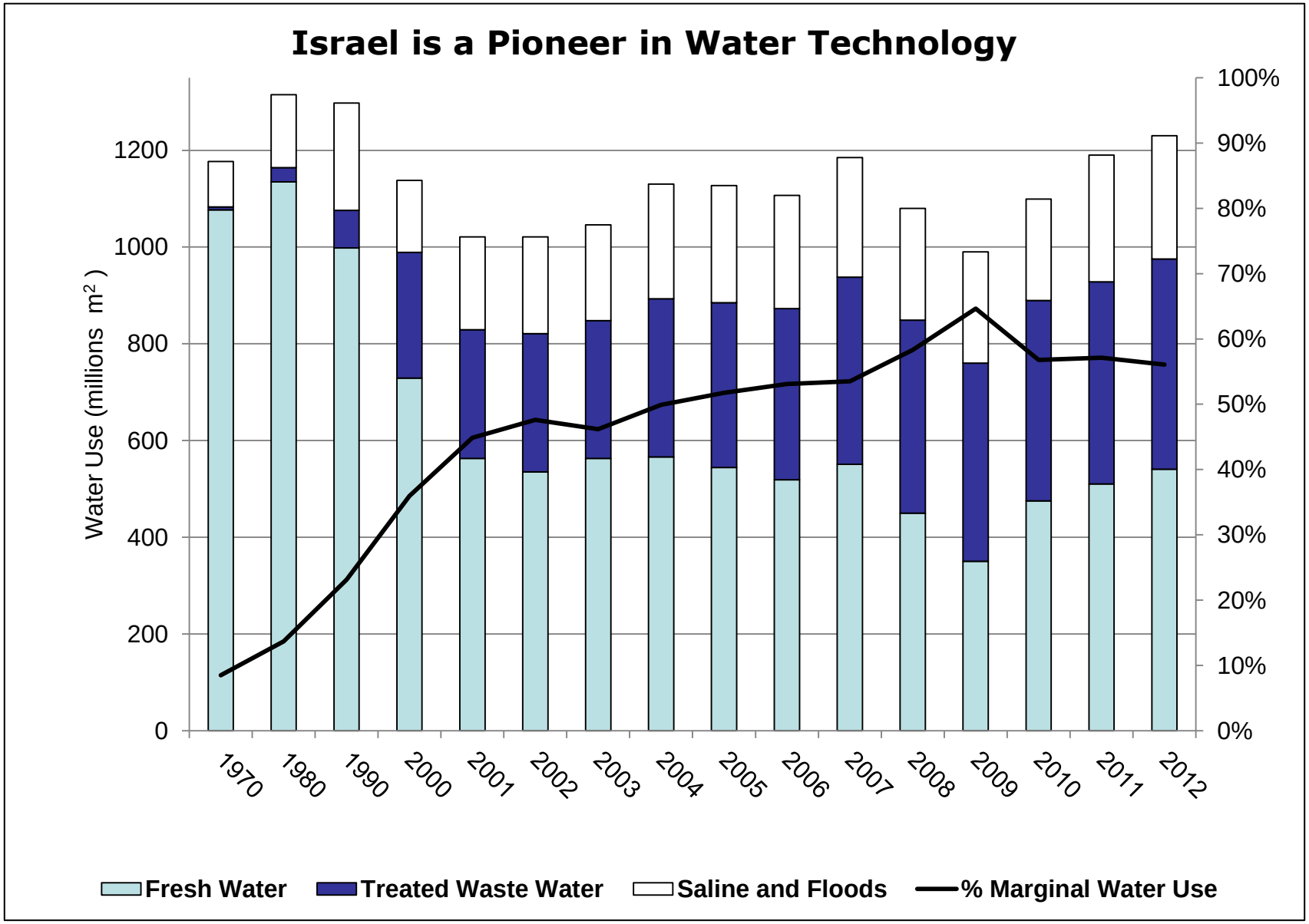
Reuse of all sewage effluents in Dan Region (Greater Tel Aviv) Wastewater Treatment plant (Shafdan) and the pipeline to Negev

