

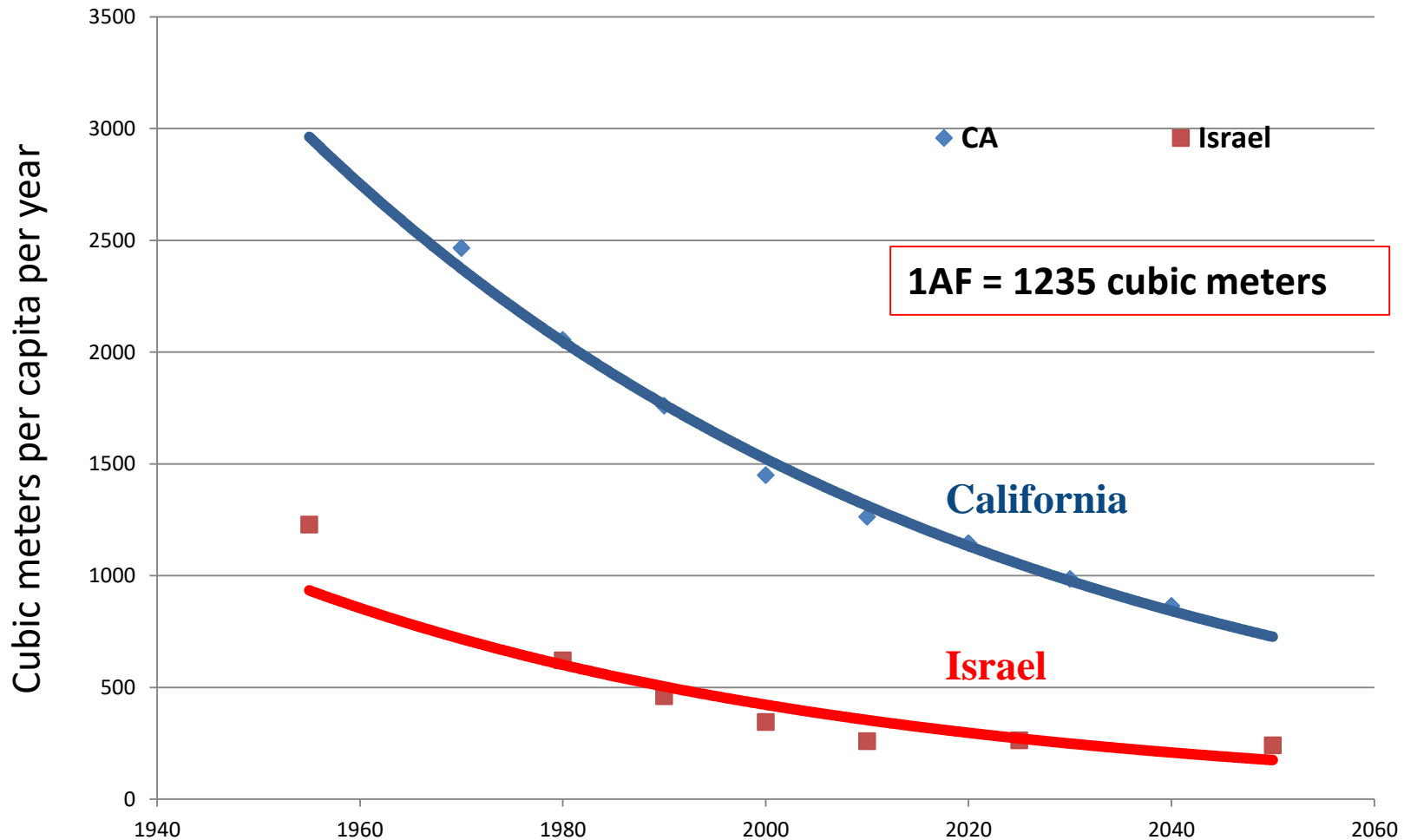
Dealing with Prolonged Drought & Water Scarcity: **Water policy reforms that took Israel from a water scarce** **to a water abundant nation**

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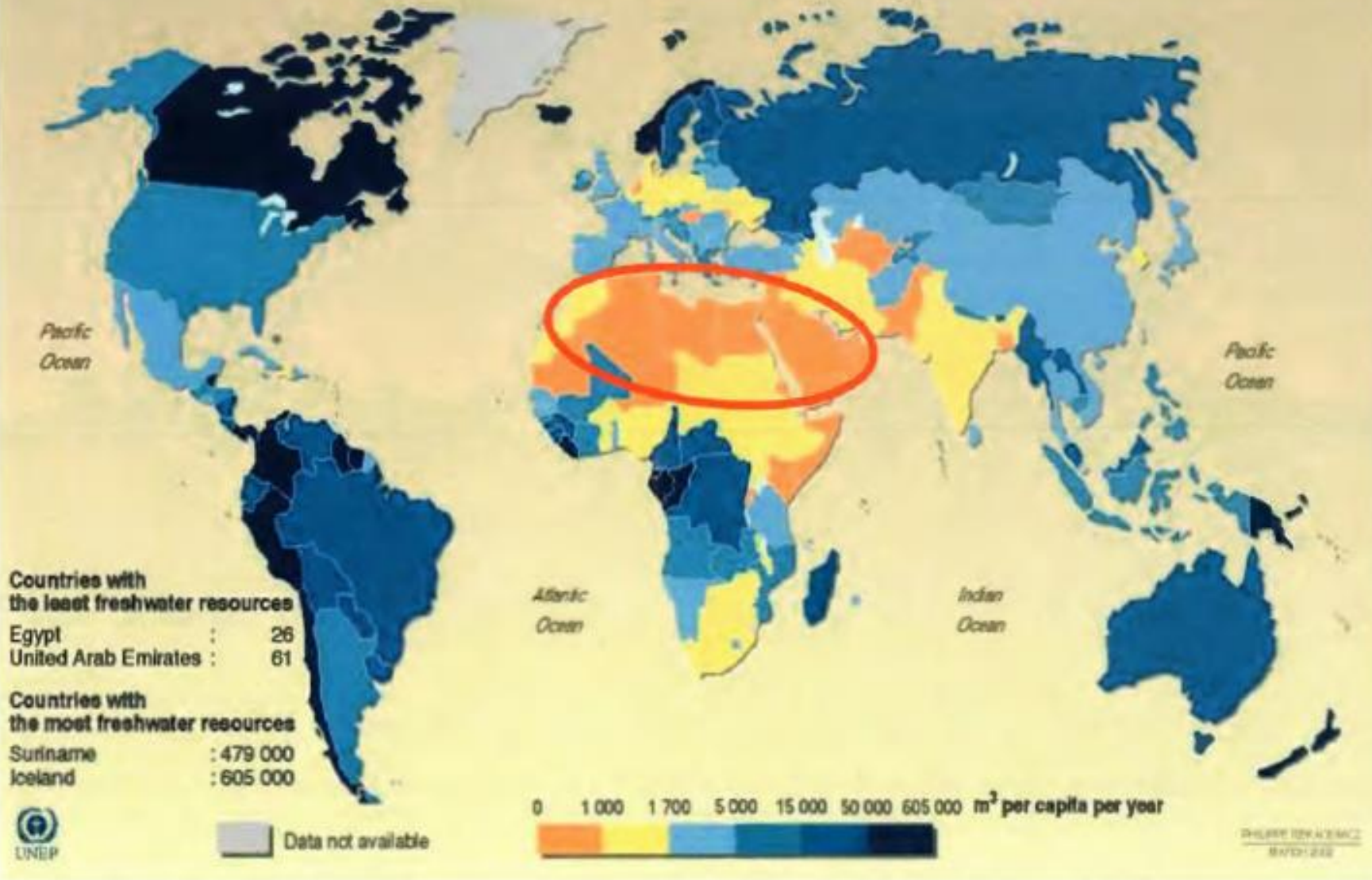
Slides marked with “CH” are courtesy of Professor Haim Gvirtzman, The Hebrew University of Jerusalem. His help is much appreciated.

