EcoPeace
Middle East

ENVIRONMENTAL & SOCIAL BENEFITS OF TRANSBOUNDARY WATER COOPERATION

LESSONS FROM THE LOWER JORDAN RIVER BASIN

DECEMBER 5TH , 2019
UNECE, GENEVA

Transboundary River System

Lower part of Jordan River
divides into three political areas:

Israeli:

Sea of Galilee to Yarmouk River

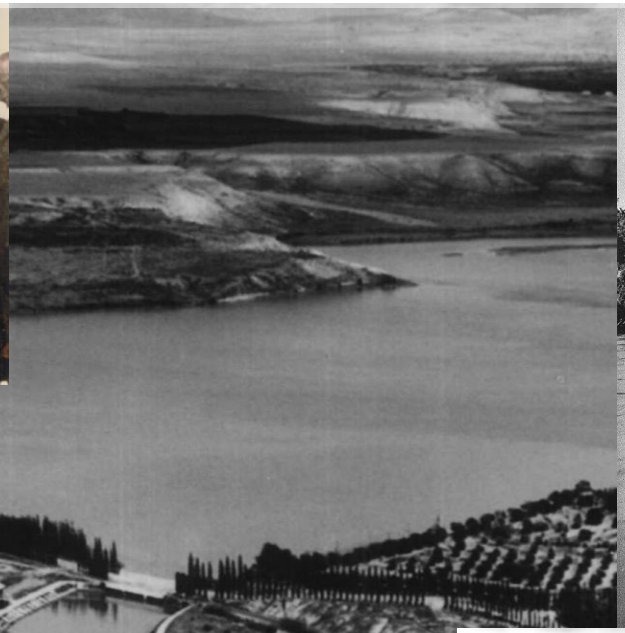
Jordanian-Israeli:

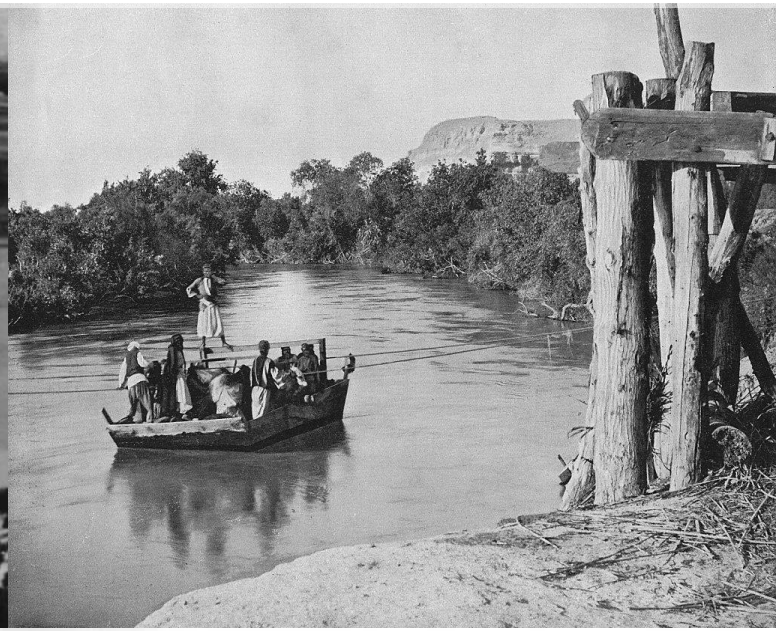
Yarmouk River to Bezek Stream

Palestinian-Jordanian:

Bezek Stream to Dead Sea

The Mighty River Jordan





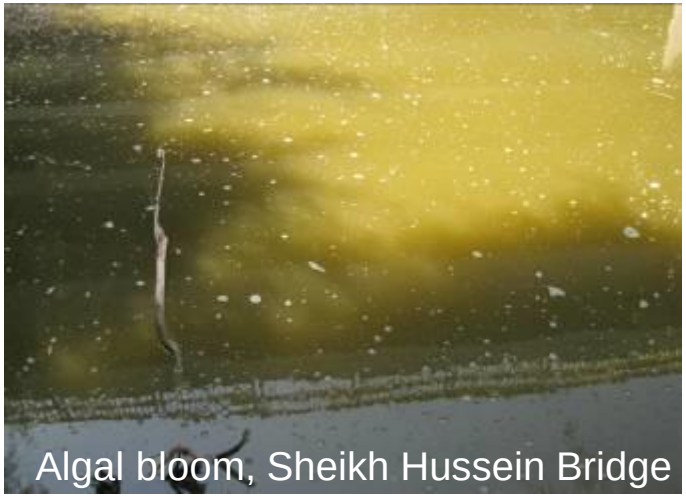
Back Door Dump / Conflict Mindset

Environmental Flow Study Methodology

- Regional team of experts sampled the LJR.
- **Morphological and hydrological** variables including cross sections, velocity, discharge
- **Water Quality**: temperature, transparency, Electric Conductivity, salinity, Dissolved Oxygen, % oxygen saturation etc.
- **Macroinvertebrates**
- **Botanical Survey**
- **Constraints** in sampling: access, mines, budget, historical references

