Directory of Selected Israeli, Jordanian, and Palestinian Water-Related Publications

Executive Action Team
Regional Water Data Banks Project
Multilateral Water Resources Working Group
Middle East Peace Process

November 1997

PREFACE

Multilateral working groups to advance the Middle East Peace Process were formed in January 1992. One of these groups, the Water Resources Working Group, endorsed the Water Data Banks Project in November 1994. The Water Data Banks Project consists of a series of specific actions to be taken by the Israelis, Jordanians, and Palestinians that are designed to foster the adoption of common, standardized data collection and storage techniques among the Parties, improve the quality of the water resources data collected in the region, and to improve communication among the scientific community in the region. The project is managed by an Executive Action Team, EXACT, comprised of water experts from Israeli, Jordanian, and Palestinian water-management agencies. Technical and financial support to EXACT is contributed by the United States, European Union, Canada, France, Norway, and Australia.

Many publications about the water resources in the region have been prepared in the past 20 to 30 years. With no formal system of library exchanges among the Parties, however, it has been difficult for scientists within the region to know the publications exist and to acquire copies. The only articles readily available to scientists in the region are those published in foreign scientific journals. This directory of selected Israeli, Jordanian, and Palestinian water-related publications is an attempt by EXACT to improve communications among the region's scientists. It includes a wide variety of publications and, for each of them, lists the title, author, publisher, length, publication date, language of publication, an abstract, and an address from which the publication can be obtained. It has been prepared, and is being released as, a public service by the representatives of EXACT.

Contents

Israeli Publications

Jordanian Publications

Palestinian Publications

Israeli Publications

1
TITLE: Hydrological Yearbook of Israel
AUTHORS: Staff of the Hydrological Service
PUBLISHER: Hydrological Service of Israel
PAGES:
PUBLICATION DATE: 1946/47 - 1992/93
LANGUAGE OF PUBLICATION: Hebrew & English
ABSTRACT: The yearbook series contains:
1 volume of hydrological measurements prior to October 1944;
2 volumes of hydrological measurements for the years 1944/45 and 1945/46;
volumes of hydrological yearbooks for the years 1946/47 to 1992/93;
1 volume of summary of records prior to October 1967.
The yearbook contains basic data of all hydrometric network stations operating in streams, reservoirs, Lake Kinneret, the Dead Sea and at springs in Israel; daily water level records in Lake Kinneret and the Dead Sea; discharges, flow volumes and salinity records in streams, reservoirs and springs, and annual precipitation over surface watersheds. The data cover a period from October 1 (beginning of the hydrologic year) through September 30 (end of the hydrologic year).
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service of Israel, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request

2
TITLE: Hydrologic State Report
AUTHORS: Staff of the Hydrological Service of Israel
PUBLISHER: Hydrological Service of Israel
PAGES: 90
PUBLICATION DATES: 1978 - 1992
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: The report, which was published annually, describes, evaluates and analyzes the hydrologic state of the natural water sources of Israel in the reported year and in course of the preceding five years. The sources included in the report are Lake Kinneret and the seven groundwater basins of Israel. Each groundwater basin is subdivided into cells, referred to as Reporting Cells. The information on each of the above sources includes the following parts:
a) A schematic diagram showing all components of the water balance;
b) Estimates of the mean annual replenishment and estimates of planned steady state values of water levels, annual flows and withdrawal;
c) A review of the level and trend in water levels and water quality (chlorides and nitrates) in the reported year and in the last five years, respectively, as well as estimates of the components of the water balance for the same periods, including the source and amount of data on which the information is based;
d) A comparison of the actual level of exploitation and of the actual water levels with the planned ones;
e) An explanation of the causes of the discrepancies between planned and actual values;
f) Recommendations for action to reduce the discrepancies.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service of Israel, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: Available for reading in the library of the Service

3
TITLE: Evolution of the exploitation and state of Israel's groundwater sources
AUTHORS: Staff of the Hydrological Service of Israel
PUBLISHER: Hydrological Service of Israel
PAGES: 199
PUBLICATION DATES: 1994, 1995, 1996
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: This report continues the series of annual reports describing the state of Israel's water sources with some modifications.
The new version of the report is based on the entire record of historic data stored in the computerized database of the Hydrological Service of Israel. The report contains tables and graphs of average water levels, average concentrations of chlorides and nitrates in each cell of each basin for each year of the period of observations. The same applies to the historic record of annual volumes of pumpage, artificial recharge, springflow and rainfall.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service of Israel, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: By permission from the Director of the Hydrological Service

4
TITLE: Summary of the rainfall season
AUTHORS: Staff of the Hydrological Service
PUBLISHER: Hydrological Service of Israel
PAGES: 6 + tables and graphs
PUBLICATION DATES: 1965/66, 1989/90
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: The report describes the distribution of rainfall in the reported hydrologic year and summarizes the hydrologic events which occurred during the rainfall season, such as: surface runoff, changes in water levels of Lake Kinneret and the Dead Sea, springflow and changes in groundwater levels.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service of Israel, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: Available for reading/copying in the library

5
TITLE: Hydrologic summary of the 1990/1991 winter
AUTHORS: Staff of the Hydrological Service
PUBLISHER: Hydrological Service of Israel
PAGES: 6 + tables and graphs
PUBLICATION DATE: July 1991
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: The report describes the distribution of rainfall in the reported winter season and summarizes the hydrologic events which occurred during the rainfall season, such as: surface runoff, changes in water levels of Lake Kinneret and the Dead Sea, springflow and changes in groundwater levels. The report also includes data on artificial recharge of the major aquifers and some components of the Lake Kinneret water balance. A statistical relationship between rainfall and runoff is also presented.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service of Israel, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request

