



Palestinian National Authority
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Sustainable Management of the West Bank and Gaza Aquifers

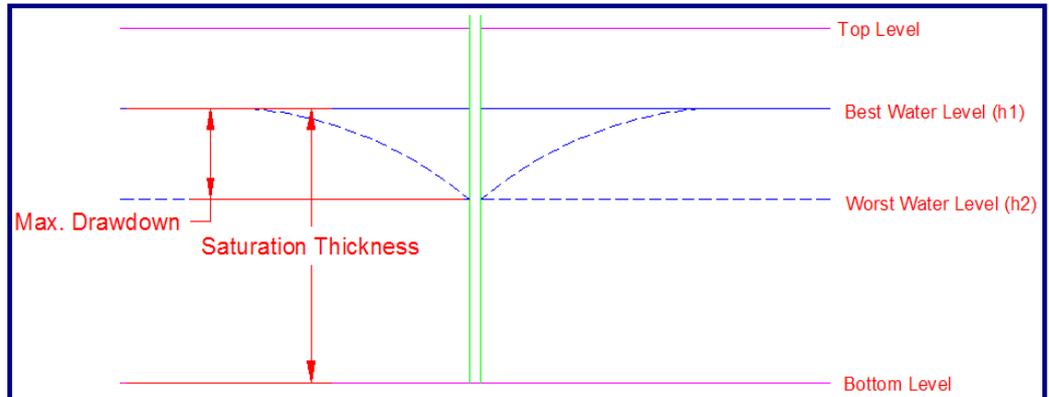
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Evaluation of Environmental Sustainability Indicators for Water Resources Management Options in Palestine



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<p>The SUSMAQ Project</p> <p>The aim of the project is to increase understanding of the sustainable yield of the West Bank and Gaza aquifers under a range of future economic, demographic and land use scenarios, and to evaluate alternative groundwater management options. The project is interdisciplinary, bringing together hydrogeologists and groundwater modellers with economists and policy experts. In this way, hydrogeological understanding can inform, and be informed by, insights from the social sciences. The results of the study will provide support to decision-making at all levels in relation to the sustainable yield of the West Bank and Gaza aquifers.</p> <p>The project runs from November 1999 to October 2004, and is a partnership between the Palestinian Water Authority, University of Newcastle upon Tyne. The project is funded by the United Kingdom Government’s Department for International Development (DfID).</p>	<p>Project Results Dissemination</p> <p>The project disseminates its results through the project website www.ncl.ac.uk/susmaq, newsletters, workshops, technical meetings, publications in conference and scientific journals.</p>
<p>Bibliographical Reference</p> <p>This report should be referenced as: SUSMAQ (2005). Evaluation of Environmental Sustainability Indicators for Water Resources Management Options in Palestine. Report No. SUSMAQ - SUS #51 V1.1, Sustainable Management of the West Bank and Gaza Aquifers, Palestinian Water Authority (Palestine) and University of Newcastle upon Tyne (UK).</p> <p>Authors: Geoff Parkin, Muath Abu Saada, Amjad Aliewi, Chris Kilsby, Nancy Rumman, Raslan Yasin, Hala Barhoumi</p>	

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1 Introduction

1.1 Scope of report

This report describes how environmental Basic Indicators (BIs) have been evaluated as part of assessments of the sustainability of a range of water resource Management Options (MOs), for a set of scenarios being considered within the SUSMAQ project (**SUSMAQ Report#39**). The BI evaluations provide data in support of policy making, using a multi-criteria analysis (MCA) methodology (**SUSMAQ Report#41**) implemented as part of decision support toolkit (DST) software.

1.2 Overall approach

The environmental BIs are subdivided into two groups: EN01-03 relate to water quantity in the aquifers, and EN04-07 relate to water quality. Full definitions of all indicators are given in **SUSMAQ Report#38**.

The BIs are evaluated for a set of demonstration studies of the sustainability assessment methodology for the West Bank (**SUSMAQ Report#60**). For the demonstration studies, the environmental indicators are evaluated only for the Western Aquifer Basin (WAB), based on the groundwater flow and transport models developed within the SUSMAQ project and data from the SUSMAQ databases, particularly the SUSMAQ Package Database (PDB) which is based on the Palestinian National Water Plan (NWP) database developed by the PWA, containing information on planned water sector projects.

In most cases, a baseline value for each BI is calculated using information from the SUSMAQ databases or other sources. The baseline values are used to approximate conditions at the start of the 25 year period (2000-2025) for which the sustainability assessments are carried out. The indicator values over the 25 year period are then calculated, as far as possible, using information from the PDB for groups of projects representing each MO being tested, and analyses with the groundwater flow and transport models for the WAB where relevant. The same approach to evaluation of BIs can be extended in the future to cover the other Palestinian aquifers, using appropriate groundwater flow and transport models and supporting databases.

1.3 Scenario definition

The BIs are evaluated for three hydropolitical/socio-economic scenarios representing possible alternative futures for Palestine (**SUSMAQ Report#34**):

- Current scenario;
- Consolidating scenario;
- Future scenario.

1.4 Regional assessments

Since the hydrogeological, social and economic conditions differ markedly in different parts of the West Bank and Gaza, indicators describing ‘average’ conditions may not be representative. Also, the SUSMAQ MOs are not all applicable equally in different parts of the West Bank and Gaza. For the case studies, the West Bank was therefore subdivided into 3 regions, based on administrative boundaries:

- West Bank North: Nablus, Tulkarem and Jenin;
- West Bank Central: Ramallah, Jerusalem and Jericho;
- West Bank South: Bethlehem and Hebron.

Many of the data used in the calculations are available from studies at the governorate level. Where further details are not available, the appropriate data for calculating the indicators for the WAB were calculated pro-rata using the fractions of the WAB area in each zone: West Bank area = 5,600 Km²; Northern zone = 516 Km² = 9.2%; Central zone = 517 Km² = 9.2%; Southern Zone = 583 Km² = 10.4%.

Values for the BIs for each of the hydro-political/socio-economic scenarios for each region are given in Appendices A and B.



Full report/document is not available online