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- **Constraints** in sampling: access, mines, budget, historical references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.

<table>
<thead>
<tr>
<th>Stations</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant Species Richness</td>
<td>82</td>
<td>69</td>
<td>50</td>
<td>50</td>
<td>29</td>
</tr>
</tbody>
</table>
## Possible Rehabilitation Scenarios

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

![Image of people in water with banner]
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 benchmarks
• 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

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