Key Findings:

- Macroinvertebrate taxa richness is at least 50% lower than in the reference sites
- Fast flow habitats have completely vanished and with them all species adopted to fast flow conditions
- Plant species diversity decreases from N-S; primarily saline tolerant plants; reduction of flow and flood frequency


Algal bloom, Sheikh Hussein Bridge

Stations	1	2	3	4	5
Plant Species Richness	82	69	50	50	29

Possible Rehabilitation Scenarios

Scenario	Required Flow	Required Quality
Take No Action	50-100 X 10^6 m^3/Y	Salinity: 3000-4000 ppm Mostly effluents, agricultural and fishpond runoff
Full Restoration	900 – 1,400 X 10^6 m^3/Y 3 minor flood/Y	Salinity: 250-350 ppm No effluents, agricultural or fishpond runoff
Partial Restoration	600 – 800X10^6 m^3/Y 1 minor flood/Y	Salinity: 500-750 ppm No effluents, agricultural or fishpond runoff
River Rehabilitation	300 – 400X10^6 m^3/Y 1 minor flood/2Y	Salinity: 1000-1500 ppm High quality effluents, agricultural and fishpond runoff up to 25% of baseflow
Flow Enhancement	300 – 400X10^6 m^3/Y 1 minor flood/2Y	Salinity: 3000-4000 ppm Mostly effluents, agricultural and fishpond runoff

Set NGO Targets: Regional Rehabilitation Goal

- 400-600 mcm annually, one minor flood
- Salinity level less than 750 ppm; primarily fresh water with only the highest quality of effluents allowed up to 25% of the LJR's base flow
- This strategy would remove most of the disturbances, restore the river's structure and function, allow biodiversity to recover and achieve a fair to high ecosystem integrity and health.
- Would allow broad tourism activities, baptism, recreation and fishing.

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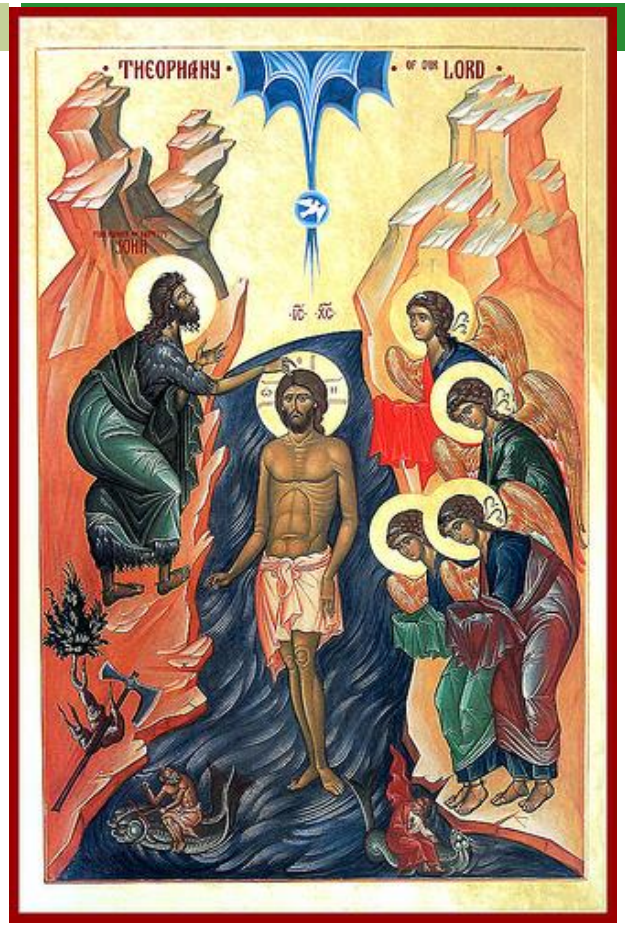
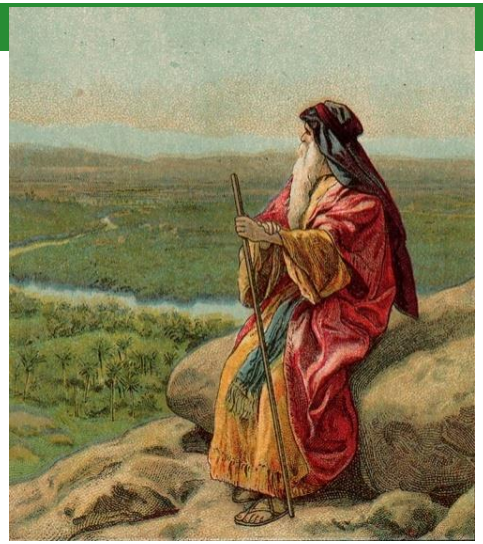
Social Benefits Identified through Grassroots Action

Expand Social Action Globally: A Tradition of Pilgrimage





For many pilgrims the Jordan River features prominently along routes connected to Biblical and Islamic texts, drawing visitors to the places where miracles occurred and prophets walked.