6
TITLE: Hydrologic Model of the Western Mountain Groundwater Basin for Stage 1 of the Harvard Middle East Water Project
AUTHOR: Yehuda Bachmat
PUBLISHER: In preparation for publication as part of the report of the Harvard Middle East Water Project
PAGES: 55
PUBLICATION DATE:
LANGUAGE OF PUBLICATION: English
ABSTRACT: Overview of the geology and hydrogeology of the Western Mountain Groundwater Basin; mathematical formulation of a multicell groundwater flow model for the basin; preparation of a historic data bank and calibration of the model; estimation of the long-term mean annual replenishment and of the steady state groundwater volume balance; analysis of the natural flow pattern; formulas of the relationship between the patterns of pumpage and piezometric head under steady state conditions; formula for estimating pumping cost.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Institute for Social And Economic Policy in the Middle East, John F. Kennedy School of Government, Harvard University, 79 John F. Kennedy Str., Cambridge, MA 01238, U.S.A.
AVAILABILITY: Will be available after publication of the project report

7
TITLE: Methodology of designing a groundwater level observation network as a problem of decision making under uncertainty. Hydro1990/1, ISSN-0334-3367
AUTHOR: Meir Ben-Zvi
PUBLISHER: Hydrological Service of Israel
PAGES: 119
PUBLICATION DATE: January 1990
LANGUAGE OF PUBLICATION: Hebrew with an English abstract and table of contents
ABSTRACT: Formulation of a mathematical framework which integrates dynamic decisions on groundwater level observations with dynamic decisions on groundwater pumping rates along a given planning horizon. The problem is presented viewing the groundwater as a stochastic system. At the beginning of each time period of the planning horizon, two consecutive decisions are made: a) the precision of the information to be acquired from the network and, hence the configuration of the observations to be made; b) the quantity of water to be pumped during the time period. The total objective function is the difference between the expected net benefit from managing the aquifer (pumped water and the resulting head) and the cost of the observations in terms of observation precisions. An optimal precision level is one for which the marginal increase in the management objective function equals the marginal increase in the precision cost. The optimal decisions with regard to precision and pumpage at the beginning of each time period are motivated by the desire to maximize the value of the total net benefit function for the remaining periods. The values of the optimal decisions and the value of the objective function are expressed in terms of the prior distribution which is dependent on the decisions in the previous period. This feature makes the problem suitable to be solved by stochastic dynamic programming. Some examples demonstrating the procedures and techniques involved in combined network and groundwater management are presented.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service of Israel, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: Available at a nominal service charge

8

TITLE: Design of a Ground-water Level Observation Network
AUTHORS: N.C. Matalas, J.R. Slack, M. Jacobs, Y. Bachmat, M. Schneidovich and M. Ben-Zvi
PUBLISHER: U.S. Geological Survey Open-File Report 76-165
PAGES: 84 + 40 pages of 5 appendices
PUBLICATION DATE: 1976
LANGUAGE OF PUBLICATION: English
ABSTRACT: The report summarizes the results of a cooperative study by the Hydrological Service of Israel and the U.S. Geological Survey to develop concepts and systems analysis techniques for the design of groundwater data collection systems with the objective of providing hydrologic information for planning and managing water resource systems.
The study was limited to groundwater level as one hydrologic variable.
The specific subject of network design to which the study addressed itself was the extent to which an existing groundwater level observation network in the coastal aquifer of Israel could be reduced without significant loss of information for planning and management. Owing to time and budget constraints an assessment of benefits from reducing uncertainty was beyond the scope of the project. Therefore, emphasis was placed on the development of an analytic technique for designing a least cost observation network for achieving a specified error level. An algorithm was developed for an optimal reduction of the network including both reduction in frequency of observations as well as discontinuation of wells. The algorithm was applied to a pilot area in the coastal aquifer of Israel.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
U.S. Geological Survey or Library of the Hydrological Service of Israel, P.O.Box 6381, Jerusalem 91603, Israel
AVAILABILITY: Available for reading in the library of the Hydrological Service or by order from the U.S. Geological Survey, Branch of Information Services, Box 25286, Denver, CO 80225-0286

9

TITLE: Spatial Approach to Estimation of Missing Data
AUTHORS: Meir Ben-Zvi and Shmuel Kessler
PUBLISHER: Journal of Hydrology, 1986, vol. 88
PAGES: 69 - 78
PUBLICATION DATE: 1986
LANGUAGE OF PUBLICATION: English
ABSTRACT: Two methods are presented for estimating occasionally missing groundwater level observations in a given network of observation wells. One method is applicable when the map of water levels can be assumed to move parallel to itself in time. The other method is based on spatial correlations of observations for pairs of wells.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Meir Ben-Zvi, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request

10

TITLE: Preposterior analysis as a tool for data evaluation: application to aquifer contamination. In: Water Resources Management, volume 2, No. 1, 1988
AUTHORS: Meir Ben-Zvi, Brian Berkowitz and Shmuel Kessler
PUBLISHER: Kluwer Academic Publishers
PAGES: 11-20
PUBLICATION DATE: 1988
LANGUAGE OF PUBLICATION: English
ABSTRACT: The paper deals with the assessment of the value of data before they become available. The role of data is to reduce the risk associated with decisions taken under conditions of uncertainty. However, while the inclusion of relevant data reduces risk, data acquisition involves cost, and there is thus an optimal level beyond which any addition of data has a negative net benefit. The Bayesian approach is applied to construct a method for updating decisions and evaluating the anticipated reduction in risk following consideration of additional data. The methodology is demonstrated on a problem of management of an aquifer under threat of contamination.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
The Journals Department, Kluwer Academic Publishers, P.O.Box 17,
3300 AA Dordrecht, Holland
AVAILABILITY: By order from the publisher

11
TITLE: Management of groundwater observation programs
Operational Hydrology Report No. 31, WMO- No. 705
AUTHOR: Yehuda Bachmat
PUBLISHER: World Meteorological Organization
PAGES: 96
PUBLICATION DATE: 1989
LANGUAGE OF PUBLICATION: English
ABSTRACT: The report presents in a systematic way the process and procedures of planning and managing a groundwater observation program as part of an information system for the rational management of groundwater resources.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
World Meteorological Organization, 41 Avenue Giuseppe Motta, Geneva, Switzerland
AVAILABILITY: Available at nominal price

