



Statement

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on**

**Water Scarcity in the Middle East:
Regional Cooperation as a Mechanism towards Peace**

By

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Background: Water Availability and Use

1. Israel has been using the full potential of its natural water resources for several decades, and has drawn down the sources below dangerous levels during sequences of drought years (e.g., 2001-2002).
2. Large hydrological variability is typical in the region. The average annual natural recharge in Israel's three main sources – the Coastal Aquifer, the Mountain Aquifer and Lake Kinneret (Sea of Galilee) - for the 70 year period 1932-2002 is 1457 mcm (1.18 million acre-feet/year; 1,055 mgd;) with a standard deviation of 458 mcm/year. Over this period it has been as low as 657 mcm/year (less than half the average) and as high as

3563 mcm/year (2.45 times the average).

3. Water quality in the sources has deteriorated due to over-exploitation and to human activity above the aquifers. For example, over the 33 year period 1970-2003 average Chlorides concentration in the Coastal Aquifer rose from 160 to 260 mg/liter and Nitrates from 34 to 57 mg/liter.
4. The situation of the sources in Jordan and in the Gaza Strip is the same or worse.
5. On the demand side, Israel is a world-pioneer in conservation and efficient water use in agriculture and industry. Water productivity in agriculture grew by a factor of 5-10 over the last several decades.
6. Substantial conservation has also been achieved in the urban sector, and more is being done to constrain the rise in per-capita consumption.

For comparison: residential per capita water use (in litres per capita per day): Jordan – 94; Israel – 170; Italy – 250; Canada – 326; US single dwellings – 382. Residential (home and yard) is about 2/3 of total urban use.

7. Urban demand keeps rising with growth of the population - from the current 6.7 million to 8.6 million forecasted in 2020. Even with a constant per-capita consumption, this will bring the urban use to about 960 mcm/year, over 70% of the natural potential.
8. Fresh water allocation to agriculture has been curtailed drastically - from a former consumption of 1,200 mcm/year to 530 mcm/year.
9. Total demand for potable water over the coming decade is forecasted to rise from the current 1350 to 1535 mcm/year, which exceeds the average natural replenishment and is far greater than the low values of replenishment.

Closing the Water Balance Gap: Desalination and Reuse of Sewage Effluents

10. Repeated occurrence of water-shortage crises due to droughts led to adoption in 2001 of a national plan to augment

the supply through a 10-year program of sea-water desalination. It was initially set for desalination of about 500 mcm/year (~360 mgd) - over one-third of the natural potential! - to be produced in 6-7 plants along the Mediterranean coast. Subsequent decisions have reduced the immediate plan to 310 mcm/year.

11. Other sources to be developed: desalination of brackish groundwater in several suitable locations (50-60 mcm/year) and treatment of groundwater that is too polluted to be used directly.
12. Import of 50 mcm/year from Turkey is a "political project", justified on the basis of the overall relations between the two countries, not on professional considerations or an economic justification.
13. Agriculture has national values beyond the narrow economic, including protection of open spaces and green environments, self-supply of basic foods, and maintaining the social fabric of the agricultural sector.

To sustain the required level of agriculture, the reduction in potable water allocation is compensated by the supply of reclaimed sewage - to be raised from the current level of 270 mcm/year to a projected 530 mcm/year. Soil salination and damage to plants associated with reuse of effluents have to be overcome by advanced (membrane) treatment of the effluents.
14. The quantities of sewage increase with the rise in urban water use. Untreated or poorly treated sewage creates a serious danger to health, to water resources and to the environment.
15. On the other hand, properly treated sewage can be used for irrigation, flow augmentation in streams, and wetlands. About two-thirds of the urban sewage can be reclaimed for reuse.
16. Where there is no use for the treated effluents, they can be discharged into the environment without detriment - provided they are treated to high quality levels.

17. Similar solutions are relevant for Jordan and the Palestinian areas. Therefore Israeli researchers are cooperating with Palestinian and Jordanian colleagues in refining technologies for treatment and reuse of sewage effluents.
18. Israel faces a very serious threat of sewage from the West Bank percolating into the Mountain Aquifer, a major source of potable water for both Israelis and Palestinians, and flowing downhill into its streams.