2019: Rehabilitation of Lower Jordan River … underway

- Sewage Being Removed: Waste Water Treatment Plants being built in Israel, Jordan and Palestine.
- River restoration in Israel.
- Israel – National Master Plan Being Developed
- Israel Releases Fresh Water – 9 mcm pa
- Reversal of the national water cariar.
- With EU Support Regional NGO Master Plan Developed

Lessons from the Lower Jordan River Basin

- Civil society can be effective catalyst
- Need regional approach and regional vision
- Undertake sound research – environmental & socio-economic
- Identify clear targets and bench marks
- Build local constituents – schools/activists/mayors/faith based groups across the basin.
- Attract the media local & global
- Mindful of synergy between bottom up and top down advocacy
- Must be directed to create Political Will

For more information visit

www.ecopeaceme.org

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SWEDEN

European Union

Decoupling National Water Needs for National Water Supplies: Insights and Potential for Countries in the Jordan Basin

Nadav Tal and Michael Gilmont

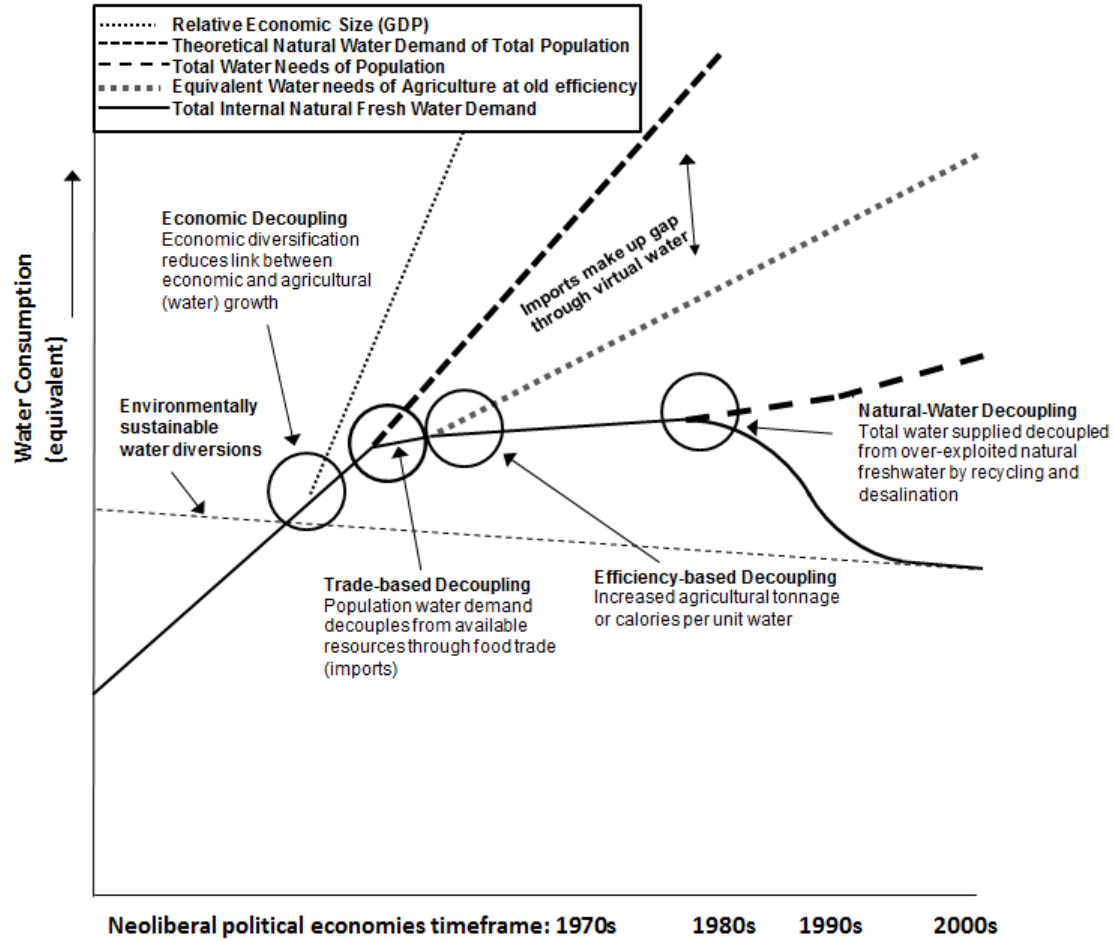
(based on work by Gilmont et al 2017)