California faces similar trends as Israel, and is even in better shape



Availability of Freshwater in 2000

Average River Flows and Groundwater Recharge

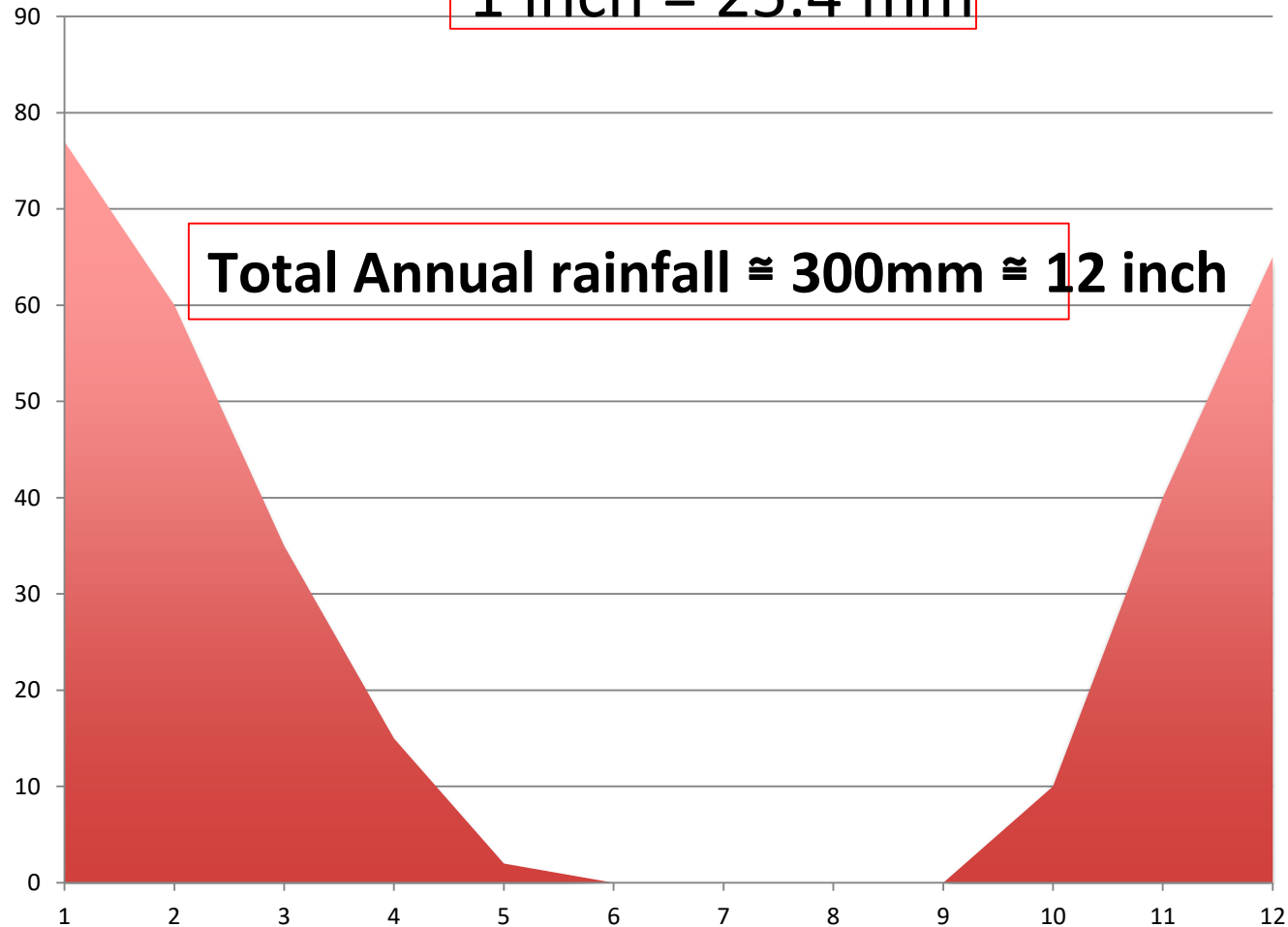


Source: World Resources 2000-2001, People and Ecosystems: The Fraying Web of Life. World Resources Institute (WRI), Washington DC, 2000

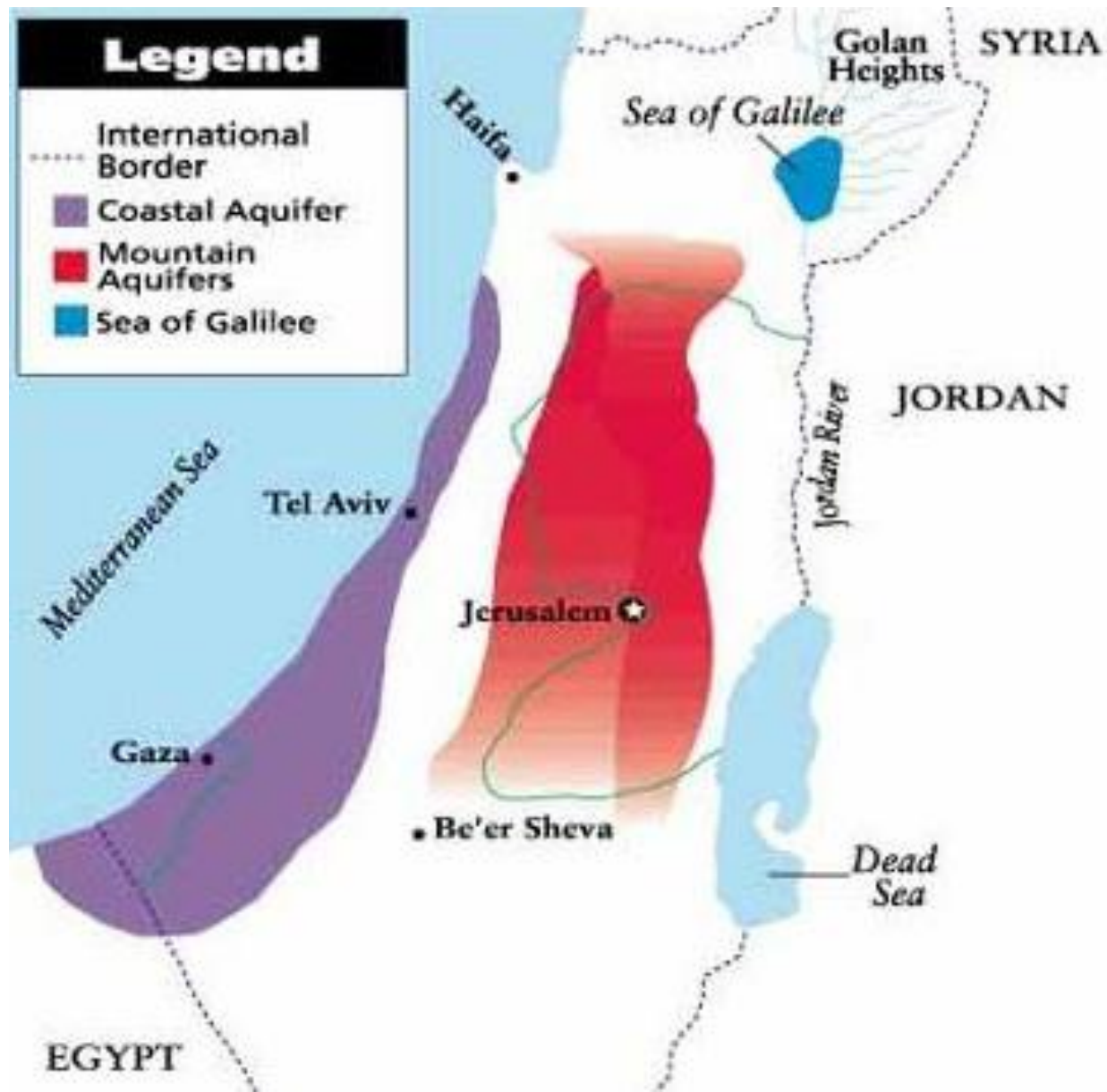
Rainfall distribution in Israel (mm) 1900-2012

Rainfall (mm)

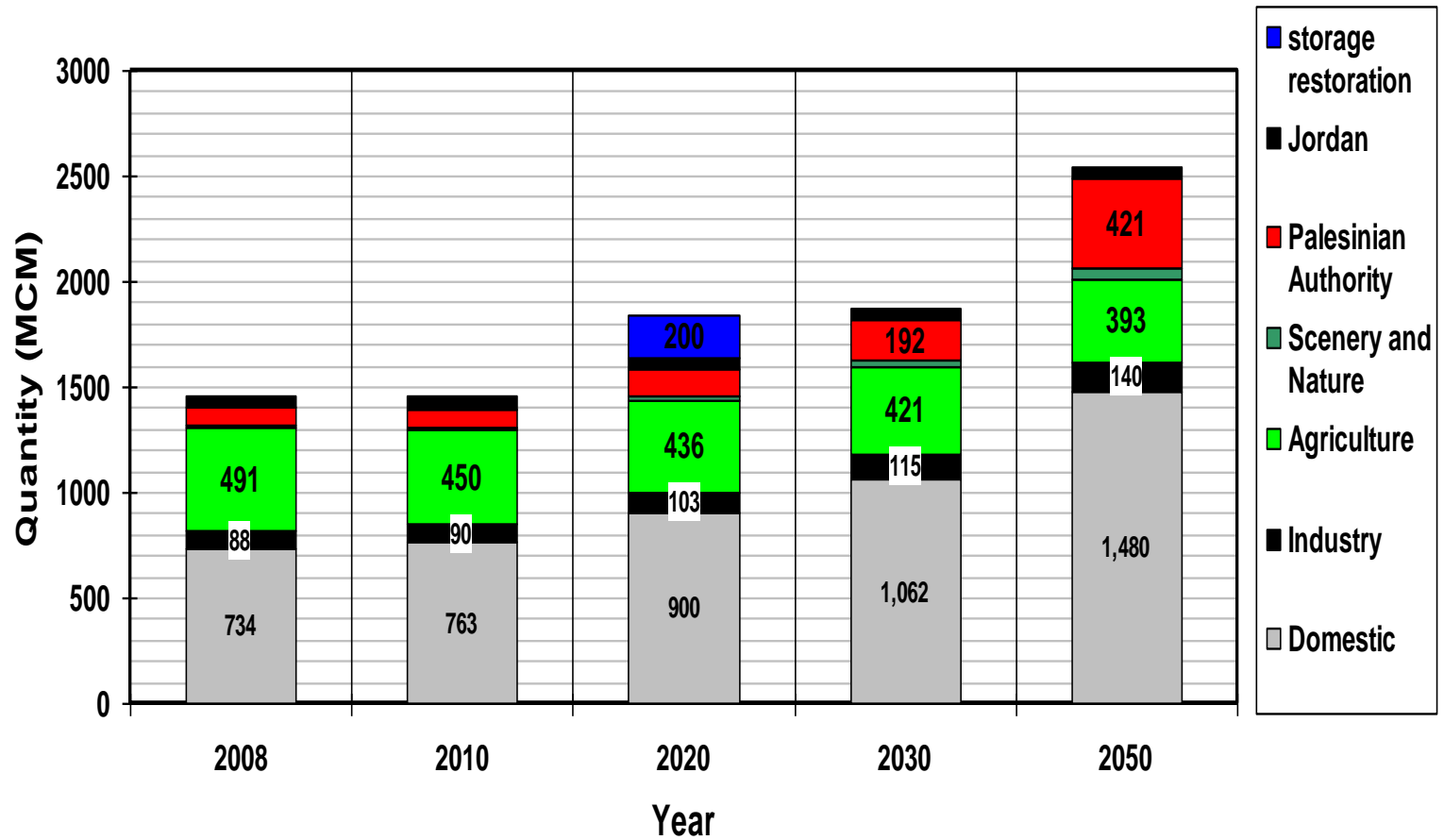
1 inch = 25.4 mm



Main Surface and groundwater sources



Potable Water Demand



Early projects and plans

- Massive investment in freshwater conveyance
- Massive investment in wastewater treatment
- Investment in water harvesting