- 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)



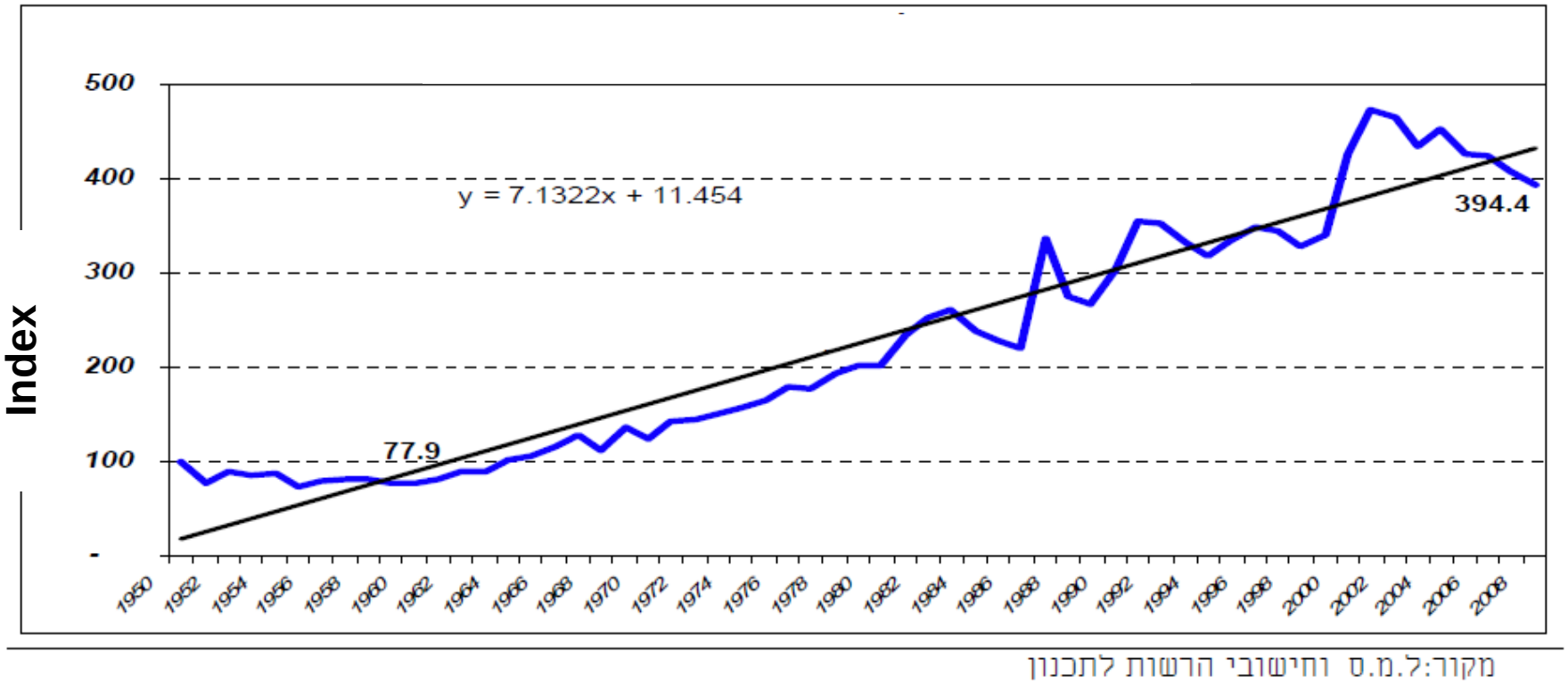


Water for Agriculture- Amounts and Type



Water use efficiency (production output / water use)