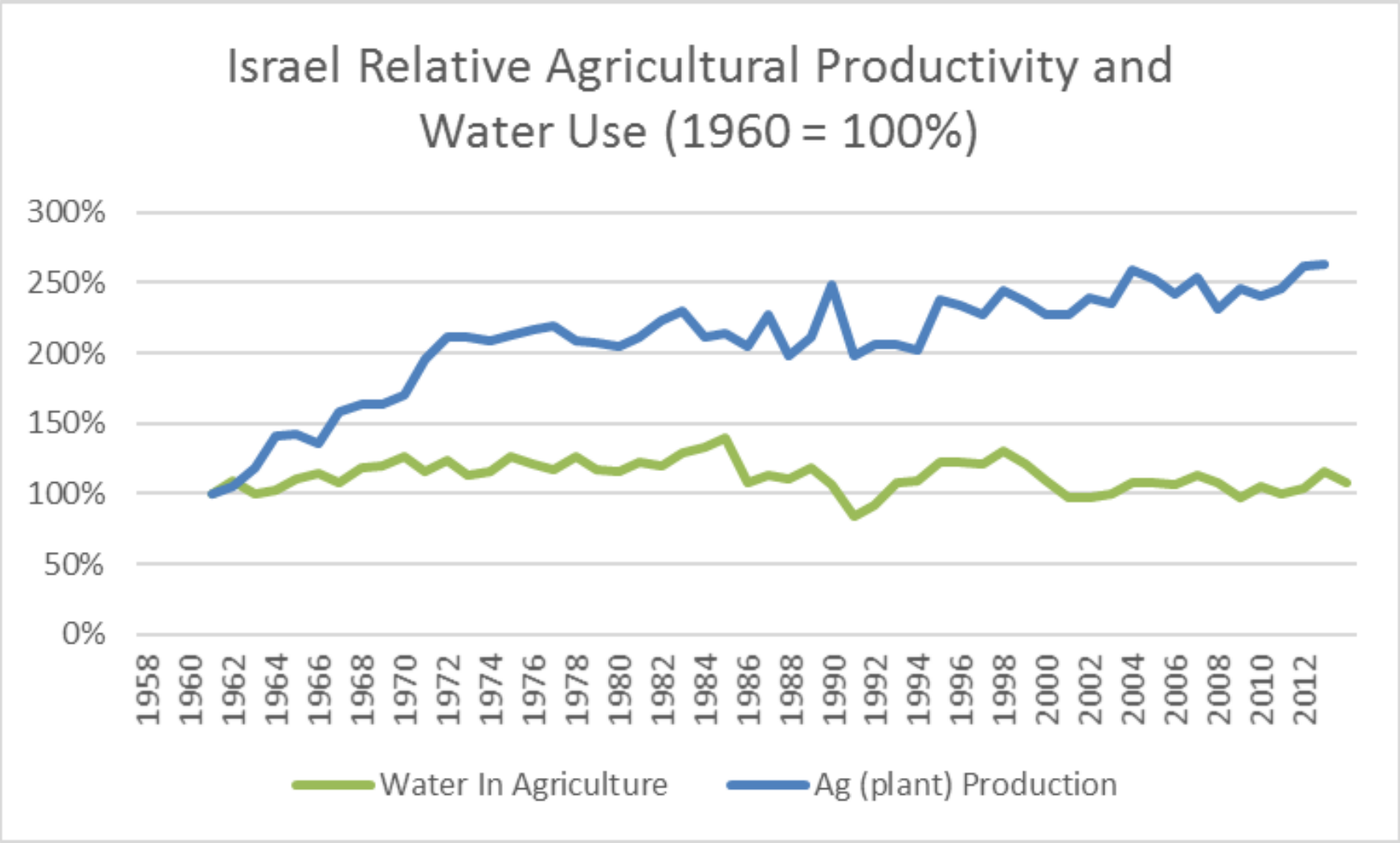
Funded By

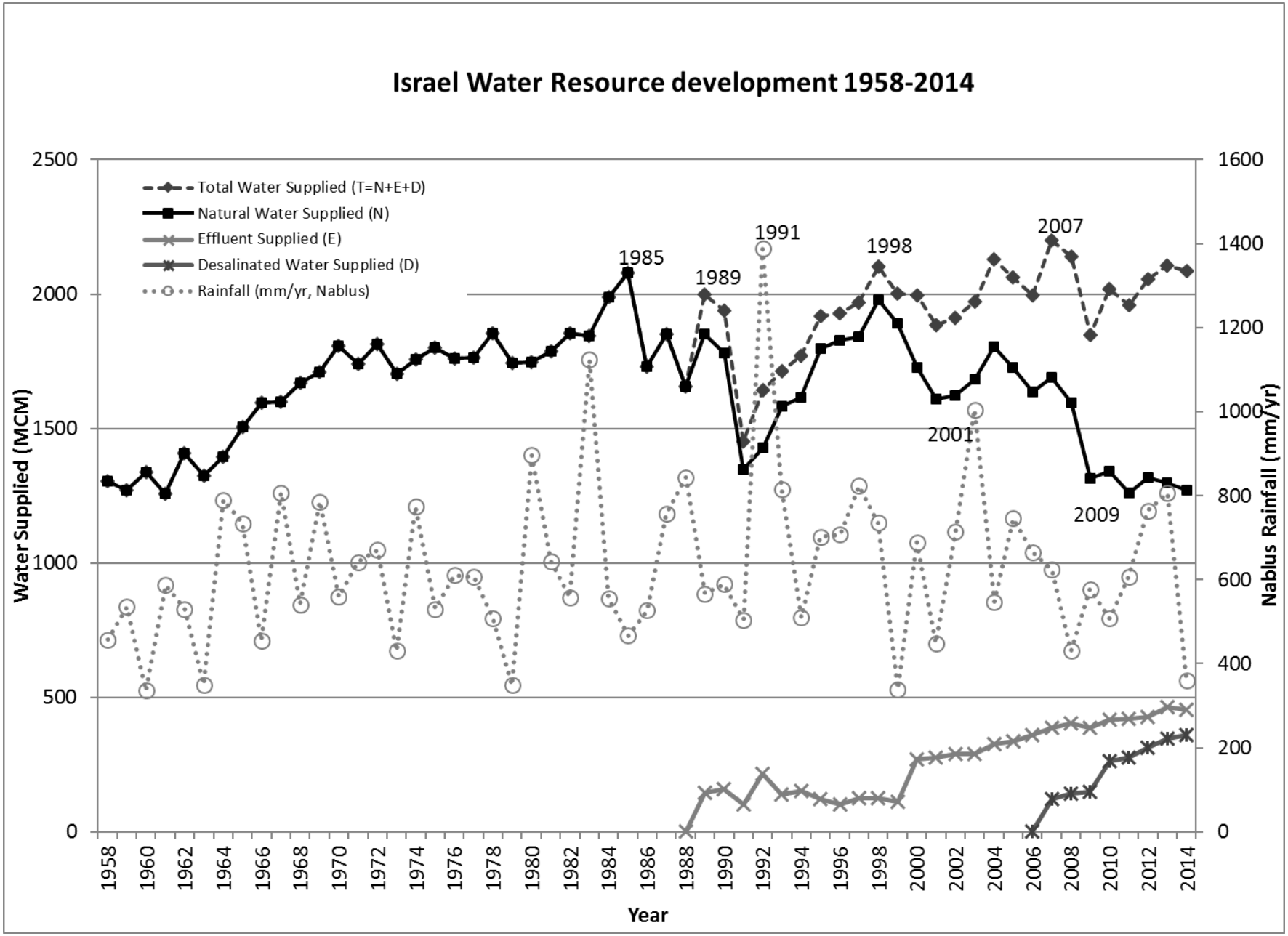
Decoupling Trends

Increasing outputs, decreasing water inputs.