- Yet, water quality and quantity problems prevail

Israeli Water System: Many sources, One long pipe. National Water Carrier 1960s



SHAFDAN 1970s

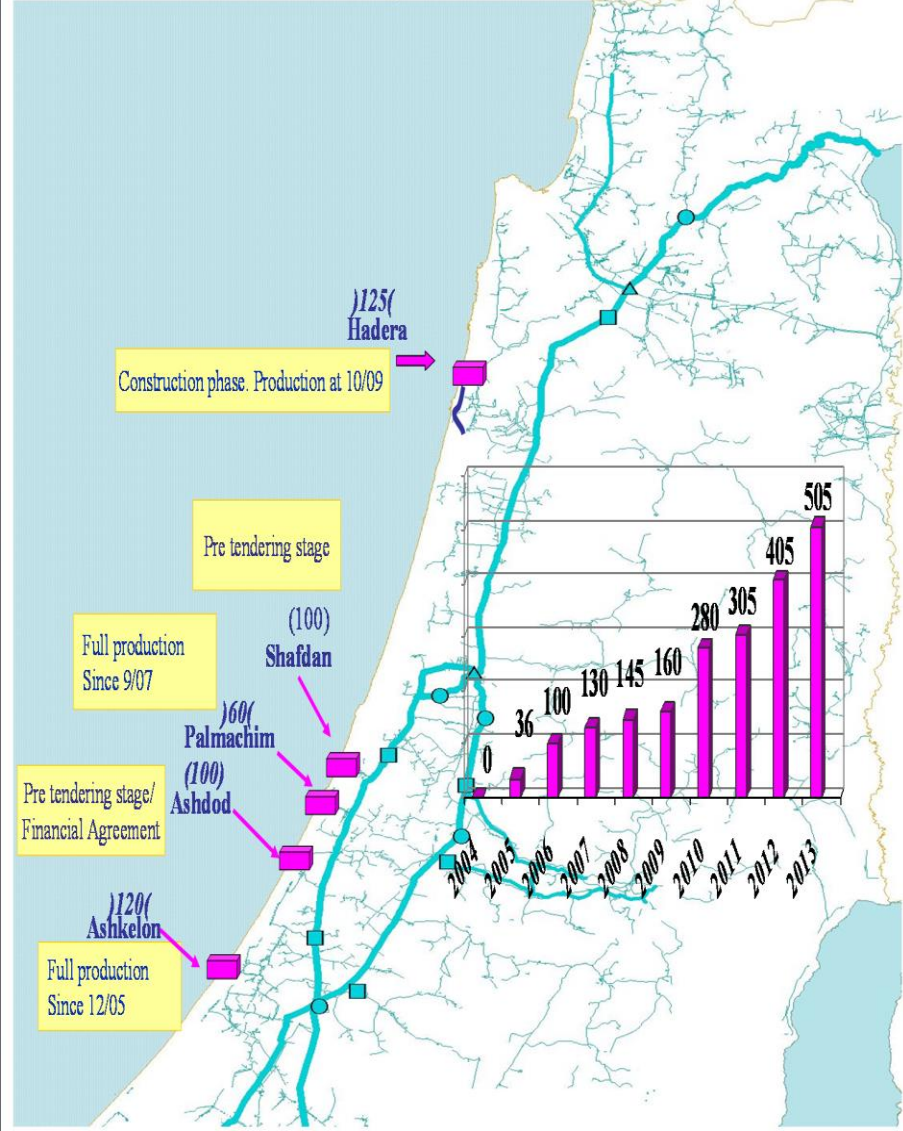


Floodwater harvesting ponds

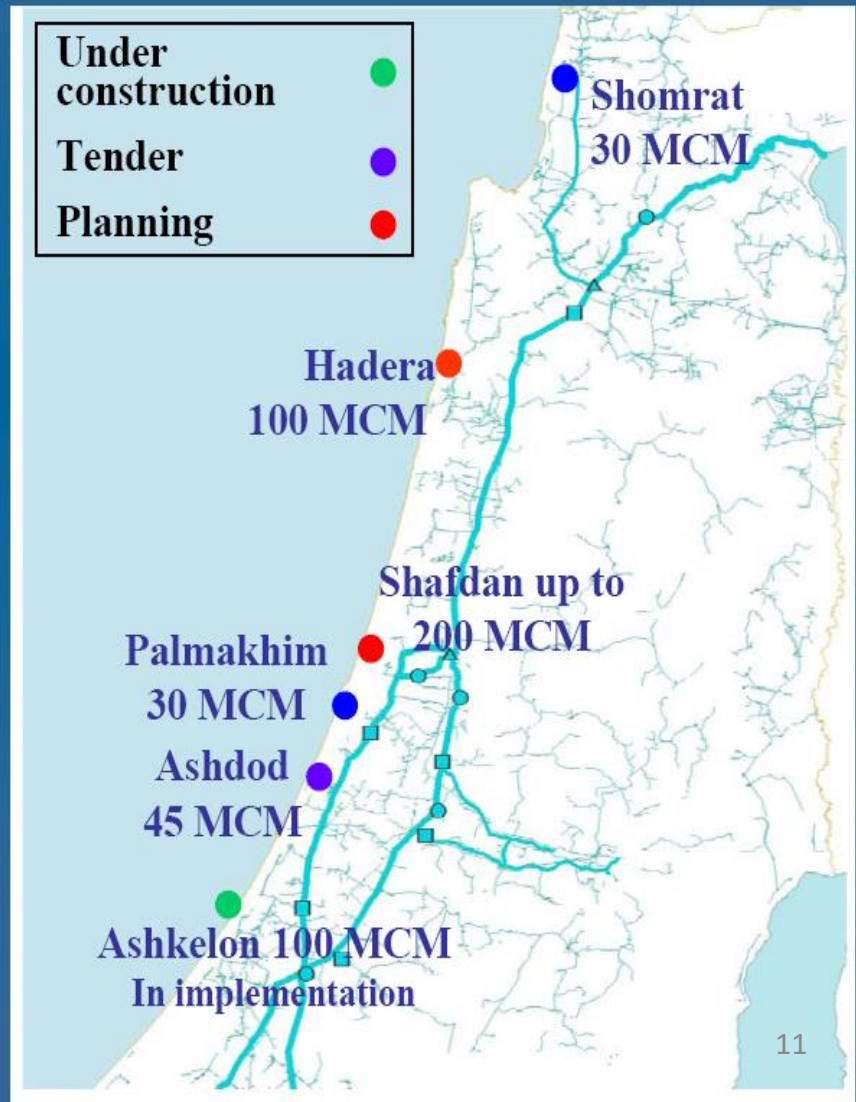


Plans for New desalination schemes

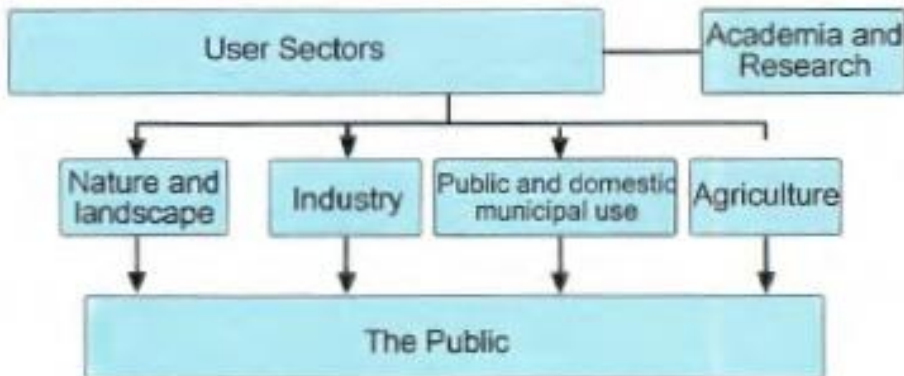
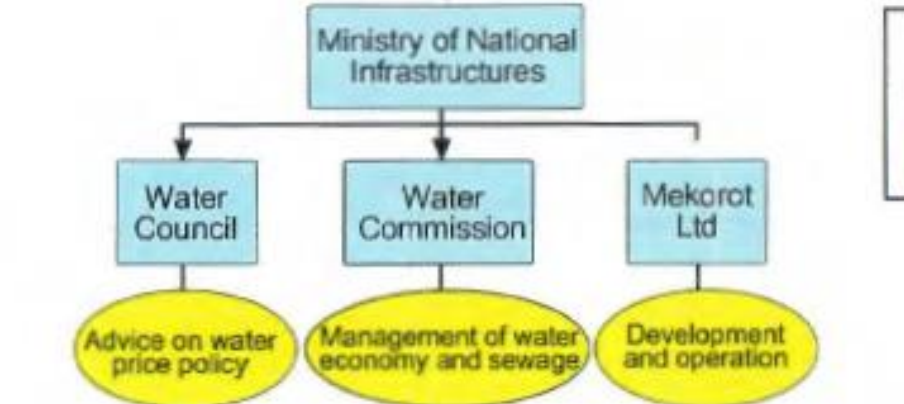
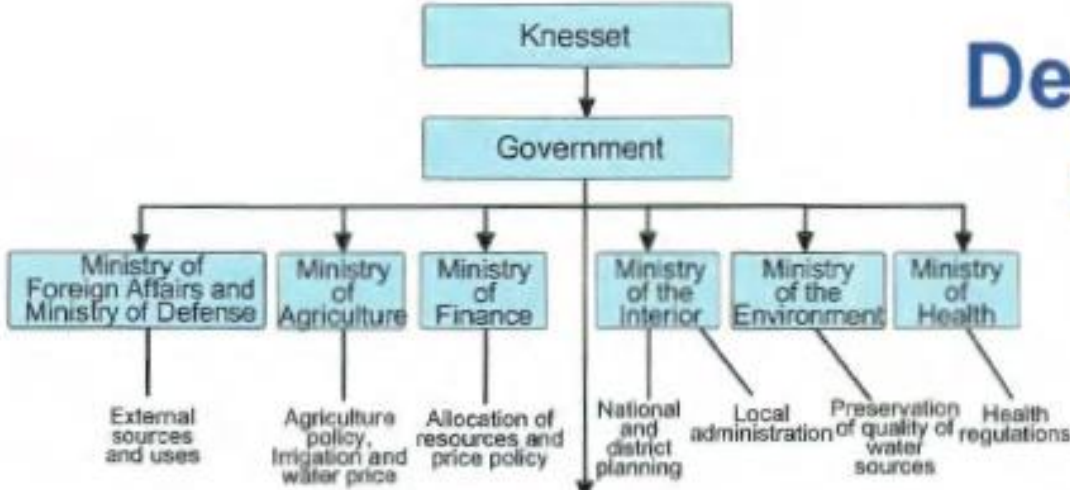
Development of Sea Water Desalination Plants