1950-2008



מקור:ל.מ.ס וחישובי הרשות לתכנון

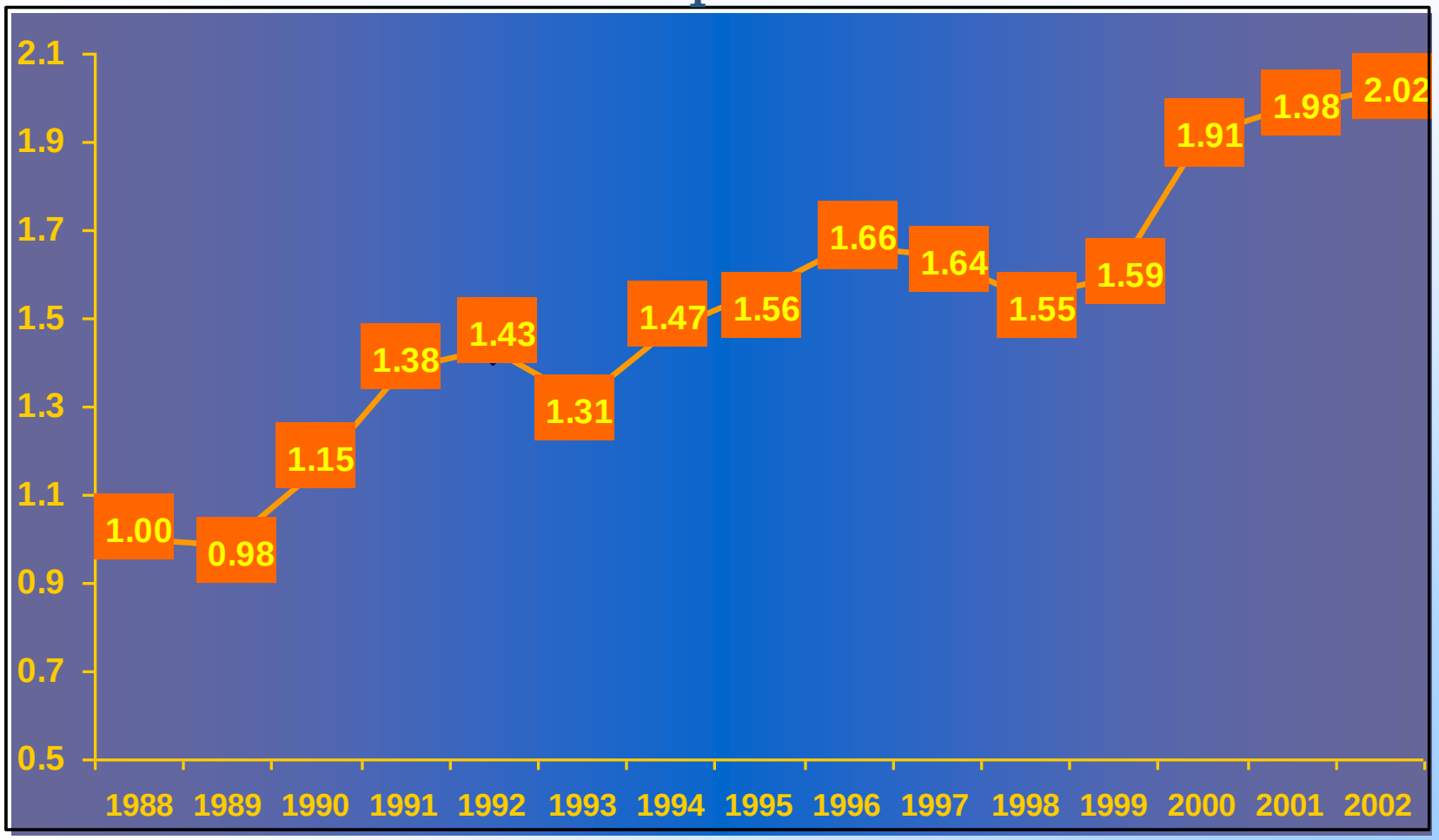
Source: CBS and Planning Authority, MARD

