

## **Exploring the potential of Managed Aquifer Recharge to mitigate water scarcity in the Lower Jordan River within an IWRM approach**

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### ABSTRACT

The German federal Ministry for Research and Technology, considering the Resolution 58/217 of the United Nations dated 20. December 2000 is supporting a research program for the "Integrated Water Resources Management (IWRM)" in regions with water shortages. The SMART project Sustainable Management of Available Water Resources with Innovative "Technologies" in the lower Jordan Valley is one of these projects. The consortium comprises more than 17 partners from universities, research centers, companies and NGOs from Jordan, Israel and Palestine. The investigation area reaches from the southern shores of the Sea of Galilee (Lake Tiberias) down to the northern part of the Dead Sea. The dominating geotectonic element is the rift structure of the Jordan River Valley. At the northern shores of the Dead Sea the valley floor is at ca. -400 m below sea level whereas the surrounding highlands reach on average 800 m above sea level. The area is characterised by severe water scarcity. For Jordan, the available renewable water resources are dropping drastically to an annual per capita share of 160 m<sup>3</sup> in recent years, compared to 3600 m<sup>3</sup>/cap/a in 1946. Aquifers are seriously overexploited and groundwater levels have been dropping during the last decades. The water level in the Dead Sea as the basis of the regional drainage system has declined by almost 20 m, causing problems of slope instability. The waters of the Jordan are an extremely important resource to the dry lands of the area and are a bone of contention between Lebanon, Syria, Jordan, Israel and the Palestinians. Given this background, it is imperative to seek for artificial recharge of groundwater. Traditional methods include the constructions of check dams in the wadis.

The main idea of SMART is to include all water resources of the Lower Jordan River, namely ground water, waste water, saline water, and flood water into an integrated management concept. These issues are explored with a series of test sites along both sides of the Jordan valley. Test sites are planned for infiltration of reclaimed wastewater, infiltration of water from flash floods, infiltration of urban surface runoff and irrigation of agricultural area with treated sewage. The test sites are embedded into several water balance studies and finally, a numerical groundwater flow model will be constructed for the entire Lower Jordan Valley. A separate team of socio-economists assesses the water demand in different sectors (e.g. agriculture, urban population) along with likely future trends. All information is integrated into a decision support framework (DSS). The DSS is based on the DPSIR approach (Drivers, Pressures, State, Impact, Response). Together with key stakeholders from the three involved countries, scenarios of current and future water management strategies are set up. These scenarios are evaluated with special regard to their environmental, social and economical impacts on the region. Within this concept, SMART

explores the role of MAR in the IWRM strategies of the Lower Jordan River.