Sea Water Desalination Projects



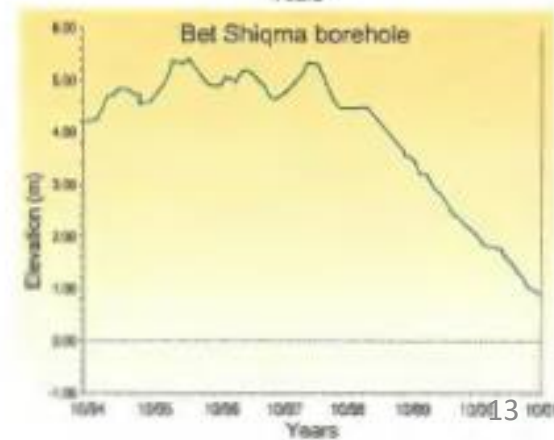
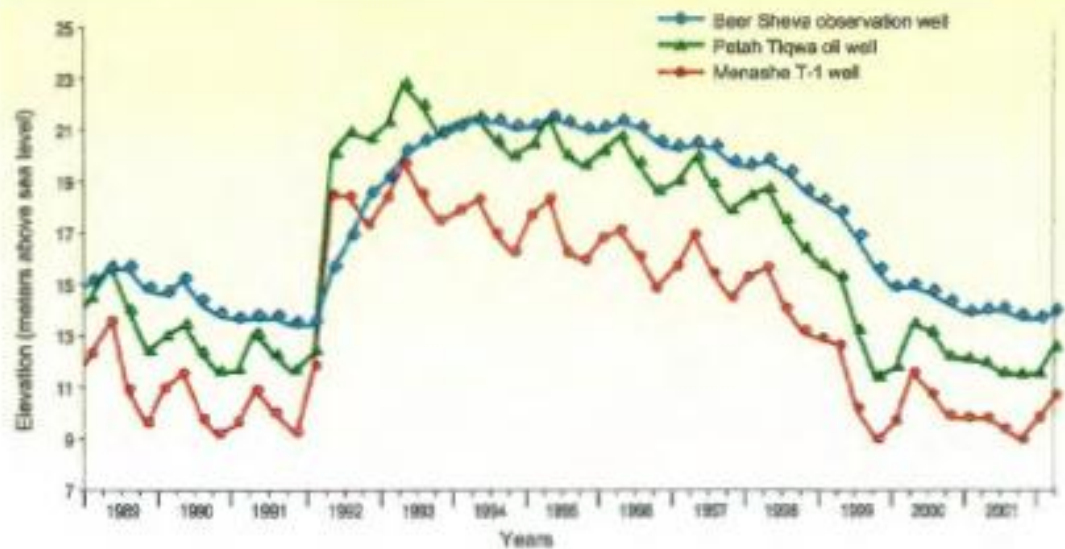
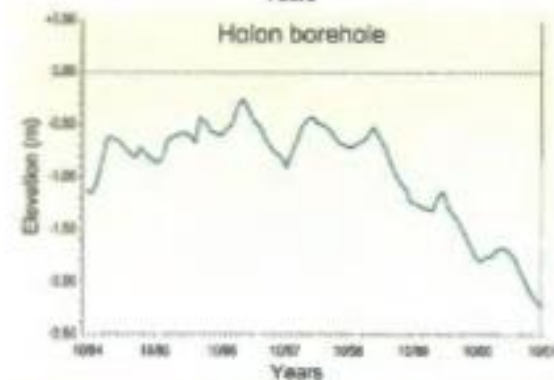
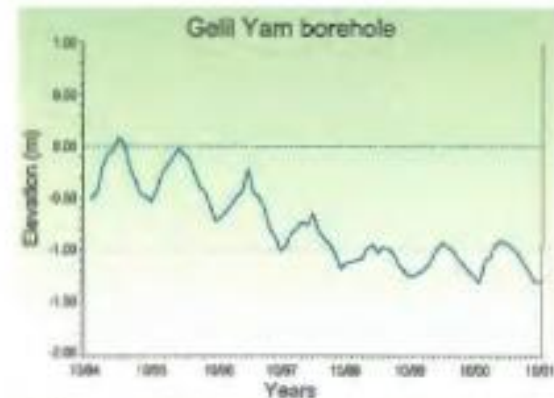
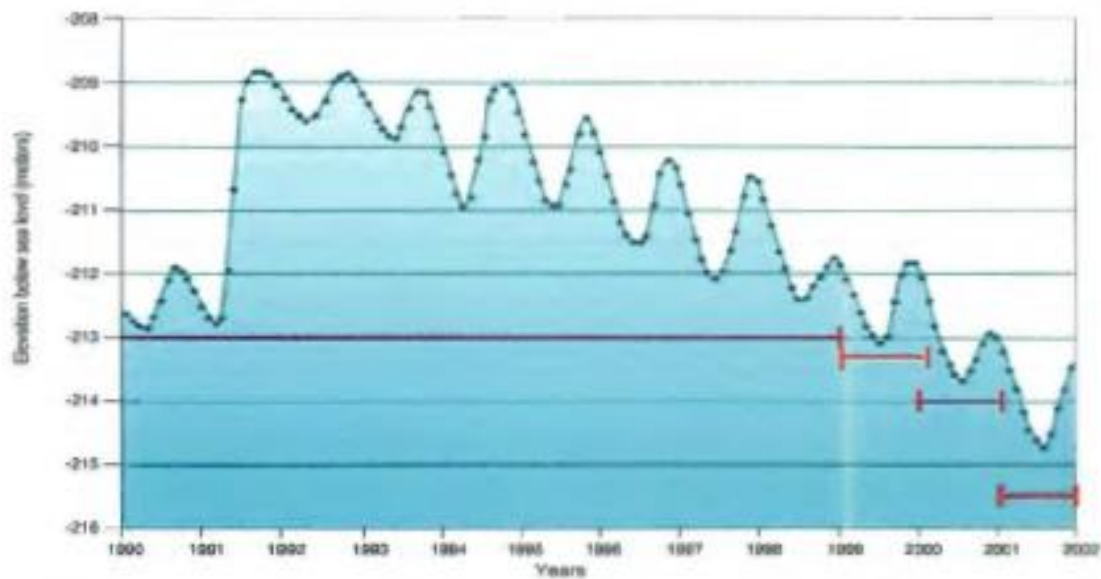
Decentralization of responsibility



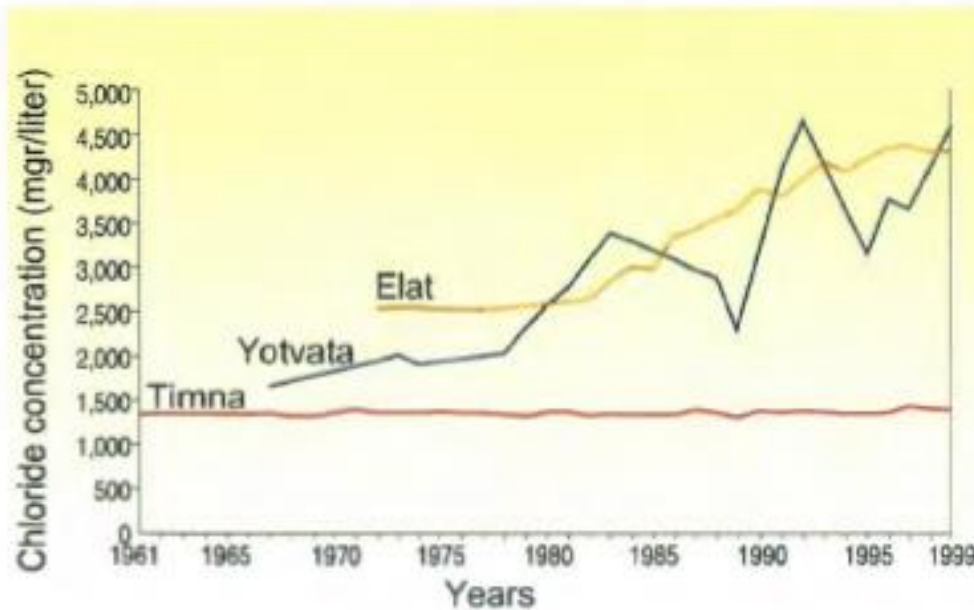
The "method" of mutual neutralization

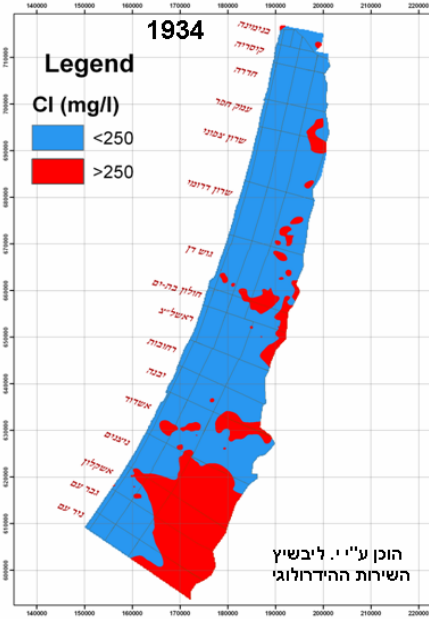
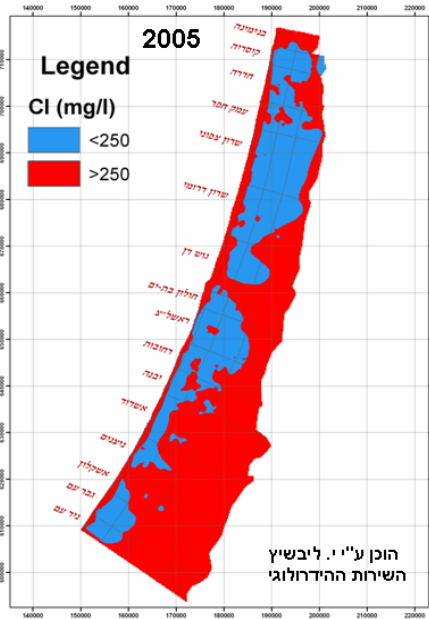
No decision making due to the lack of a single executive officer