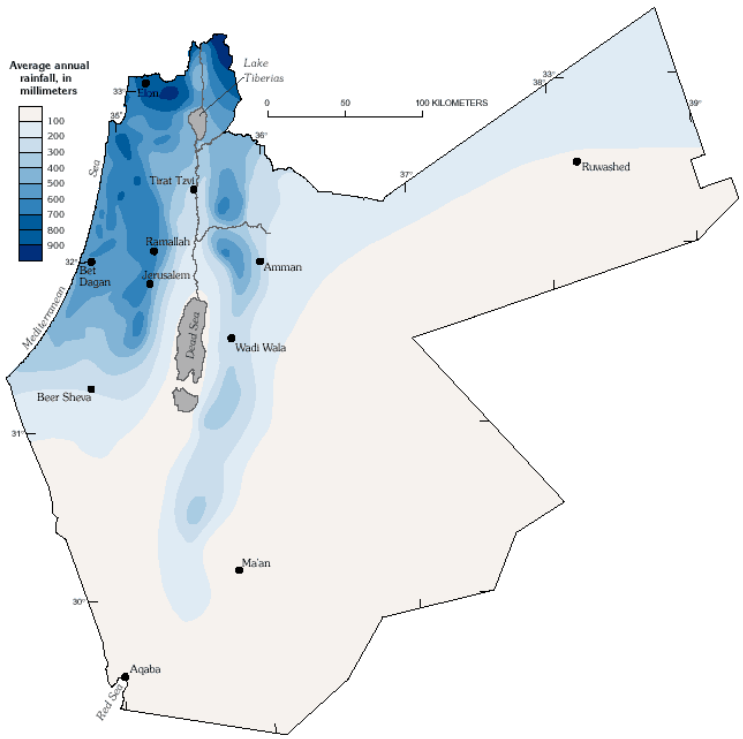
- Economic diversification
- Food Imports
- Agricultural water productivity
- Non-natural water (wastewater, desalination)