WATER AUTHORITY

Water Saving in Agriculture

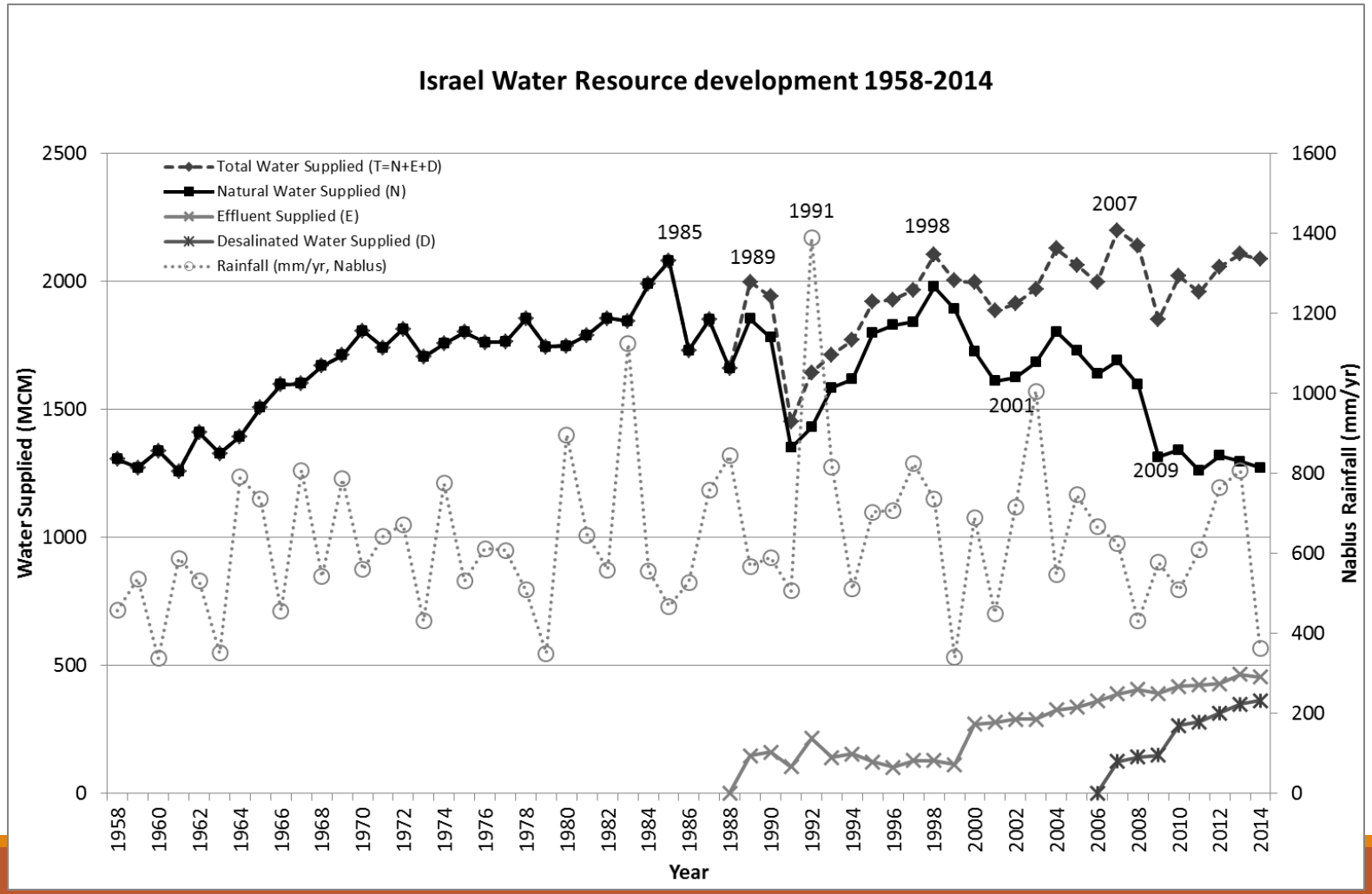
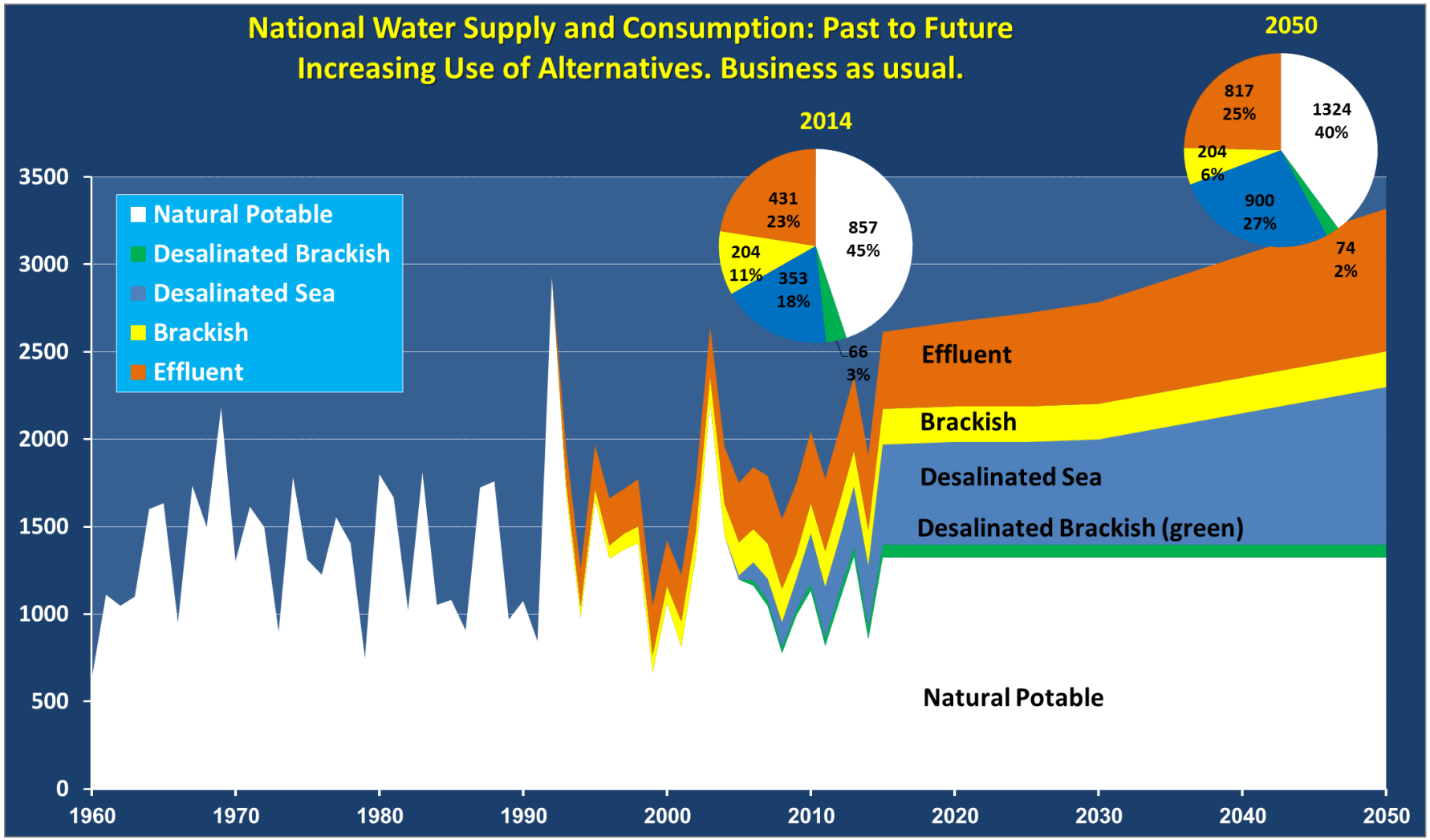
STATE OF ISRAEL

Production per Water Unit



Source: Israel Farmer's Federation

Natural Water Decoupling – Israel's cemented achievements



תמהיל מקורות המים בישראל בעשורים הקרובים