Water table dropping

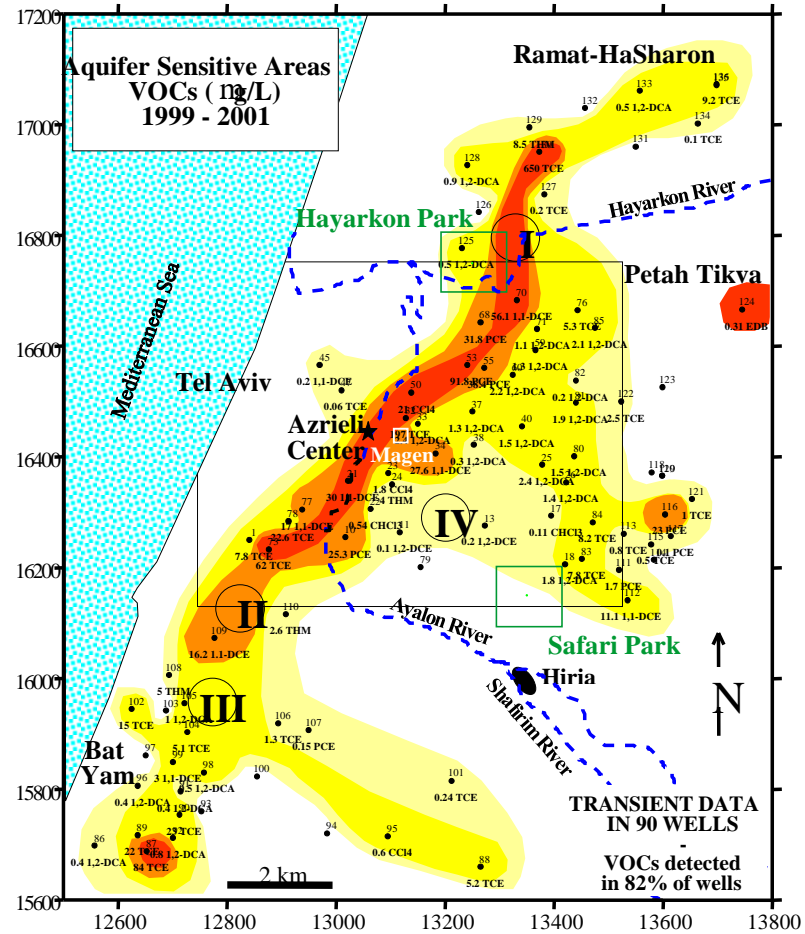


Groundwater salination

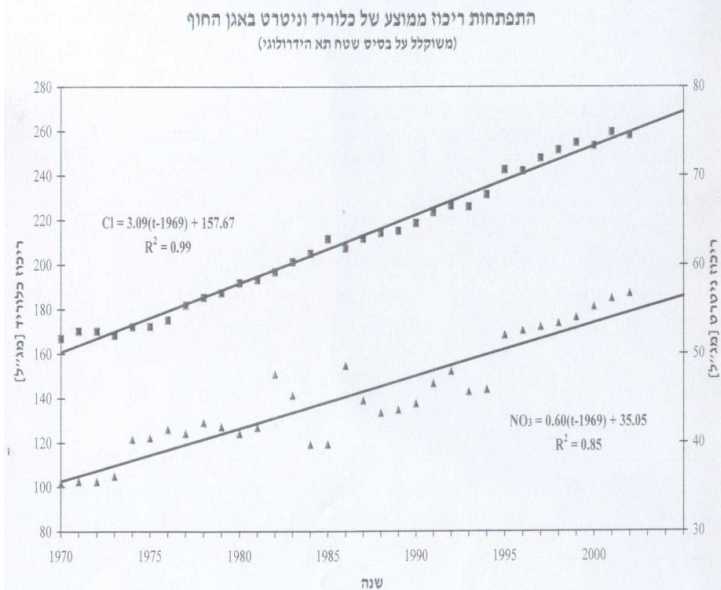




Increasing groundwater salinity

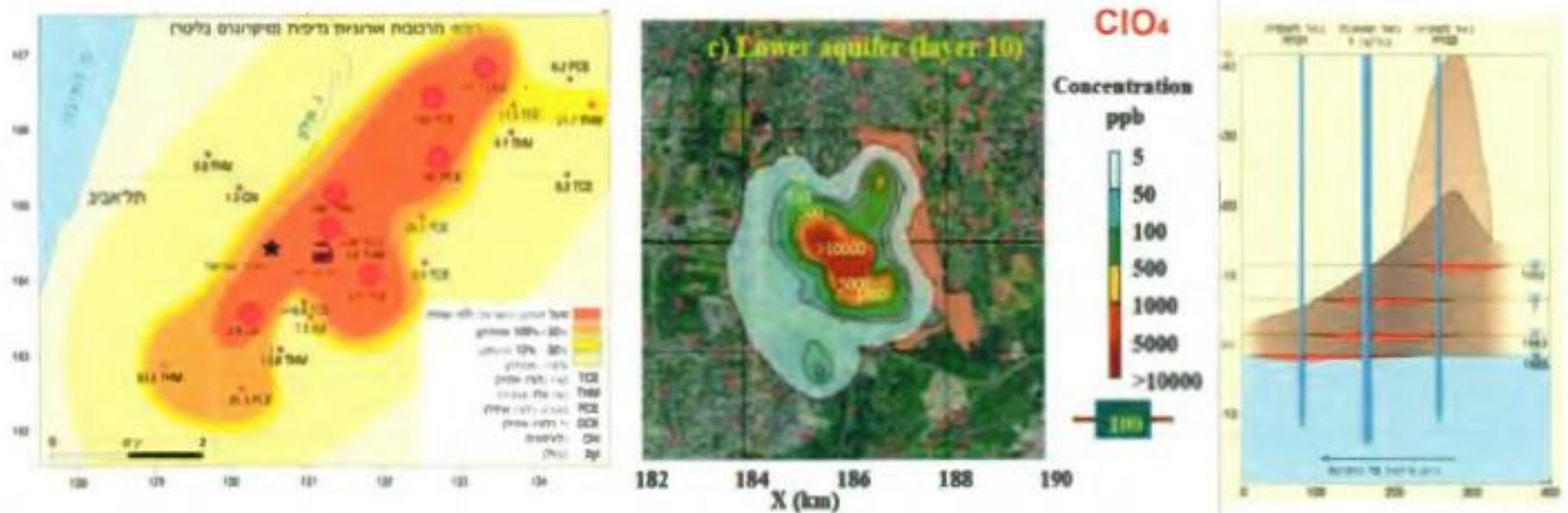


Local-Regional pollution



Rising salinity and nitrates over time

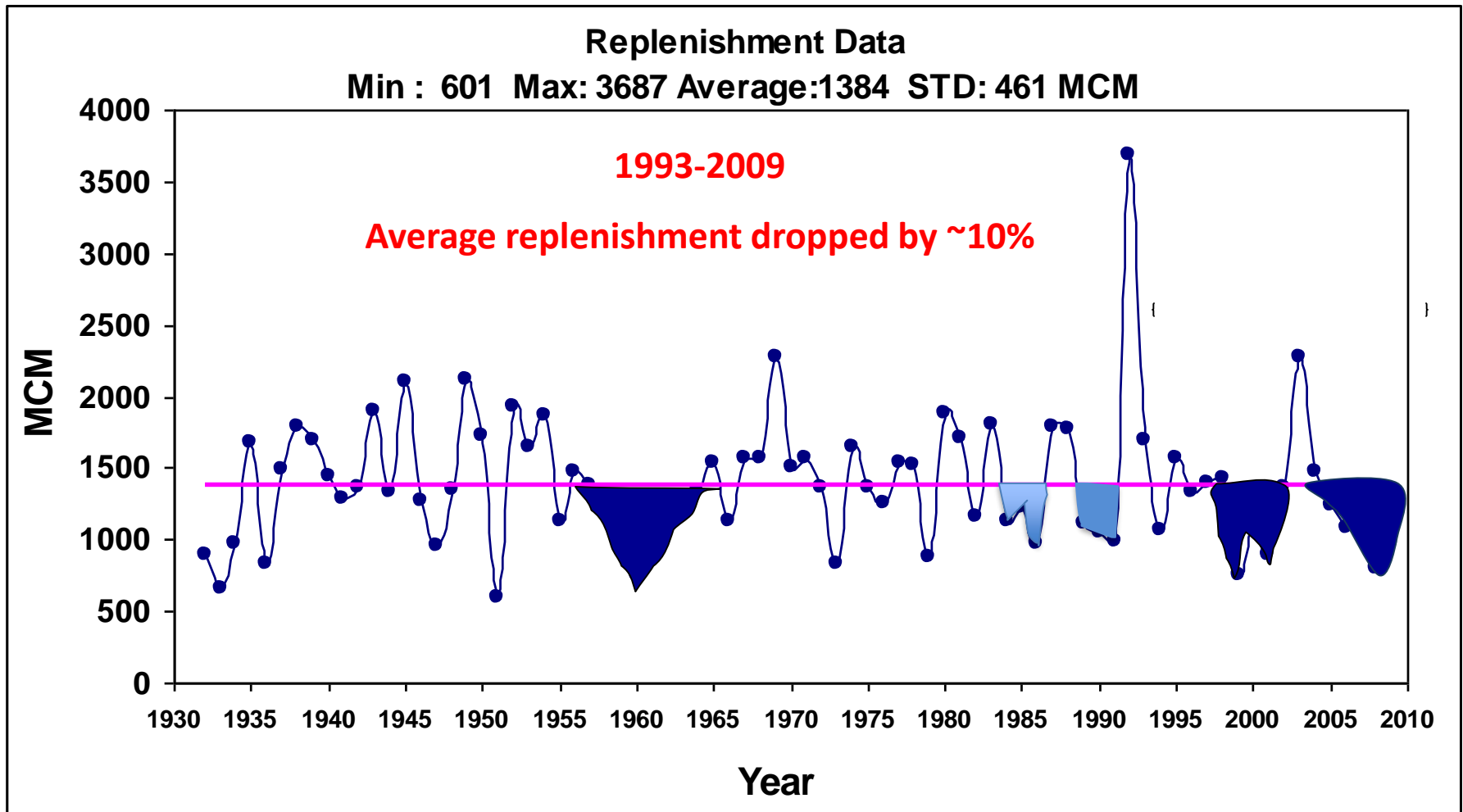
Salination and contamination



Seawater intrusion, leaks of sewage, sewage effluent irrigation, insecticides, fertilizers, landfills, oil lens, toxic metals, micro-pollutants, etc.

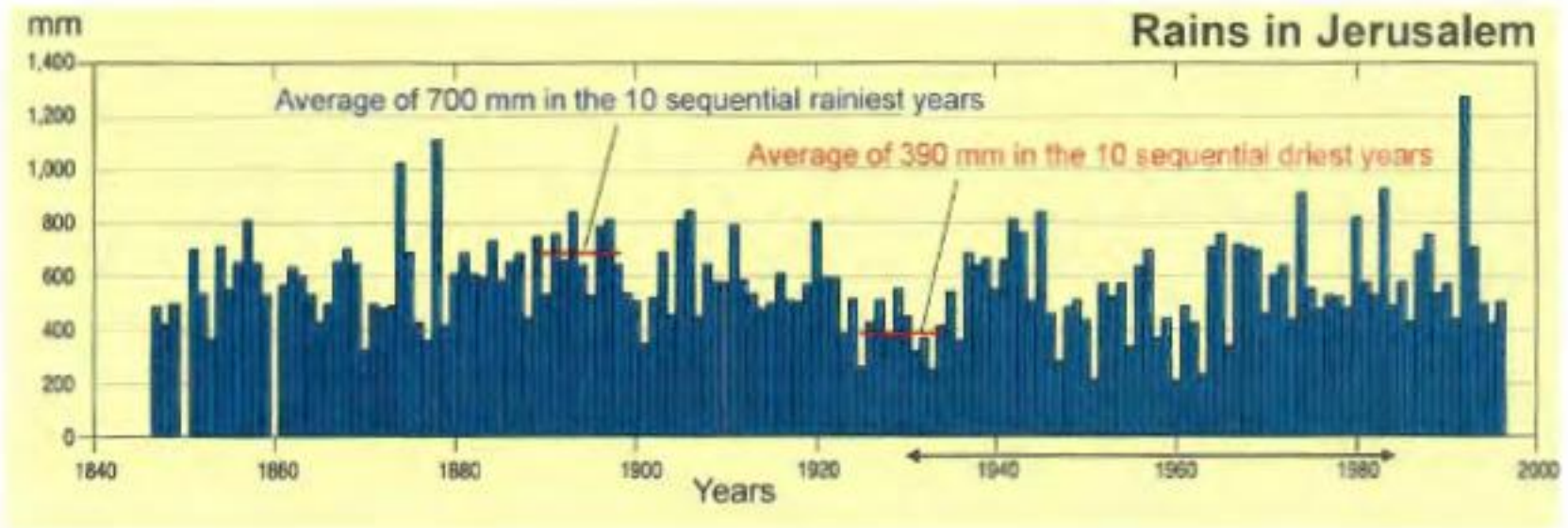
Replenishment Data (Three Basin System)

1932-2009



**Cumulative shortages associated with sequences of dry years
require reliable additional supply**

Climate variability



**Not enough Infrastructure
to store water from rainy
years to dry years**

Lake Kinneret



Parliament's State Control Committee (2000)

CH

“The report revealed a water system in a most serious state. Most of the severe findings detailed in the State Comptroller's Annual Report of 1987, and in the Special Report of 1990 on water economy management, are still valid today. These reports failed to bring any government to serious discussion or decisions, and the situation continued to deteriorate. We are currently in a state of emergency. If no decisions are made, no policy defined, and no drastic steps taken in the near future, Israel's water economy will face the danger of collapse.”

- **Lack of national policy**
- **No responsible authority**
- **No water reserves**
- **Over pumping**
- **Water contamination**
- **Sewage re-use**
- **Agriculture**
- **Political process**

Policy Reform

- Institutional reform
- Investment in technology
 - Desalination
 - Treatment
 - Control
- Investments in infrastructure
- Pricing (all sectors) – A closed pricing system: no subsidies
- Public campaign (conservation)
- Transparency
 - Periodical water prices updates (publicly)
 - Periodical water quality test results (publicly reported)

Getting out of the water crisis since 2000

- **Establishing the Water Authority**
- **Increasing water price (+40%)**
- **Entering the desalination era**