Israel Relative Agricultural Productivity and Water Use (1960 = 100%)
300%
250%
200%
150%
100%
50%
0%
1958
1960
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
Water In Agriculture
Ag (plant) Production


Israel Water Resource development 1958-2014
Total Water Supplied (T=N+E+D)
Natural Water Supplied (N)
Effluent Supplied (E)
Desalinated Water Supplied (D)
Rainfall (mm/yr, Nablus)
1985
1989
1991
1998
2001
2007
2009
Water Supplied (MCM)
Nablus Rainfall (mm/yr)
Year
0
500
1000
1500
2000
2500
0
200
400
600
800
1000
1200
1400
1600
1958
1960
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014

Similar agriculture water needs (rainfall deficit) in East Israel, Palestinian West Bank and West Jordan



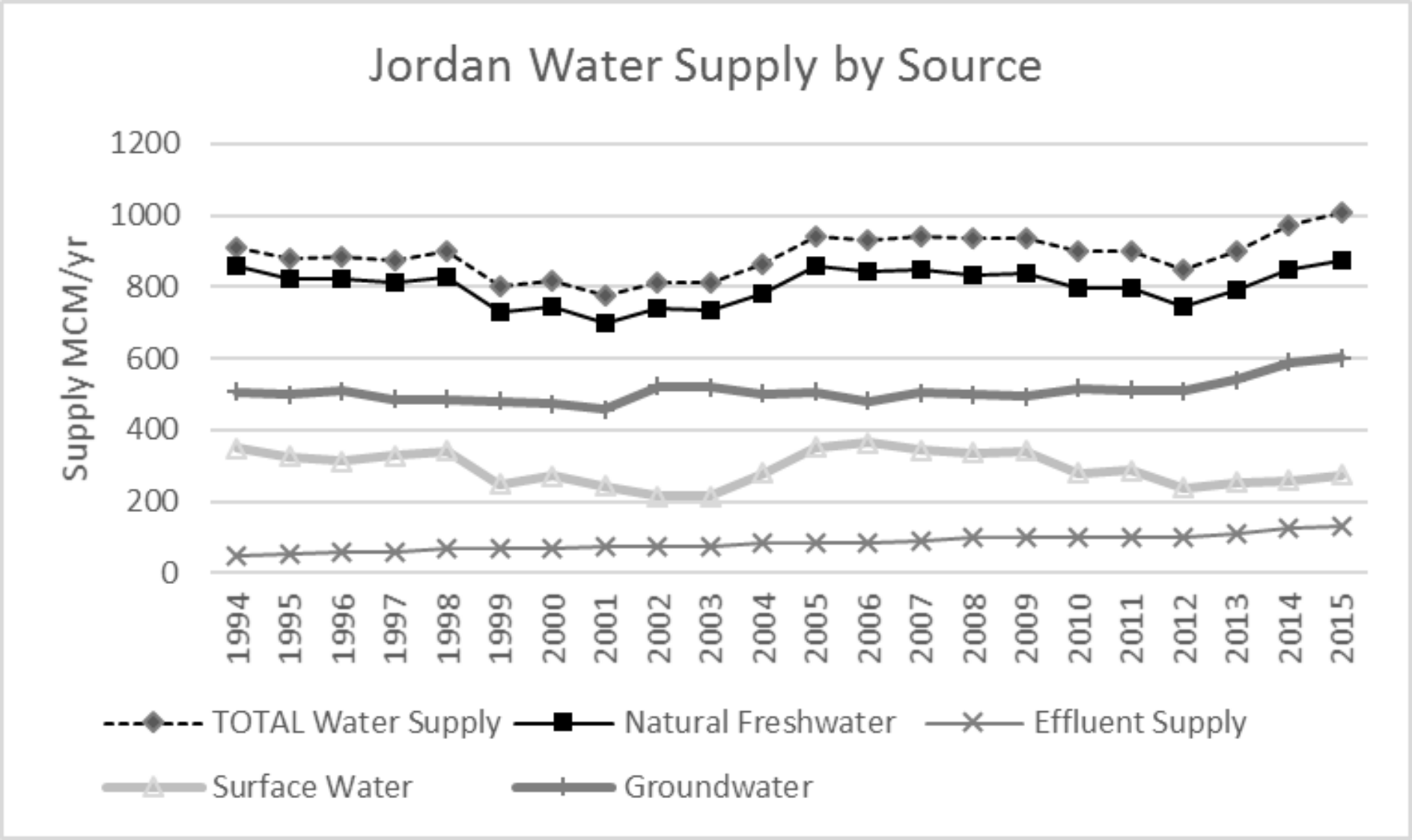
What can neighbours learn from each other in terms of:

Agricultural Water Productivity (crop per drop)