12
TITLE: Survey of sewage collection, treatment and use - 1994
AUTHOR: Gabi Eitan
PUBLISHER: Water Commission, Division of Water Quality, Prevention of Pollution and Effluents
PAGES: 175
PUBLICATION DATE: November 1995
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: The publication is one of a series of earlier reports. It includes data on the annual volume of sewage produced by the different categories of water use (household, agriculture and industry) in each of the settlement types in Israel; the volumes sewered; the treatment facilities and the volumes treated; chemical data of raw sewage and effluents at selected treatment facilities; data on sources and volumes of water stored in effluent storage reservoirs, and graphs showing the concentration levels of Cl, Na, K and B in the drinking water and in the sewage of various settlements.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Gabi Eitan, Water Commission, P.O.Box 184, Jerusalem, Israel
AVAILABILITY: At request

13
TITLE: Water Use Report
AUTHORS: Staff of the Publisher
PUBLISHER: Department of Water Allocation and Licensing, Water Commission, Israel
PAGES:
PUBLICATION DATE: Annual Report
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: The report contains data on annual volumes of water consumed by users in Israel, including specification by category of use (domestic, agricultural, industrial) and source of supply.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
AVAILABILITY: Restricted

14
TITLE: Water Quality Management Under Conditions of Scarcity. Israel as a case study
AUTHORS: Hillel Shuval, editor, and 12 Israeli contributors
PUBLISHER: Academic Press
PAGES: 352
PUBLICATION DATE: 1980
LANGUAGE OF PUBLICATION: English
ABSTRACT: Goals and levels of water quality control under conditions of scarcity. Water quality problems and methods of water quality management in the coastal aquifer and Lake Kinneret. Legal aspects of water quality management. Environmental, economic, social and administrative considerations in reuse of wastewater.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Academic Press, Inc., 111 Fifth Avenue, New York 10003, U.S.A.
AVAILABILITY: By order from the publisher

15
TITLE: Monitoring of groundwater quality: a new approach
In: Scientific Basis for Water Resources Management, Proceedings of a symposium, Jerusalem, 1985
AUTHORS: D. Ronen, M. Magaritz, Y. Kanfi & W. Garner
PUBLISHER: IAHS (International Association of Hydrological Sciences), Publication No. 153
PAGES: 311 - 315
PUBLICATION DATE: 1985
LANGUAGE OF PUBLICATION: English
ABSTRACT: A sampling scheme composed of a multilayer sampler based on the dialysis cell technique and a monitoring well with screens at the water table region is presented. This methodology will enable detection of influx of pollutants to the saturated zone.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
IUGG Publications Office, 39 tar Rue Gay Lussac, 75005 Paris, France
AVAILABILITY: From the publisher

16
TITLE: Optimization of a groundwater quality sampling program
In: Quality of Groundwater, Proceedings of an International Symposium, Noordwijkerhout, 1981
AUTHORS: Y. Bachmat and M. Ben-Zvi
PUBLISHER: Elsevier Sci.Publ.Co. Studies in Environmental Science, Volume 17
PAGES: 23 - 27
PUBLICATION DATE: 1981
LANGUAGE OF PUBLICATION: English
ABSTRACT: The paper considers information pertinent to groundwater quality as an input to groundwater management decisions. Accordingly, the design of a groundwater quality sampling program is treated as a problem of maximizing the net benefit from the collected data. It is assumed that the loss because of a suboptimal management decision is partly due to the level of information supplied by the data collection program, which is determined by the frequency, the spatial density and configuration of the observations. An algorithm for deriving the optimal values of the latter under conditions of risk is presented. The algorithm is implemented in planning the program of groundwater quality observations in the coastal plain of Israel.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service of Israel, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request

17
TITLE: Percolation of Domestic Sewage into a Karstic Aquifer
In: Quality of Groundwater, Proceedings of an International Symposium, Noordwijkerhout, 1981
AUTHORS: B. Azmon and D. Gilad
PUBLISHER: Elsevier Sci.Publ.Co. Studies in Environmental Science, Volume 17
PAGES: 231 - 237
PUBLICATION DATE: 1981
LANGUAGE OF PUBLICATION: English
ABSTRACT: The paper presents results of a hydroecological study on the percolation of Jerusalem sewage from the Soreq river into the karstic calcareous outcrops of the underlying mountainous aquifer. The study is based on 1 to 3 months records of discharge losses between adjacent hydrometric stations during a five year period.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service of Israel, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request

18
TITLE: Detection of fresh-water /sea-water interface by the Time Domain Electromagnetic Method (TDEM) in Israel. In: Proceedings, 10th SWIM, Ghent 1988 Natuurwet. Tijdschrift, vol. 70, 1988
AUTHORS: M. Goldman, A. Arad, U. Kafri, D. Gilad, A. Melloul
PUBLISHER: Natuurwettenschapelijk Tijdschrift
PAGES: 329 - 344
PUBLICATION DATE: 1989
LANGUAGE OF PUBLICATION: English
ABSTRACT: Description of the TDEM method and report on a feasibility study on the applicability of the TDEM method in detecting sea-water intrusion into fresh-water aquifers. It was found that absolute resistivity values varying between 0.5 - 1.5 ohm-m are typical for seawater intrusion. These are different from any other resistivity values which stem from other known lithology and/or salinity combinations. The TDEM method has proved to be a reasonable accurate technique for detection of a freshwater/seawater interface in carbonate, and particularly, coastal aquifers.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Mark Goldman, The Geophysical Institute of Israel, P.O.Box 2286, Holon 58122, Israel
AVAILABILITY: Available at request

19
TITLE: A geological-geophysical reassessment of the Judea Group (Yarkon-Taninim aquifer)
AUTHORS: L. Fleischer, E. Gelberman, O. Wolff
PUBLISHER: Institute for Petroleum Research and Geophysics
PAGES: 92
PUBLICATION DATE: February 1993
LANGUAGE OF PUBLICATION: English
ABSTRACT: The report summarizes the results of a geological-geophysical study of the Judea Group from the northern Negev to Mt. Carmel. It defines the structural configuration of the Group and provides lithological information, including facies changes. The report includes topographic and isopach maps of the main lithological units, lithostratigraphic cross sections, and isolith and ratio maps for the entire group and for each specific lithological unit.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service of Israel, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: Available for viewing in the library only