- **Recycling full sewage potential**
- **Water allocation for nature**
- **Restoring aquifer storage**
- **Water & Sewage Corporations Law**

Water Authority Board

ONE table for decision making



June 15, 2015 announcement of new water tariffs (a rate reduction!)

Water price update = f(CPI (85%), Salary index (10%), Energy index (5%))

Exchange rate = 3.83 IS/\$ 1af = 1235 cubic meters

- Fresh water for ag \$754/af
- SAFDAN WW for ag \$354/af
- Any WW for unrestricted use \$354/af
- Secondary WW \$299/af
- Fresh for household use (base amount) \$670/af
- Fresh water for household use (above base amount) \$1929/af

ברית פיקוח • דו דכונים בתחום המים • יורם תמרי

התעריפים הינם לפני מע"מ.
התעריפים הם תעריפי חברת מקורות.
את לוח התעריפים המלא, נפרסם בחדש הבא, לא סומו ברשומות.
על תעריפי היטלי ההפקה אמורה להחליט ועדת ו של הכנסת, ואנו נפרסם אותם לאחר שיתקבלו בוועדו זה, ששיעור השינוי יהיה דומה לזה של שאר התעריפים.

2. הודעות על שימועים ברשות המים

בעת האחרונה אנו "זוכים" למבול של הודעות לע שונים ברשות המים.

עיקרי הנושאים הנוגעים לציבור החקלאי הינם:

- הכוונה להפחית את תעריפי המים לגינון ציבורי ובמושבים - יופעל החל מראשית השנה הבאה.
 - רישיון "ספק אזורי" על פי מודל שמרבית מרכיביו מ על המערכות שלנו.
 - התכנית ל"אמבטיה ארצית" - תכנית אותה מובילי המים וחברת מקורות. שימוע ראשון נערך השבוע ו הרשות. התכנית זוכה להתנגדות נמרצת של התאחו לאי ישראל ואגודות המים.
 - תיקון כללי המים - קביעת נתאים שונים ברישיונו תיים.
 - סוגיית הדיווחים השנתיים.
- התייחסות לכל הנושאים הללו ניתן למצוא באת המים www.water.gov.il.
- יצוין שהגופים היציגים של המערכות החקלאיות - דות חקלאי ישראל וארגון עובדי המים (הכולל גם א אגודות המים החקלאיות) - מייצגים את האינטרס ו בכל אחד מהנושאים שעל הפרק, אף שקשה להבטיחו בכל החזיתות.

יפי מים חדשים - מיום 1 ביולי 2015

מתעדכנים תעריפי המים לכל המגזרים אחת ל-6 כ-1 לינואר וב-1 ליולי, של כל שנה.

המים כפופים לשינויים החלים במדד המשוקלל חדשים, המורכב כדלקמן:

צדד המחירים לצרכן;

צדד השכר במשק;

דד השינויים במחירי האנרגיה.

ירסום מדד המחירים לצרכן לחודש מאי האחרון -

ששת החודשים האחרונים ירד המדד המשוקלל

ד, ומכאן, שהחל מיום 1 ביולי 2015 יופחתו תעריפי גיהם בשיעור זה.

