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POTENTIAL FOR COLLABORATION ON REGIONAL WATER PROJECTS IN THE MIDDLE EAST

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Nowhere is the impact of water scarcity felt more than in the Middle East, where millions of people continuously vie for a share in ever-diminishing supplies. Here, annual renewable water resources amount to about 1,400 m³ per person per year - less than 20% of the global average. In all regions, the demand and the actual consumption of water is far beyond the annual rate of replenishment, exceeding the safe yield of the regional water resources. Most of the water resources in the Middle East are transboundary, i.e. shared by more than one country or national water authority. This applies to the major rivers, as well as groundwater reservoirs, including the following: the Arava Aquifer (shared by Israel and Jordan); the Jordan River resources (shared by Syria, Lebanon, Israel, Jordan, Palestine); the Judean and the Coastal Aquifers (shared by Israel and Palestine). All rivers originating over the Samaria, Judea and Hebron mountains cross the coastal plain of Israel. This highlights the inter-dependence of communities living over the sources of recharge and replenishment, and riparian communities.

BENEFITS FOR MUTUAL DEVELOPMENT AND MANAGEMENT OF THE TRANSBOUNDARY UPPER JORDAN BASIN

The discharge from the Jordan River originates mainly from groundwater sources in Syria and Lebanon. Additional contributions come from the Golan Heights and the Eastern Galilee Aquifers. All the water accumulates in the Sea of Galilee, from which Israel withdraws between 300-400 million cubic meters per year. The Sea of Galilee is the only substantial natural freshwater reservoir in the Middle East. It is thus imperative that all nations in the region strive to maintain its sustainable aquatic ecology, in order to guarantee a stable supply of fresh water for years to come.

The geographical location of the Sea of Galilee provides an opportunity for international co-operation, in which the lake is used as a natural operational water storage facility for the region. International agreement on a transboundary Upper Jordan Basin Water Authority would allow the development of an optimal water management policy for the region (Jordan, Israel and Palestine).

DEVELOPMENT OF INTEGRATED WATER TREATMENT FACILITIES FOR SUSTAINABLE UTILIZATION OF RECLAIMED WATER IN ISRAEL AND PALESTINE

Most of the mountainous terrain over the West Bank comprises highly permeable karstic limestone formations, which imply fast percolation and substantial groundwater recharge into the Judea mountainous aquifer. Hydrological basins with outcrops of highly permeable formations are prone to fast percolation of natural rainfall and excess water from irrigation, as well as anthropogenic pollutants. The high population density over the Judea, Samaria and Hebron mountains poses a threat to the local groundwater quality from anthropogenic pollution. This is already affecting the local population and the Israeli well-fields along the foothills of the mountains, which provide about 35% of the water supply in Israel alone.

It is obvious that the disposal of effluents into local washes that contaminate the aquifer and the rivers crossing the coastal plain of Israel must be stopped. Due to water scarcity in the region, substantial quantities of the "new" water will come from reclaimed effluents; therefore local effluents over the West Bank *must* be treated to the highest quality. However, due to the sensitivity of the mountainous aquifer, use of this water over the recharge terrain should be avoided.

The shallow phreatic Coastal Aquifer of Israel is already polluted after almost a century of intensive industrial and agricultural development. The entire area over the Gaza Strip, which is covered by sandy terrain with shifting sand dunes, suffers from heavy anthropogenic pollution. Most of the Coastal Aquifer of Israel and the Gaza Strip cannot afford any further application of even treated effluents.

The above-mentioned description of the hydro-geological situation west of the Jordan River strongly indicates that Israel and Palestine must collaborate over water supply and water treatment management. From a hydrological point of view, the only basins which can safely absorb treated effluents are the Arad-Beer Sheva basin and the central Jordan Valley, where thick, low-permeable layers protect the local groundwater from on-surface activities. Israel and Palestine should therefore consider a water treaty, which will allow for accumulation of treated effluents from the mountainous region, and their transport for utilization in these safe basins. This cannot be done unless a bi-national water authority is established to guarantee optimal water treatment technologies and management for the entire region.