20
TITLE: The Yarkon-Taninim groundwater basin, Israel hydrogeology: Case study and critical review
AUTHORS: G. Weinberger, E. Rosenthal, A. Ben-Zvi, D.G. Zeitoun
PUBLISHER: Journal of Hydrology, vol. 161
PAGES: 227 - 255
PUBLICATION DATE: 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: The review examines the main hitherto accepted conventions regarding the conceptual hydrogeological model of the Yarkon-Taninim groundwater basin which is one of the major sources of fresh groundwater in the northern Negev and in the central part of Israel.
The review points out puzzling and contradictory phenomena and emphasizes questionable issues. The methods and effort for breaking long-established conventions used in this review may serve as an example for the need and way of periodically revising concepts in view of accumulating knowledge.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Elsevier Science B.V. Journal Department, P.O.Box 211, 1000 AE Amsterdam, Netherlands
Fax 31.20.5803598
AVAILABILITY: By order from the publisher

21
TITLE: Seawater encroachment in the coastal plain of Israel during the period 1958 - 1971
AUTHORS: Y. Bachmat, G. Chetboun
PUBLISHER: Hydrological Service of Israel
PAGES: 57 + 150 tables and graphs
PUBLICATION DATE: April 1974
LANGUAGE OF PUBLICATION: English
ABSTRACT: The intrusion of seawater into the coastal aquifer of Israel is monitored by a special network of observation boreholes. The observations include the logging of electrical resistance and temperature along the filter of each borehole twice a year, which is later interpreted in terms of salt content and electrical conductivity. The local profiles are further regionalized over equidistant strips perpendicular to the coastline to yield the profile of a hypothetical seawater-freshwater "interface" for each strip. The report presents the derived profiles of the interface in the major subaquifers in the fall season of 13 years of observation. Results regarding the rate and direction of movement of the interface, the width of the transition zone, the efficiency of the network and the accuracy of the of interpretation of the observations are also presented.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem, Israel 91063
AVAILABILITY: At request from the above address

22
TITLE: Location of an interface observation well. A Bayesian approach
AUTHORS: M. Ben-Zvi and Y. Bachmat
PUBLISHER: Water Resources Research, vol. 22, No. 11
PAGES: 1503 -1508
PUBLICATION DATE: October 1986
LANGUAGE OF PUBLICATION: English
ABSTRACT: The depth of seawater intrusion in a coastal aquifer is often measured by the distance from the coastline to the toe of a fictitious, yet well-defined, sharp seawater-freshwater interface. The paper considers the problem of estimating the location of the toe on the basis of prior information and of posterior information that can be obtained by adopting an interface model and installing an observation well. The solution to the problem involves decisions regarding the worthwhileness of drilling the well and its optimal location. A methodology is proposed for solving the problem by employing the Bayesian approach to decision making under uncertainty with the sum of expected risk and cost as the objective function. An alternative to installing a well may be the acquisition of additional prior information in order to reduce the prior range of uncertainty regarding the position of the toe. The problem then is solved by comparing the expected net benefit from acquisition of prior information only against the net benefit from acquisition of prior information, adoption of an interface model, and installment of a well.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request

23
TITLE: A single-well tracer technique for evaluating aquifer parameters
AUTHORS: Y. Bachmat, S. Mandel, M. Bugayevski
PUBLISHER: Journal of Hydrology, vol. 99
PAGES: 143 - 163
PUBLICATION DATE: 1988
LANGUAGE OF PUBLICATION: English
ABSTRACT: The theoretical basis of a field technique for evaluating longitudinal dispersivity and effective porosity of an aquifer by a single-well test is presented. A measured quantity of an ideal tracer is released instantaneously into the well at rest and moves with the natural flow velocity. After a certain delay time the well is pumped at a constant rate and tracer concentrations in the pumped water are monitored. These serve as data for estimating the above parameters. The interpretation of the data is based on an approximate analytical solution of the direct problem and on an iterative procedure for solving the inverse problem.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: By order from the publisher

24
TITLE: The hydrologic events in the winter of 1991/92. Hydro/1992/8
AUTHORS: A. Ben-Zvi, D. Gilad et al.
PUBLISHER: Hydrological Service of Israel
PAGES: 71
PUBLICATION DATE: June 1992
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: The publication is a collection of papers dedicated to the memory of the Israeli hydrologist Ofra Cohen. The papers describe the extreme hydrologic events which occurred in the 1991/92 winter season, including the meteorological characteristics, discharges and runoff volumes in the surface watersheds, springflow, groundwater replenishment and changes in the water and salt balances of Lake Kinneret.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: Available for reading at the above address

25
TITLE: The POLLSITE Land-use Register. Hydro-Report 2/95
AUTHOR: Martin L. Collin
PUBLISHER: Hydrological Service of Israel
PAGES: 35
PUBLICATION DATE: April 1995
LANGUAGE OF PUBLICATION: English with Hebrew abstract
ABSTRACT: A data bank of land-usages which can pose as potential sources of pollution to groundwater resources of Israel. The land uses include irrigation with effluents, waste disposal, oil spills and leakages, and industrial activities. A preliminary set of indicator pollutants has been noted for each type of land-use, and appended to the report.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request from the above address

26
TITLE: Composite DRASTIC/Land-use Vulnerability Assessment of Groundwater in Israel's Sharon Region Utilizing GIS Technology
Hydro-Report 05/96
AUTHORS: Sara Secunda, Martin L. Collin and Avraham Melloul
PUBLISHER: Hydrological Service of Israel
PAGES: 39
PUBLICATION DATE: February 1996
LANGUAGE OF PUBLICATION: English and Hebrew
ABSTRACT: The vulnerability assessment incorporates both the natural state of the vadose zone and the aquifer, as well as the relative danger posed by present and planned future land-uses to the regions groundwater. The composite vulnerability assessment is shown to be an effective tool for delineating monitoring networks required for surveillance of potential pollution sites. Recommendations for a nationwide program of regional vulnerability assessment, involving the use of GIS technology, satellite updates of land-use, as well as field studies for correlating composite DRASTIC/land use assessment and existing groundwater quality data, are presented.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request from the above address