There is urgent need to complete the planning, construction and operation of some 16 sewage projects in the West bank - collection, treatment and reuse or safe disposal. Funding for these projects, provided to the Palestinians, is a major concern. The plants must be operated by companies with proven international expertise and experience.

Conclusions of this part

19. In spite of great achievements in efficient water use in Israel, there is a negative balance between demands and the availability of natural supplies, a deficit that is growing with time.
20. The shortage is exacerbated by the large hydrological variability that is typical in the region. Sequences of dry years have resulted in serious deterioration of quantities and qualities in the sources.
21. A similar situation exists throughout the Palestinian areas and Jordan. Their situation is even worse, as they are land-locked (except for the Gaza Strip, and an opening for Jordan at Aqaba) and much of the demand is located at high elevations.
22. The entire region is water-short, and subject to large hydrological variability. Dividing the scarce natural water resources is not a viable solution for all Parties in the region. It must lie in production of very large quantities of new water, primarily desalination of sea-water.
23. Treatment and re-use of sewage effluents for irrigation, for nature and for stream flow augmentation is an important component of the solution, provided the sewage is treated to

high quality.

24. Proper solution of the sewage problem in the West Bank is a critical element in solving the regional water and environment problem.

Existing Regional Cooperation

25. Jordan and Israel signed a Peace Treaty in October 1994, in which water is a major component. Cooperation between the Parties since then is excellent, and no major problems have arisen that could not be settled amicably.
26. The Palestinian Authority and Israel signed in September 1995 the interim Oslo II Agreement, in which "water and sewage" are an important element. The Parties have made every effort to adhere to the Agreement, in spite of the difficult security problems. Regular meetings take place at the field, technical and policy levels, and there is a mutual agreement "to keep water out of the cycle of violence".
27. Water is practically the only domain in which the Palestinian Authority and Israel continue to cooperate effectively, even though it is hampered by the difficult security situation.
28. The US has played a critical role in helping the Parties to work together and in resolving difficult issues. The US chairs regular Tri-Lateral meetings with the Palestinian and Israeli delegations, at which both general and specific problems are discussed.
29. The US, through US-AID, has been an important force on the ground, helping the Palestinians in addressing their water and sewage problems. Carrying out studies, and especially funding and responsibility for construction of water and sewage works have a significant impact. These activities of US-AID are currently hampered by security problems, but should be sustained nevertheless, and resumed fully once conditions allow.
30. Considerable regional cooperation in applied research is ongoing, and should be encouraged and funded. This is creating solid bridges of personal and institutional cooperation,

which enhances mutual understanding for joint problem-solving.

Elements of a Long-Term Solution: Regional Cooperation in Management of Shared Water Resources - A Mechanism to Build Peace in the Region

31. Gaza gets its water from local groundwater, augmented by desalination and some import from the Israeli system - as per the Oslo II Agreement.
32. Coordinated management of the Mountain Aquifer by Israel and the Palestinians - based on the principles of the Oslo II Agreement.
33. Major desalination on the Mediterranean Coast (proposed at Hadera) and delivery directly to the West Bank, funded by Donors for the Palestinians. This is the only viable long-term solution for the West Bank.
34. The Palestinian-Israeli Joint Water Commission continues to operate along the principles of the Oslo II Agreement.
35. The US and other Donors help the Palestinians to develop their water systems, and especially to construct and operate over time in a reliable fashion sewage treatment plants in the West Bank.
36. Israel and Jordan continue to seek jointly sources in both their territories for additional supply to Jordan, to be paid by Jordan, as per the Jordan-Israel Peace Treaty.
37. The Jordan-Israeli Joint Water Commission continues to operate as per the Peace Treaty.
38. Israel augments its own supplies as described above and maintains full control of its natural water resources in the North.
39. A attractive option would be a larger regional perspective, in which water from the great rivers in the North is a component in a regional "water-and-peace" scheme. This would engage Lebanon and Syria in regional water management schemes for the benefit of all.

40. Joint projects of applied research, development and application in desalination, hydrology, water treatment, sewage treatment and reuse are valuable components of regional cooperation. These activities build bridges and contribute to joint problem-solving.