Success of wastewater in agriculture

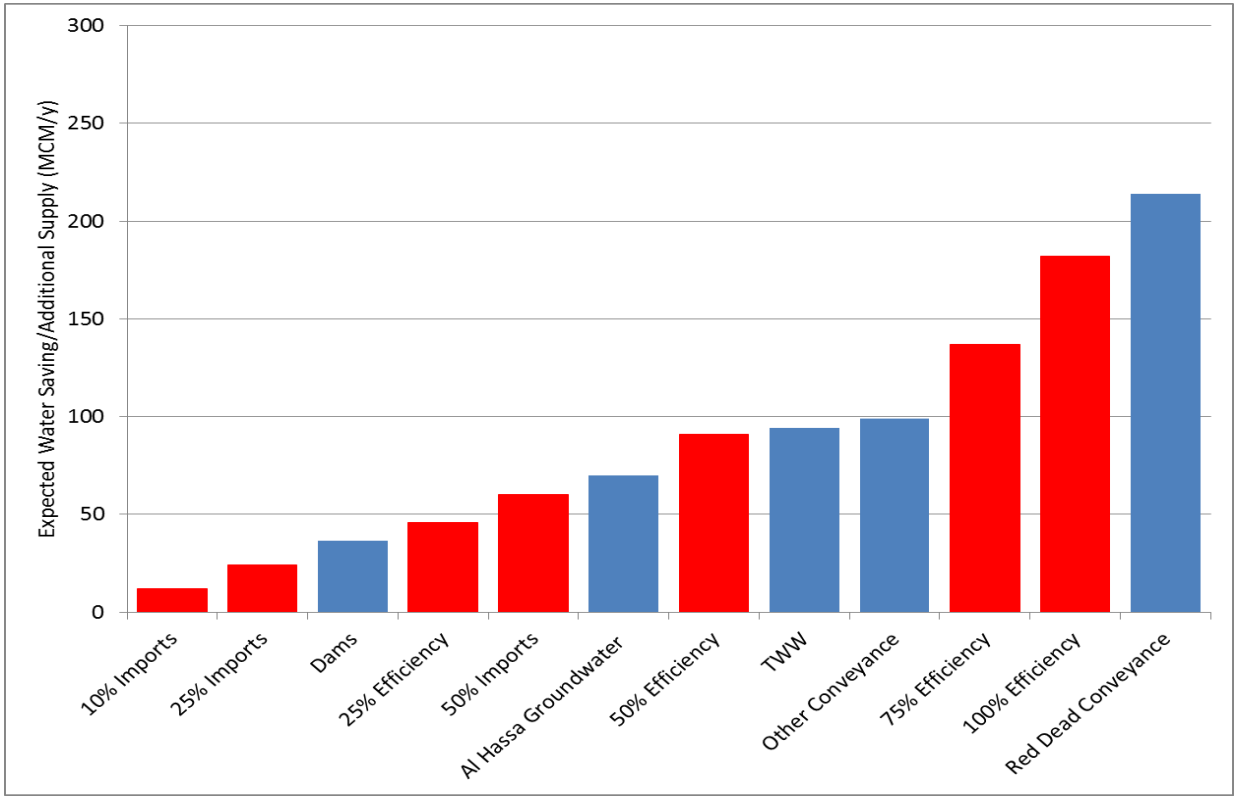
Keeping water use within sustainable limits