27
TITLE: The impact of pollutants from anthropogenic sources within a hydrologically sensitive area - Wadi Rabba Watershed - upon groundwater quality
AUTHORS: Dror Avisar
PUBLISHER: Citizens Environmental Laboratory of the Israel Union for Environmental Defence
PAGES: 55
PUBLICATION DATE: March 1996
LANGUAGE OF PUBLICATION: Hebrew with English abstract. The publication is in the process of translation to English.
ABSTRACT: The catchment area of Wadi Rabba is situated on outcrops of the Western Mountain (Yarkon-Taninim) aquifer which is a major source of drinking water. A study was carried out to investigate the influence of anthropogenic pollutants, mainly industrial effluents and urban sewage in the Wadi Rabba catchment area, upon the quality of the underlying groundwater. The study included chemical and bacteriological analyses of the effluents and of the water in surrounding wells. Isotopic analyses of uranium, tritium and radiocarbon content in some of the wells were also made to study the age of the groundwater. These analyses together with stratigraphic cross sections were used to identify the sources of the groundwater. The study revealed local effects of pollution sources on adjacent wells. However, no evidence was found for the effect of pollutant sources over aquiferous outcrops on wells lying downstream. This was ascribed to differences between the stratigraphic unit and hydraulic characteristics of the outcrop and that of the wells, as well as to the effects of chemical precipitation and dilution.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Dror Avisar, Adam Teva Vadin, The Israel Union for Environmental Defence, 21 Zalman Shneur str., Tel-Aviv 63326, Israel
AVAILABILITY: At request

28
TITLE: Flow enhancement in northern Israel through cloud seeding
HydroRep/8/91
AUTHOR: Arie Ben-Zvi
PUBLISHER: Hydrological Service of Israel
PAGES: 33
PUBLICATION DATE: March 1991
LANGUAGE OF PUBLICATION: Hebrew with English abstract
ABSTRACT: The report summarizes the results of a study conducted at the Hydrological Service during a period of ten years. The presentation of the main results is accompanied by an estimation of the added water in the north of Israel during the period of operational seeding since 1975/76. Statistical tests and regression models are used to compare flow volumes due to seeded precipitation with those due to unseeded precipitation, and with respect to concurrent precipitation depths at a control area and at the replenishment areas of the flow. A relationship was found between the effect of seeding on cloud properties, changes in properties of precipitation on the ground and changes in the parameters relating flow volumes to precipitation depths. This relationship, together with the consistency in the hydrologic results, leads to the conclusion that cloud seeding enhances the water yield, and enables to estimate its magnitude.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request from the above address

29
TITLE: Identification of sources of groundwater contamination: Application of boron isotopes
Ref.Hydro./1/1994
AUTHORS: A. Vengosh, K.G. Heumann, S. Juraske and S. Barth
PUBLISHER: Hydrological Service of Israel
PAGES: 25
PUBLICATION DATE: January 1994
LANGUAGE OF PUBLICATION: Hebrew with English abstract
ABSTRACT: The boron isotope composition of anthropogenic boron has been examined in raw and treated sewage effluents of the Dan Region Wastewater Reclamation Project as well as in contaminated groundwater in the coastal aquifer of Israel. Groundwater contaminated by artificial recharge of treated sewage yields a high
B/Cl ratio with a distinctive anthropogenic isotopic signature which is different from those of natural marine-derived saline groundwater in the coastal aquifer. This enables utilization of boron isotope composition of groundwater as a tracer for sources of groundwater contamination, particularly by detergent compounds.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request from the above address

30
TITLE: Nitrate trends in the coastal plain aquifer through 1990. Rep. Hydro/13/1992
AUTHORS: Stuart Wollman and Daniel Ronen
PUBLISHER: Hydrological Service of Israel
PAGES: 20
PUBLICATION DATE: November 1992
LANGUAGE OF PUBLICATION: English with Hebrew abstract
ABSTRACT: Nitrate trends in the Coastal Plain aquifer of Israel were determined by use of a "stable sample" of nitrate concentrations in fixed 713 wells throughout the aquifer for the years 1973, 1981 and 1990. Differences in laboratory analytical techniques were accounted for.
The trends were also analyzed in various regions of the aquifer. For purposes of comparison, results for 1990 were also calculated with data of an "unstable sample" consisting of all 1216 sampled wells in the aquifer. The mean nitrate concentration was found to be significantly lower than in the "stable sample" indicating the importance of using "stable samples" for correct trend analysis.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request from the above address

31
TITLE: The Yarkon-Taninim-Beer-Sheva Basin: Setup and calibration of a flow and salinity model. YG-509
AUTHORS: J. Gutman, H. Zukerman
PUBLISHER: Tahal, Water Planning for Israel, Hydrology Department
PAGES: 35 + 33 tables and figures
PUBLICATION DATE: October 1995
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: The calibration of flow in the basin was done in two steps using the MODFLOW code. In the first step the model was calibrated for relatively steady state natural conditions which prevailed in the basin prior to the beginning of intensive pumpage. The steady state water balance showed a natural replenishment of 352 MCM /year of fresh water, 70% of which was discharged through the Yarkon springs with the remaining 30% plus 3 MCM of sea water through the Taninim springs. In the second step the parameters of the first step were used to obtain a satisfactory reconstruction of the water levels for the period 1951/52 - 1992/93.
The calibration of salinity was made for the northern part of the basin only using the SUTRA code with the flow data from MODFLOW. The reconstruction of salinity was relatively poor. It is therefore recommended to perform the calibration of salinity by means of the PTC (Princeton Transport Code).
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Tahal, Department of Hydrology, P.O.Box 11170, Tel-Aviv 61111, Israel
AVAILABILITY: Out of print. Available for reading in the library of the Hydrological Service.