גריפי המים החדשים בסוגי המים העיקריים (בסוגריים - התעריפים הנוכחיים):

ש"ח/מ"ק	ש"ח/מ"ק	ש"ח/מ"ק
2.3640	2.3400	2.3400
(1.1100)	1.0989	1.0989
(1.1000)	1.0890	1.0890
(0.9400)	0.9300	0.9300
(1.4170)	1.4020	1.4020
(2.0990)	2.0780	2.0780
(6.0430)	5.9820	5.9820
(7.5820)	7.5060	7.5060

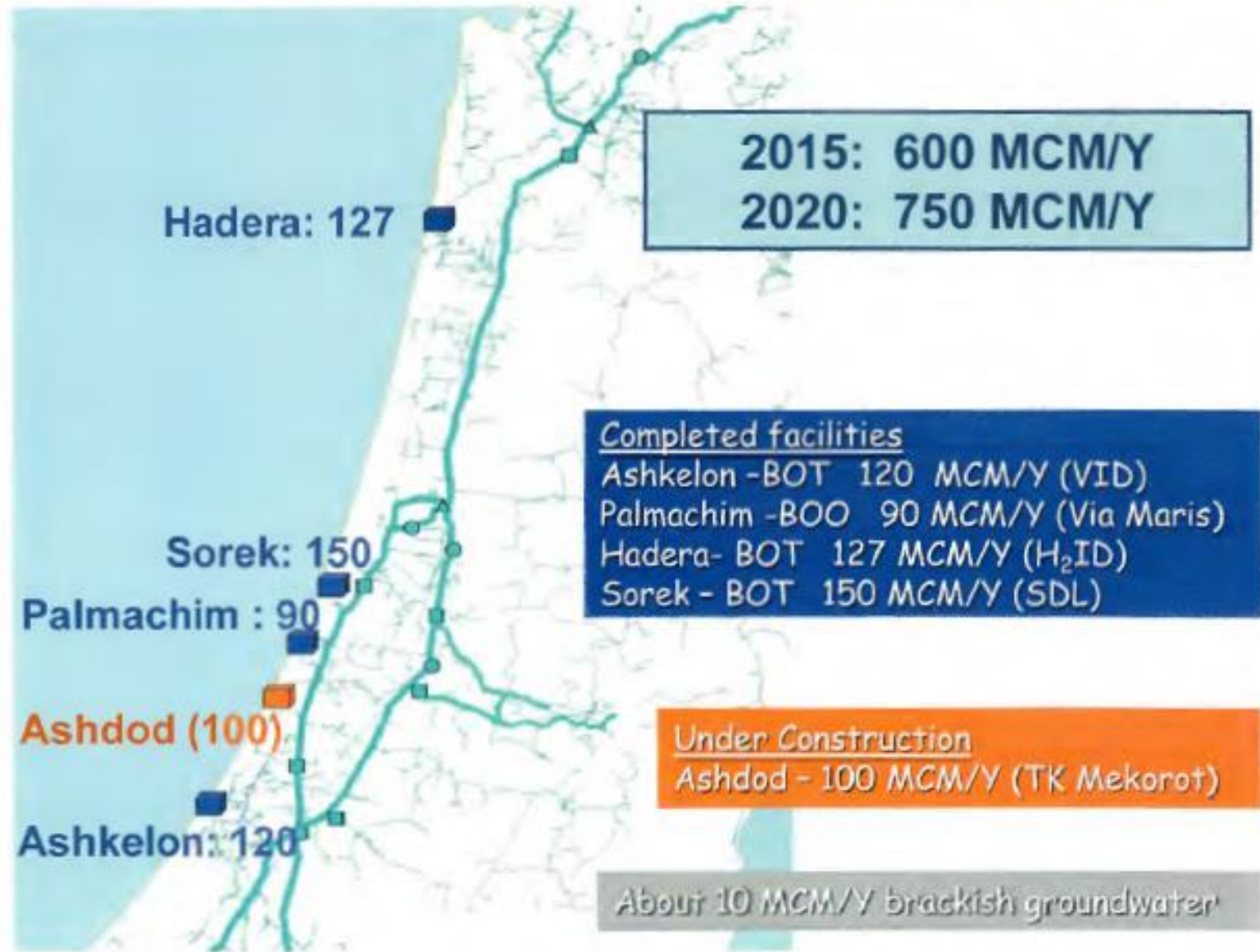
זה של מים כל עליה ברמת המליחות גודת הפחתה בת

Evolution of Desalination Capacity

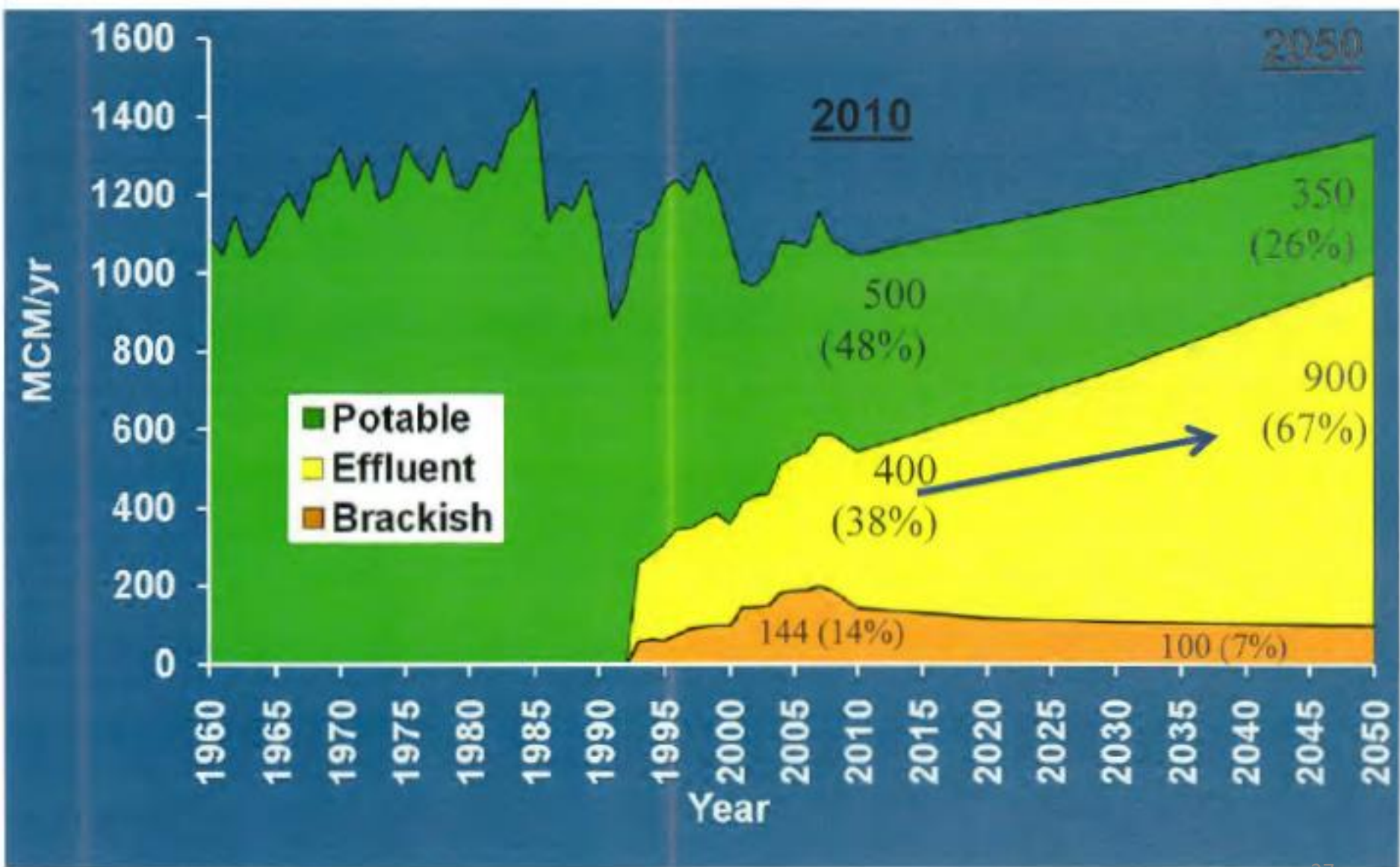
Year	2009	2010	2011	2012	2013	2014	2015
# facilities	2	3	3	3	4	4	5
Water produced (MCM)	152	267	291	310	359	350	550