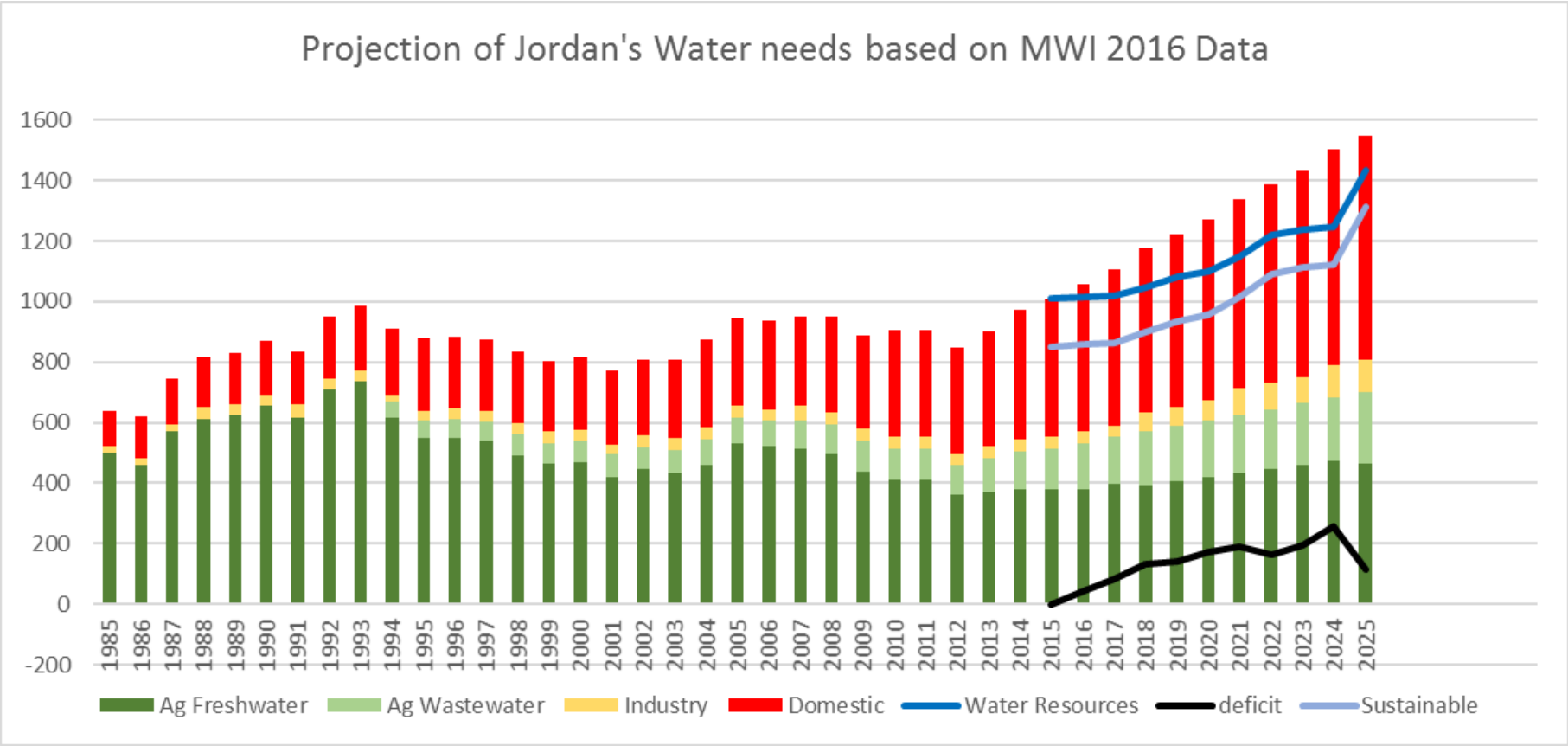
How agriculture copes (and grows) with a static volume of water supply.


Jordan Water Supply by Source
Supply MCM/yr
1200
1000
800
600
400
200
0
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
TOTAL Water Supply
Natural Freshwater
Effluent Supply
Surface Water
Groundwater

	Jordan Water use MCM (2010)	Jordan ave tonnage '000s (2009-14)	Jordan water/crop ton	Jordan Ave water use 2009-14 MCM/yr	Israel water/ crop Ton @140% inflation	% of present scenario	Water used under new scenario MCM/yr	Water Saved MCM/yr
Clover	84.0	190.1	376	71.41	Rainfed	0%	0	71.4
Olives	167.1	110.5	1,627	179.75	1278	79%	141.2	38.6
Tomatoes	74.1	753.6	100	75.73	75	74%	56.3	19.4
Banana	26.6	42.4	609	25.81	449	74%	19.0	6.8
Apples	15.0	36.1	522	18.82	187	36%	6.7	12.1
Dates	24.6	10.7	2,187	23.44	1879	86%	20.1	3.3
Watermelons	14.8	117.6	96	11.33	81	84%	9.5	1.8
Grapes	14.6	34.7	491	17.02	426	87%	14.8	2.3
Wheat	3.5	21.6	160	3.46	57	35%	1.2	2.2
Onion, dry	4.2	27.0	265	7.14	185	70%	5.0	2.2
Citrus	35.1	108.7	293	31.89	227	77%	24.7	7.2
Eggplant	11.7	106.6	111	11.87	99	89%	10.6	1.3
Potato	25.2	159.8	144	23.00	189	132%	(30.3)	-
Cucumber	7.1	191.4	41	7.75	68	168%	(13.0)	-
Total	507.5	1910.7		508.4			(352.5) 340	168.4

Comparison of Instruments




Projection of Jordan's Water needs based on MWI 2016 Data
1600
1400
1200
1000
800
600
400
200
0
-200
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
Ag Freshwater
Ag Wastewater
Industry
Domestic
Water Resources
deficit
Sustainable

Conclusions and Recommendations

- Enhanced decoupling possible in Jordan, and likely in the Palestinian Territories.
- Potentially possible to grow agriculture within CURRENT (550mcm/yr) limits (water savings used to grow output) in Jordan
- Opportunity for investment in rural economy to deliver sustainable agriculture AND contribute to water security
- Strategic import substitution could be avenue to forcing national water resources within sustainable national resources
  - Significant social and economic considerations
- Require holistic inter-sector analysis and planning (agriculture, water, economy, trade, social development)


Thank You!