32
TITLE: Characterization and reduction of uncertainty in planning the exploitation and development of groundwater sources in the Cenomanian aquifer in the regions of Jerusalem and the hill range
AUTHORS: U. Baida, H. Zukerman, G. Dagan, F. Idelman
PUBLISHER: Tahal and University of Tel-Aviv
PAGES: 55
PUBLICATION DATE: February 1995
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: An earlier report by Tahal investigated the possibility of enhancing the pumpage in the reported area. The present report checks the effect of uncertainty in the various parameters of the flow simulation model on the reliability of increased pumping levels. It was found that the possible pumpage is highly sensitive to changes in the levels of rainfall, of transmissivity in the pumped areas and to changes in the boundary conditions of the model. The results of the study are expressed in terms of the expected availability of the increased pumping capacity as a function of time. It was found that this expectancy will decline in the course of time and will ultimately stabilize at a level lower than the installed pumping capacity.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Tahal, Department of Hydrology, P.O.Box 11170, Tel-Aviv 61111, Israel
AVAILABILITY: Available for reading in the library of the Hydrological Service.

33
TITLE: Mapping of seawater intrusion into the coastal aquifer by electromagnetic methods (Time Domain Electromagnetic) Hydro Report 1990/4 IPRG Report 843/132/89
AUTHORS: D. Gilad, M. Goldman, A. Melloul, A. Ronen
PUBLISHER: Hydrological Service and The Institute for Petroleum Research
PAGES: 30 + figures, tables and lithologic logs
PUBLICATION DATE: July 1990
LANGUAGE OF PUBLICATION: Hebrew with English abstract
ABSTRACT: An extensive TDEM survey, which covered almost the whole mediterranean coastal area of Israel, was carried out during the summer of 1989 in order to make a quantitative evaluation of the TDEM method as a tool for detecting seawater intrusion into the coastal aquifer of Israel. To obtain an estimation of the statistical significance of the results, a total of 100 TDEM stations was established, some in close proximity of existing observation wells. In order to ensure an objective evaluation of the TDEM results, a prior data interpretation was carried out without using any geological or hydrological information from the wells. It was found that the resistivity values of seawater in the aquifer vary within a narrow range of 1.1 to 2.9 Ohm-m, whereas low resistivity lithologies have values not lower than 10 Ohm-m. Of 31 TDEM measurements which detected seawater intrusion and which could be quantitatively compared with borehole data, 26 showed a good to fair agreement. Out of five TDEM measurements which did not detect seawater intrusion, four were found to be correct by comparison with data from nearby observation wells.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: Out of print. Available for reading in the library only.

34
TITLE: Electromagnetic survey for detecting and monitoring the interface at the coasts of the Mediterranean and the Dead Sea. Report L10/151/95
AUTHORS: M. Goldman, D. Gilad, B. Rabinovitch, A. Ronen
PUBLISHER: The Institute for Petroleum Research and Geophysics
PAGES: 4 + a map and 64 data tables and graphs
PUBLICATION DATE: June 1995
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: The report presents data of an electromagnetic TDEM survey performed by the Institute of Petroleum Research and Geophysics for the Hydrological Service of Israel. The survey included 54 measurements in the coastal area of the Mediterranean sea and 6 at the Dead Sea shore (the Ein-Zukim or Ein Feshha springs). Some of the measurements were made at the same spots as those performed in 1989, 1991, 1992, and 1993, thus enabling to follow-up the fluctuation of the interface in time. The objective of the measurements at new sites was to map the location of the interface in areas without observation wells.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: For reading in the library only.

35
TITLE: Evolution of the hydrogeochemistry of groundwater in the Kurnub Group and its impact on groundwater quality in the southern part of the Yarkon-Taninim basin. Hydro Rep. 03/1995
AUTHORS: E. Rosenthal, B.F. Jones, G. Weinberger
PUBLISHER: Hydrological Service of Israel
PAGES: 17 + tables and figures
PUBLICATION DATE: November 1995
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: Hydrogeochemical evolution of the ancient Kurnub Group waters in Sinai and the Negev was investigated starting from the rainfall on the outcrops of the Group in the Sinai mountains, via the known flow paths and down to its outflow outlets. Geochemical models were used to identify possible relationships between the chemical composition of the water and the mineral composition of the aquiferous rocks. The chemical reactions between the two phases were found adequate to explain the lithological composition and the facial changes in the different parts of the Kurnub Group. The processes along the flow paths include dissolution, precipitation, degassing, ion exchange as well as mixing of waters. Salinization of the fresh groundwater in the southern flank of the Yarkon-Taninim groundwater basin is explained by mixing with invading Kurnub Group waters.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request

36
TITLE: A regional model for the probability of peak discharges in Israel
Rep. Hydro. 1994 /4
AUTHORS: Isabella Shentsis, Arie Ben-Zvi, Salomon Goltz
PUBLISHER: Hydrological Service of Israel
PAGES: 61
PUBLICATION DATE: August 1994
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: The study refers to the maximal instantaneous peak discharge in a year. At first, the Log-Pearson 3 distribution function was adopted for estimating the probability of occurrence of a peak flood at a single hydrometric station. Historic peak flood records for observation periods between 13 and 68 years at 68 individual stations were used to derive the parameters of that function for each of the stations. The next step included regionalization of the distribution function from observed to unobserved sites. To this end, the country was subdivided into geographic regions which are relatively uniform in their rainfall forming properties. For each region was selected a function which relates the magnitude of a peak discharge at a given probability level to characteristics of the drainage basin. An estimation of the peak flood estimation error is also provided. The model serves as a tool for providing hydrologic information required for designing and operating systems and devices on and near streams in all parts of the country.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request

37
TITLE: The hydrologic situation in the coastal aquifer of the Gaza strip from 1985 to 1990. Rep. Hydro 1992/7
AUTHORS: A. Melloul, M. Bibas
PUBLISHER: Hydrological Service of Israel
PAGES: 36
PUBLICATION DATE: April 1992
LANGUAGE OF PUBLICATION: Hebrew with English abstract
ABSTRACT: Hydrologic investigations of the coastal aquifer in the Gaza strip from 1970 onwards indicate an overdraft of 10 to 30 million cubic meters per year accompanied by high and rising concentrations of chlorides and nitrates in the pumped water. The report presents data on the spatial distribution and trends of groundwater levels and salinity in the Gaza strip, analyzes their causes and recommends activities for improving the situation.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request