Source: Water Sector Budget 2015

Sea Water Desalination



Agriculture irrigation sources

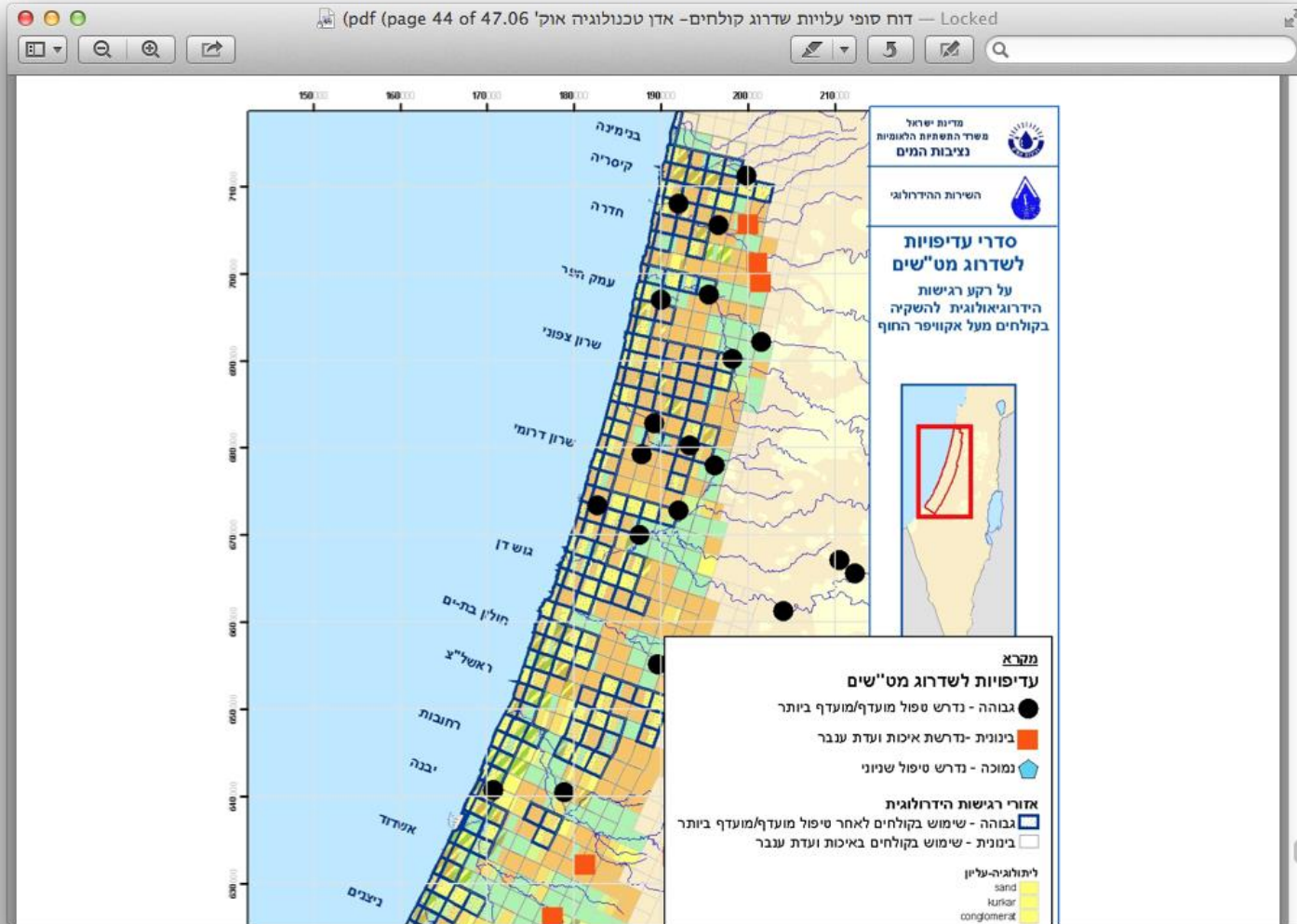


Reuse of All Sewage Effluents



Irrigation with recycled effluents of Dan Region
130 MCM/Y

Recycled Water and Land Use



Expansion of irrigated land

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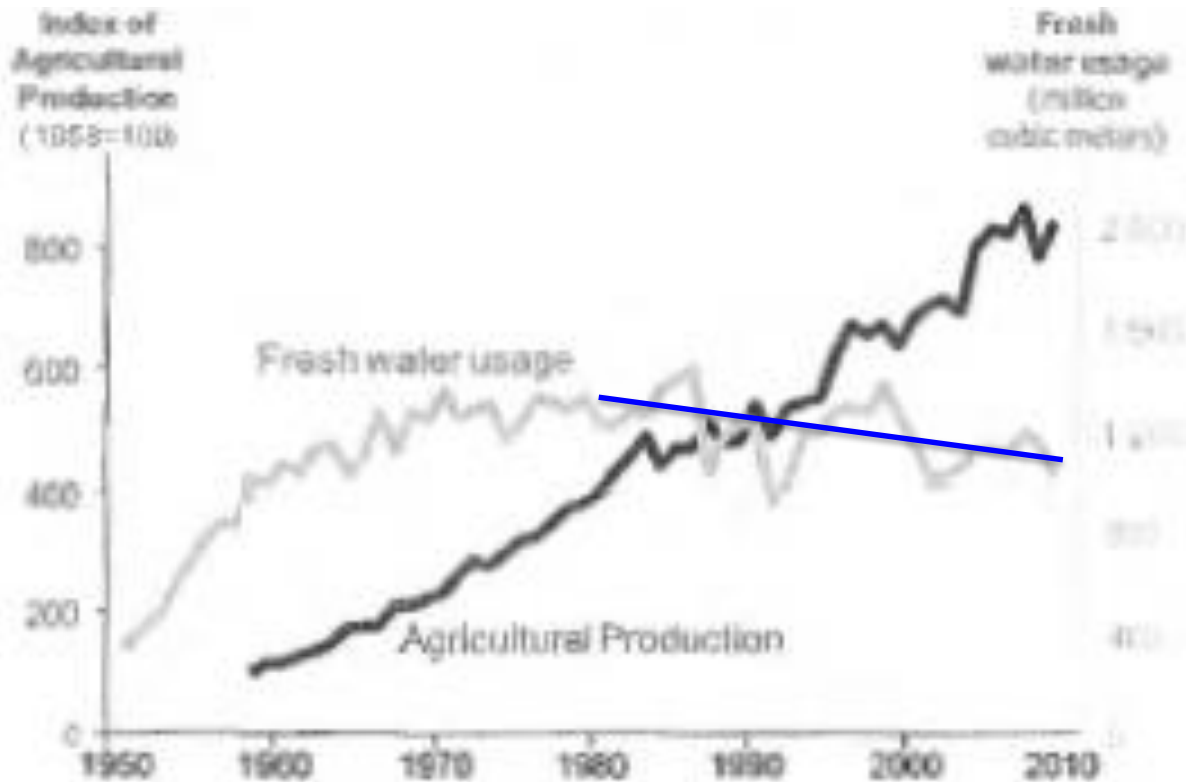


Reducing water demand

- **Guidance through a media campaign.**
- **Enforcement regarding public parks irrigation.**
- **Increase in water rates.**
- **Water saving devices.**



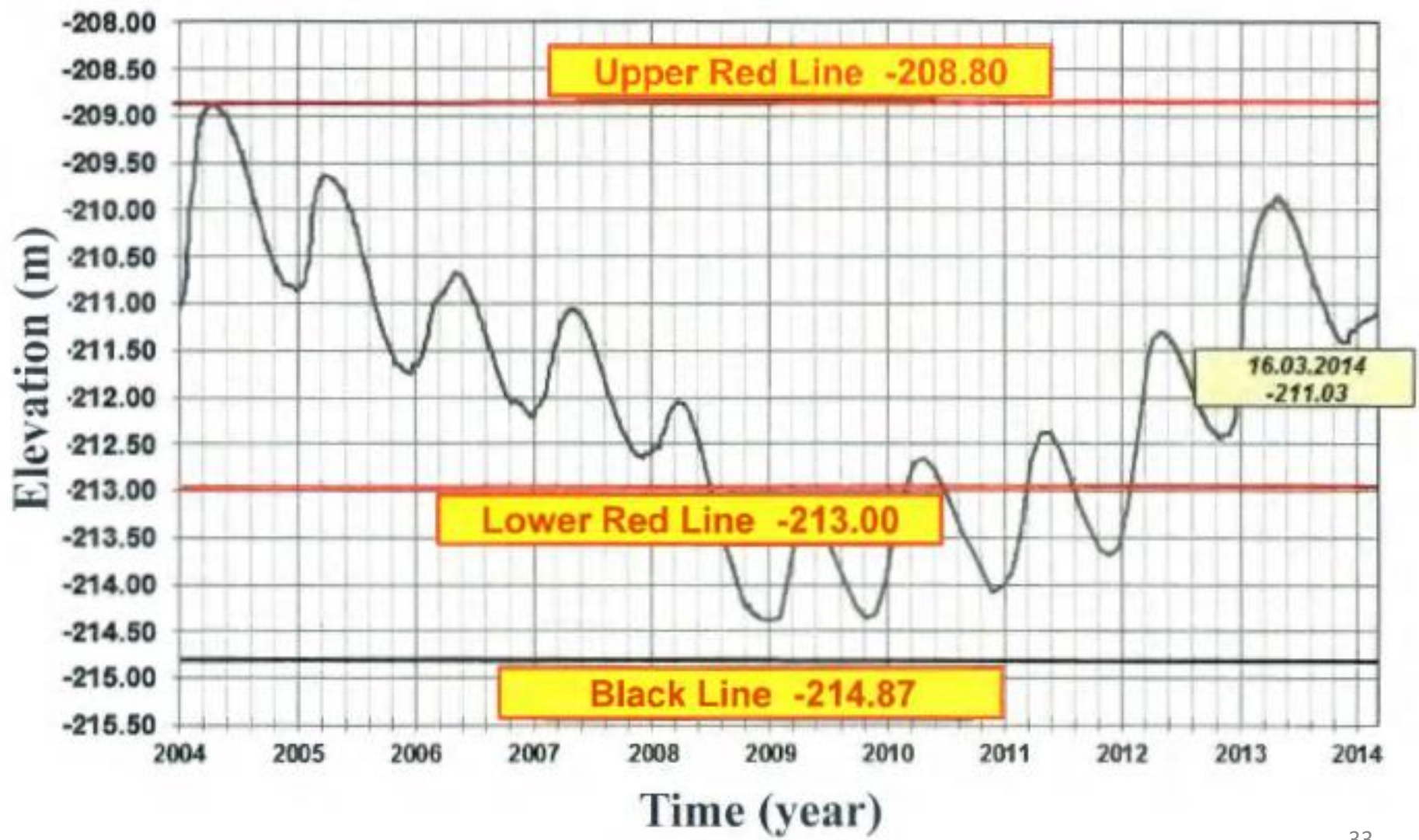
Irrigation Water Use and Agricultural Production



Source: Yoav Kislev.

Data: Central Bureau of Statistics, *Statistical Abstract of Israel*, various years.

Restoring water storage



Municipal Water Sector

Investment deficit of 10 billion shekels

Legislation Water-Sewage Corporations Law

By 2014, 55 Corporation were established, serving about 6.2 million citizens (out of 8.0 million).

Achievements:

- ❖ Reducing water loss.
- ❖ Increasing current collection.
- ❖ Increased investments in infrastructure.
- ❖ Implementation of new technologies.

Water tariffs – Domestic sector

Two-block tariff system:

1 cubic meter \approx 250 gallons \approx 2.5 CCF

- Below 3.5 m³/person/month - the rate is USD 2.5/m³
- Above 3.5 m³/person/month - the rate is USD 4/m³

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



Demand Management: Impact of domestic water pricing on consumption



Domestic water consumption (MCM/y) in Israel during 1996 – 2011.

Source: Israel's Water Authority. 2011. Water consumption by sectors: 1996 – 2011 (in Hebrew).

<http://www.water.gov.il/Hebrew/ProfessionalInfoAndData/Allocation-Consumption-and-production/20112/1996-2011.pdf>.

Additional future steps

- Further reforms in water tariffs
- Water allocation for nature
- Master plan (up to 2050)
- Export (sell) water to neighbors