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Comparison of alternative water development and planning options towards sustainable IWRM implementation in the Lower Jordan Valley based on indicator assessment

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The Lower Jordan Valley is characterised by an extreme water shortage due to its semi-arid climatic conditions, limited water availability and continuously growing water demand. The available water resources (precipitation, aquifer recharge, flood runoff, spring discharge) exhibit a high temporal and spatial variability with generally higher quantities available during the winter months (about December–March). The temporal pattern of water demand is reversed, i.e. maximum demand during summer and reduced demand in winter. Water management concepts and water technologies, adapted to the specifics of the regional conditions are required in order to match supply with demand. Regional aquifers have a very important role with respect to their high storage capacity and their function of providing protection against evaporation and contamination.

The central objective of the SMART-MOVE research and implementation project is the integrated transfer of innovative technologies and management instruments to the water management practice of cooperation partners in Israel, Palestine and Jordan. Particular importance is placed on the analysis of the robustness of the water resources systems with respect to the observed high hydrological variability (extreme events such as droughts and floods).

The study region at the Israeli-Palestinian territory comprises three watersheds, namely Al Qilt (189 km2), Al Nuemah (128 km2) and Al Auja (260km2), located in the eastern part of the West Bank. They extend from the central mountains of the West Bank in the west to the Jordan River in the east. The lower parts of the three watersheds have considerable development potential with regards to trade, tourism and agriculture, being of major importance for Palestinian crop production, including Jericho city with 25000 inhabitants as major urban center. The south-western parts near Ramallah-Al Bira present industrial and commercial potential.

In order to cope with the expected water deficit and extremely high hydrological variability, alternative upgrades of the water resources systems by means of infrastructural and technological measures are being studied and priority interventions (IWRM measures) are being identified. The different planning variants are being compared with regard to their robustness with respect to hydrological fluctuations and extreme events based on hydrological scenarios. Their resilience is being evaluated based on indicators for operational and supply reliability. General system performance is being assessed based on technical, social, economic and environmental indicators. Recommendations are provided for system upgrade and sustainable water resources planning and development.