38
TITLE: Use of morphotectonic methods for tracing groundwater flow directions in the Northern Arava.
Rep.Hydro 1991/16
AUTHORS: Salomon Goltz, Eliyahu Rosenthal
PUBLISHER: Hydrological Service of Israel
PAGES: 10 + 5 figures
PUBLICATION DATE: August 1991
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: Flat relief areas composed of young and homogeneous sediments are usually short of structural and tectonic maps. Under such conditions a regional morphotectonic analysis may be helpful for clarifying the hydrogeologic conditions. The analysis consists of two steps: determination of the order of river courses and construction of iso-base maps. The later are used to produce a morphotectonic map. The main product of the present work is a morphotectonic map of the Northern Arava which shows a number of principal structures in the section between the Dead Sea and Wadi Paran. A joint analysis of the morphotectonic findings with prior hydrologic data identifies groundwater flow paths from the plateau of Edom to the Dead Sea. Local salinity sources were found to coincide with crossings of faults which have been identified from the analysis of iso-base maps.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request

39
TITLE: Groundwater salinity in the Beer-Sheva-Yarkon-Taninim basin
Progress report nr.2 Tahal 01/80/60
AUTHOR: Abraham Mercado
PUBLISHER: Tahal, Water Planning for Israel ltd
PAGES: 65
PUBLICATION DATE: July 1980
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: The basin is viewed as a system of two interconnected aquifers: an upper and a lower one. The report proposes a conceptual model which describes the flow regime as well as the sources, outlets and processes which govern the salinity of groundwater in the various parts of the basin. The validity of the model is tested on the basis of available historic data pertinent to the water balance and the mass balance of chlorides. Basinwide estimates of the components of these balances are also given for both undisturbed steady state conditions, which prevailed in the basin prior to the development of intensive pumpage, and for a later period of transient state conditions. A computer code of a two-layer numerical model in the vertical plane is used to produce forecasts of anticipated changes in Cl concentration as a function of changes in the spatial pattern of pumpage.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request

40
TITLE: A stand-alone ultrasonic ranging system for hydrological water stage measurements
AUTHORS: Sam Ben Yaakov, Chanina Golan and Shmuel Kessler
PUBLISHER: IEEE Transactions on instrumentation and measurement, Vol. 41, No. 5
PAGES: 699-702
PUBLICATION DATE: October 1992
LANGUAGE OF PUBLICATION: English
ABSTRACT: A stand-alone ultrasonic ranging system was designed and applied in hydrological measurements of water levels in rivers and water reservoirs. Ranging is carried out through air by an electrostatic ultrasonic transducer which is controlled by a microprocessor-based system. The data are collected in a 64 K Byte EPROM cassette. The problems associated with temperature correction were studied theoretically and experimentally. The advantages of remote water level measurement, as compared to direct contact methods, are examined and discussed.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
S. Ben-Yaakov, Department of Electrical and Computer Engineering,
Ben-Gurion University of the Negev, Beer-Sheva, Israel
AVAILABILITY: At request

41
TITLE: Blocking and sealing of small diameter observation boreholes
Rep.Hydro 1988/3
AUTHORS: A. Melloul, I. Reingold, A. Dax
PUBLISHER: Hydrological Service of Israel
PAGES: 46
PUBLICATION DATE: July 1988
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: The report presents the results of two field surveys on the blocking of small diameter observation boreholes and on its effect on the hydraulic contact between the borehole and the aquifer. The first survey included 280 boreholes in which the bottom of the borehole was measured. By comparing the measured depth with the original one, and by knowing the location of the perforated section of a borehole, it could be concluded whether the well is blocked and which part of the perforation is still open.
The second survey included slug tests in 110 boreholes. Analysis of the data led to the finding that the decline of water level in the borehole during a slug test can be represented by an exponential decay function. The decay coefficient, or its reciprocal - the decay time, can serve as a measure of the extent to which the hydrograph of the borehole corresponds to that of the groundwater in the vicinity of the borehole. Although a positive correlation was found between the level of blocking of a borehole and its efficiency as an observation well, periodically repeated slug tests are necessary for providing a quantitative measure of the behavior of its hydrograph and for following up changes in the value of this measure as time goes on. The results of the surveys suggest that high Cl concentrations expedite corrosion and destruction of corrosive casings. It was also found that the presence of clay or loam within the perforated section enhance blocking of the borehole.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request

42
TITLE: The snow of Mt. Hermon and its contribution to the Jordan River sources. Rep.Hydro 1/1988
AUTHORS: J. Bonne, D. Gilad
PUBLISHER: Hydrological Service of Israel
PAGES: 48
PUBLICATION DATE: January 1988
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: The water sources of the Upper Jordan watershed and, particularly, of the main springs at the foothills of the Hermon, are fed partly by the melting of snowfall on the Hermon. The objective of the study was to find characteristic parameters which can be used to evaluate the relationship between the volume of snow on the Hermon and its contribution to the baseflow of the sources of the Jordan River, and to check the possibility of forecasting the quantity of water which will be delivered from snowmelt. The snow covered region was obtained from Landsat satellite images and from air photos. Once delineated on maps, the area covered with snow was computed. Data of areas covered with snow in a series of years were tested against flow volumes in the tributaries of the Jordan River and in the Dan and Banias springs. Parallel measurements of the depth and water content in different locations of the snow layer were also made. It was found that the average contribution of snowmelt in the studied period was at least 50 million cubic meters per annum. This quantity is about one eighth of the yield of all springs of the Jordan River sources, and about one quarter to one third of the yield of the Dan and Banias springs in the summer.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request

