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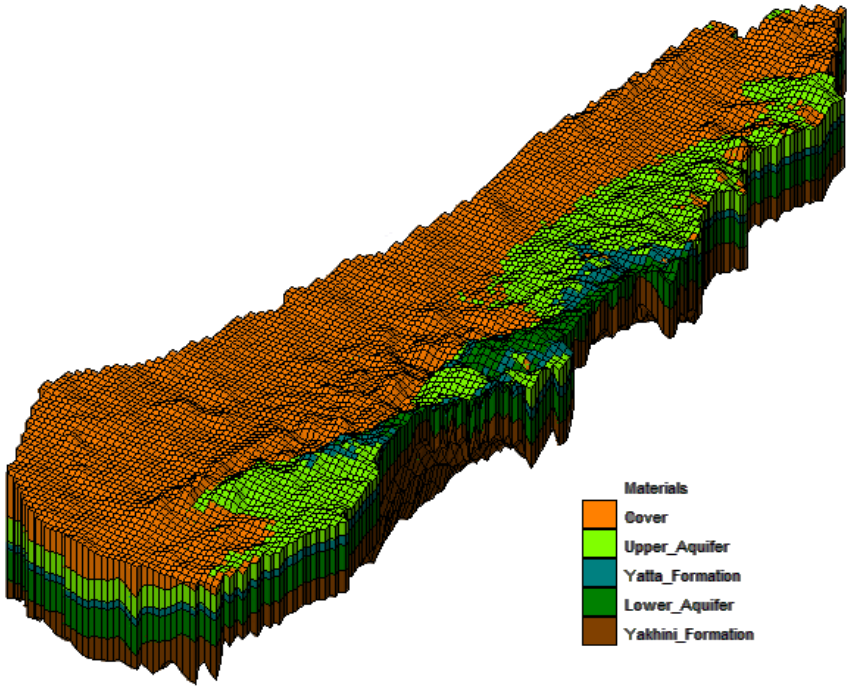
Sustainable Management of the West Bank and Gaza Aquifers

UNIVERSITY OF NEWCASTLE

NERC British Geological Survey

Department for International Development
DFID

Hydrogeochemistry of the Aquifers of the West Bank: Review and Interpretation of the Available Data with regard to Recharge, Water Quality and Groundwater Flow



Working Report
SUSMAQ-REC # 18 V 0.1

Prepared by:
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This working report is an output from the Recharge Estimation Component, part of SUSMAQ project.

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The SUSMAQ Project

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 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.
The project runs from November 1999 to October 2004, and is a partnership between the Palestinian Water Authority, University of Newcastle and the British Geological Survey. The project is funded by the United Kingdom's Department for International Development (DFID).

Recharge Estimation Component is part of the SUSMAQ project which aims at developing improved estimates of groundwater recharge to the West Bank Aquifers with emphasis on the Western Aquifer Basin. This will be achieved through developing object oriented model for recharge and studying the hydrochemistry of the aquifers.

Bibliographical Reference

This report should be referenced as: SUSMAQ (2003). Hydrogeochemistry of Aquifers of the West Bank: Review and Interpretation of the available Data with regard to Recharge, Water Quality and Groundwater Flow. Working report No.: SUSMAQ-REC#18V0.1. Sustainable Management for the West Bank and Gaza Aquifers, Palestinian Water Authority (Palestine) and University of Newcastle upon Tyne (UK).

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Feedback

This is Version 0.1 of the Report, "Hydrogeochemistry of Aquifers of the West Bank: Review and Interpretation of the available Data with regard to Recharge, Water Quality and Groundwater Flow". The Recharge Estimation Team welcomes feedback, both positive and negative! Please, tell us what you think about the ideas and issues raised in this report by contacting the team at one of the addresses above. Your feedback will be appreciated and is necessary for updating and correcting this report in another version.

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Understanding the nature of recharge, water quality and groundwater flow in the aquifers of the West Bank requires a rounded appreciation of their hydrogeology. This presents many challenges, partly because of the karstic or sub-karstic nature of some of the formations, but also because of the relative scarcity of data. Hydrogeochemistry in the wider sense (i.e. including isotope hydrology and geochemistry) has an important role to play in addressing both the resource and quality aspects of West Bank groundwater supply. In this way it can assist and inform the resource-based modelling that is required to support the sustainable management of the various aquifer units concerned.

The most basic use of chemistry is to investigate water quality, and this is one area where there is an abundance of basic data available in the form of PWA (2001). This includes some time-series data which allow conclusions to be drawn about long-term changes as well as the identification of pollution hotspots. More complex uses of chemistry data include examining processes of recharge, natural patterns of groundwater evolution, and identifying mixing between waters with different hydrochemical characteristics.

Progress beyond this requires the consideration of isotopic evidence in conjunction with hydrochemistry. While the PWA has not had routine access to such relatively sophisticated techniques, sufficient has by now been published by various researchers on isotopic studies in the West Bank and adjacent areas to begin to better understand problems such as mode(s) of recharge, water residence times, and groundwater mixing patterns.

This report represents a first attempt at synthesising and interpreting the available hydrogeochemical information for the West Bank as a whole. While many problem areas undoubtedly remain, it is hoped that the report will at least provide the basis on which further research can be developed and taken forward to enhance understanding of recharge and groundwater flow.

Full report/document is not available online