Loibl W, Orthofer R (2002):
Spatial Risk Modeling for Water Shortage and Nitrate Pollution in the Lower Jordan Valley; ARC Seibersdorf research Report, ARC—S-0162, 56 pp., ARC seibersdorf research, February 2002

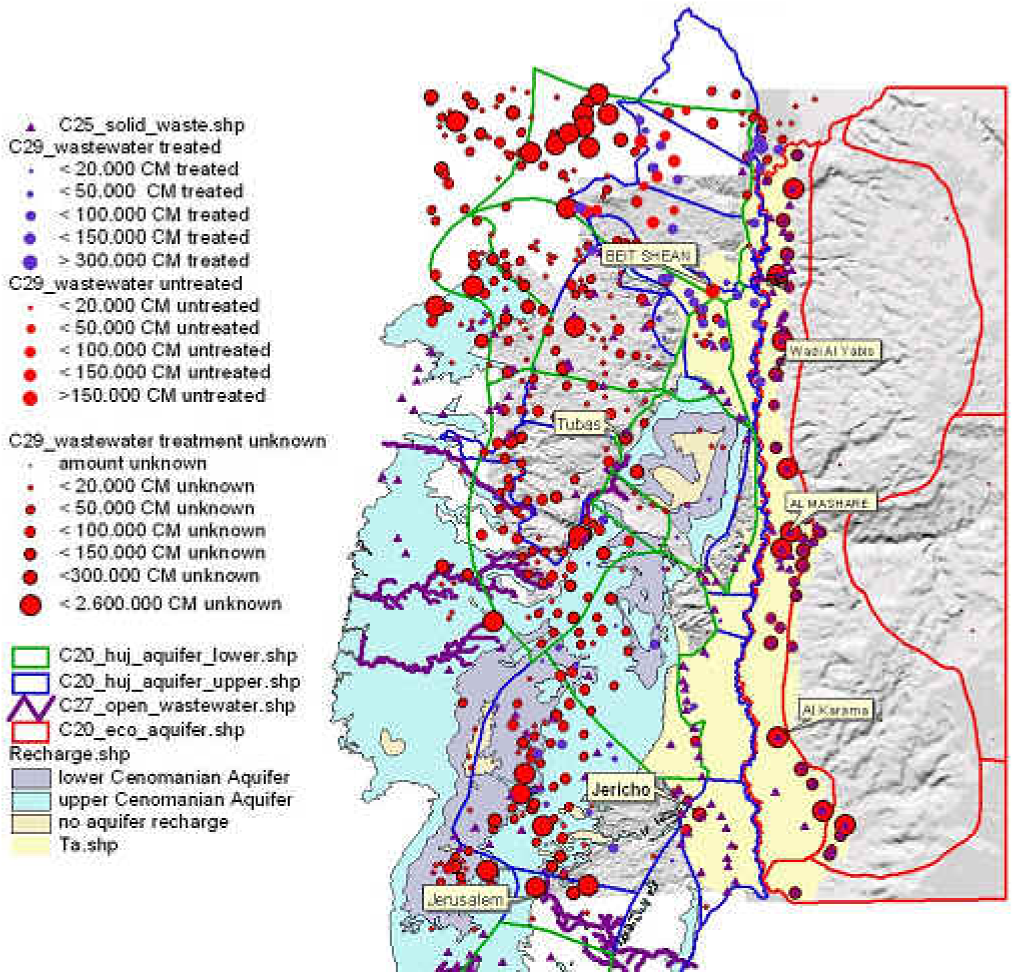
Abstract

This report summarizes the results of the spatial risk modeling activities (work package WP-4.4, "*GIS Risk Modeling*") of the INCO-DC project "*Developing Sustainable Water Management in the Jordan Valley*". The project was funded by European Commission's INCO-DC research program. The main objective of the project was to develop the scientific basis for an integral management plan of water resources and their use in the Lower Jordan Valley. The outputs of the project were expected to allow a better understanding of the water management situation, and to provide a sound basis for a better future water management – not only separately in the three countries, but in the overall valley region.
The risk modeling was done by the *ARCS seibersdorf research* (ARCS), based on information and data provided by the regional partners from Israel (Hebrew University, Jerusalem, HUJ), Palestine (Applied Research Institute, Jerusalem, Bethlehem, ARIJ) and Jordan (EnviroConsult Office, Amman, ECO). The land use classification has been established through a cooperation between ARCS and the Yale University Center for Earth Observation (YUCEO).
As a result of the work, the spatial patterns of agricultural and domestic water demand in the Lower Jordan Valley were established, and the spatial dimension of driving forces for water usage and water supply was analyzed. Furthermore, a conceptual model for nitrate leakage (established by HUJ) was translated into a GIS system, and the risks for nitrate pollution of groundwater were quantified.

Example: Local water sources in the six water regions of the study area (MCM/yr = million cubic meters per year)

		North		**Center**		**South**		
		Bet Shean	**Sh Husayn**	**Tubas**	**Mashare**	**Jericho**	**Karama**	**Total**
Wells	MCM/yr	65	7	6	2	35	30	144
Springs	MCM/yr	44	3	10	12	33	1	104
Surface water	MCM/yr	7	0	0	0	0	0	7
Total local supply	MCM/yr	116	10	16	14	68	31	255
Per-hectare supply	*m^3/ha.yr*	*5.800*	*800*	*2.300*	*700*	*1.600*	*1.100*	*2.000*
Per-capita supply	*m^3/cap.yr*	*4.600*	*200*	*4.100*	*200*	*1.500*	*700*	*1.000*

Example: Pollution risks for the lower aquifers from domestic sewage, dumping sites and open wastewater flows. Recharge areas refer to cenomanian aquifers (greenoutline) but not to Pleistocene aquifer (outlined by the blue line) and the Jordanian aquifer (red oulines): the latter two might cover much of area that is over the aquifers (in the uplands as well as in the valley)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BEIT SHEAN
Wadi Al Yabis
Tubas
AL MASHARE
Al Karama
Jericho
Jerusalem