43
TITLE: Evaluation of the hydrologic situation in the Gaza strip as a basis for operating the aquifer
Rep.Hydro 1975/3
AUTHORS: A. Melloul, Y. Bachmat
PUBLISHER: Hydrological Service of Israel
PAGES: 83
PUBLICATION DATE: August 1975
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: The pumpage from the aquifer in the Gaza strip was estimated on the basis of both data from volumetric recorders installed in 80 wells, and interviews with well owners. Revised estimates of parameters and components of the annual groundwater balance in the Gaza strip in the period 1968 - 1974 were made on the basis of annual rainfall data, available hydrogeological information, soil types, pump tests, water levels, chloride content, pumpage and hydrologic analogy with other regions. An estimate of the permissible mean annual volume of pumpage from the strip under a prescribed depth of sea water intrusion was also derived. As a result, the discrepancy between the planned and actual levels of water levels, salinity and pumpage in the different parts of the Gaza strip could be evaluated along with their trend. The report is concluded with recommended actions with respect to the control of pumpage, water saving, improvement of observation networks, hydrogeological investigations and ways for solving the water shortage problem in the Gaza strip.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request

44
TITLE: Representation of a group of hydrographs by a set of synthetic hydrographs. In: SBWRM-ISRAEL, International Symposium on scientific basis for water-resources management, Jerusalem. Additional Papers, 1985.
AUTHORS: M. Ben-Zvi, A. Melloul, S. Kesler
PUBLISHER: Eyal (Israel Association of Hydrologists)
PAGES: 12-24
PUBLICATION DATE: 1985
LANGUAGE OF PUBLICATION: English
ABSTRACT: The "principal components technique" is used to reduce a set of hydrographs of a large group of wells to a smaller set of (one or more) synthetic hydrographs which "represent" the original set, i.e. contain the same information as the original set with a smaller number of data.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request

45
TITLE: The problem of missing groundwater observations. In: SBWRM-ISRAEL, International Symposium on scientific basis for water-resources management, Jerusalem. Additional Papers, 1985
AUTHOR: Achiya Dax
PUBLISHER: Eyal (Israel Association of Hydrologists)
PAGES: 71 - 93
PUBLICATION DATE: 1985
LANGUAGE OF PUBLICATION: English
ABSTRACT: The paper proposes an automatic algorithm for completing missing water level records of an observation well. The algorithm employs a simple additive model consisting of three components: a trend, which is an annual constant that may vary from year to year, a seasonal component which is a separate constant for each month, and a random component. The model is used to produce a sequence of synthetic water levels which has the same seasonal pattern as the actual observations, satisfies the condition of a small mean square error and forms the basis for interpolation between the actual observations. The method is computationally efficient. It was tested on a large sample of wells and gave satisfactory results.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
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AVAILABILITY: At request

46
TITLE: A spatial, time-dependent approach to estimation of hydrologic data.
In: Journal of Hydrology, 135 (1992) 133-142
AUTHORS: B. Berkowitz, M. Ben-Zvi, J. Berkowitz
PUBLISHER: Elsevier Science Publishers B.V.
PAGES: 10
PUBLICATION DATE: July 1992
LANGUAGE OF PUBLICATION: English
ABSTRACT: Procedures for analysis of data from a hydrologic network usually assume that a collection schedule is fully followed. In practice, however, data are frequently missing (or simply unknown, in regions where measurements were not planned), and must be estimated on the basis of other available observations and information. During the 1980s a simple method to estimate missing data (e.g. on water levels) by use of a spatial approach was developed. Spatial and temporal variations of a measurable state variable (such as hydraulic head) were assumed to be described by a deterministic function, with randomness introduced by the choice of location and timing of observations. The function describes a spatial surface, and allows only for fluctuation parallel to itself along the time axis. Missing (or unknown) data can then be estimated from predicted surfaces. The constraint of parallel fluctuations has now been removed. The proposed method, which is more general, is based on integration of two sources of information: prior estimates and online estimates. It allows for continuous updating of the function as additional information becomes available, and as a consequence, missing (or unknown) data can be more accurately estimated.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Elsevier Science Publishers, Journal Department, P.O.Box 211 1000 AE, Amsterdam, Netherlands
AVAILABILITY: By order from the publisher

47
TITLE: Fluctuations of the level of the Dead Sea and climatic fluctuations in the country during historical times. In: SBWRM-ISRAEL 85, International Symposium on scientific basis for water-resources management, Jerusalem, 1985. Additional Papers
AUTHOR: Cippora Klein
PUBLISHER: Eyal (Israel Association of Hydrologists)
PAGES: 197-224
PUBLICATION DATE: 1985
LANGUAGE OF PUBLICATION: English
ABSTRACT: Annual and periodical changes of the measured Dead Sea level in the present century follow closely the measured annual and periodical changes of the rainfall amount over its drainage basin. Integrating dendrochronology (back to 1115 CE) and contemporaneous documents on the quality of rainfall seasons and periods (back to 2000 BCE) with data on the morphological, archaeological, botanical, sedimentological and chemical indicators of the Dead Sea levels elevation both climatic changes in the country and the Dead Sea levels fluctuations during historical times were reconstructed. The range of fluctuations of the Dead Sea level during historical times was found to exceed 75 meters. The average annual precipitation in Jerusalem was calculated for the different elevations of steady historical Dead Sea levels.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request

48
TITLE: Identification and quantification of long-term trends in water quality. In: SBWRM-ISRAEL 85, International Symposium on scientific basis for water-resources management, Jerusalem. Additional Papers
AUTHOR: Yoel Geifman
PUBLISHER: Eyal (Israel Association of Hydrologists)
PAGES: 94-107
PUBLICATION DATE: 1985
LANGUAGE OF PUBLICATION: English
ABSTRACT: Trend analysis was carried out on fifteen years of monthly nutrient loads and discharge in the Jordan River at its inflow to Lake Kinneret. Nonparametric tests were used to identify trend. Measurement of trends in this source required removal of the discharge effect. For this purpose two models were used: multiple regression and the conditional joint density function. The reliability and efficiency of the models were examined by a Monte Carlo analysis. Upward trends were found in the loads of Ammonium and soluble Phosphorus, but no change was detected in the other nutrient loads. In the last two years a downtrend was detected in Organic Nitrogen loads.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request

49
TITLE: Groundwater salinity in the coastal plain. Progress Report No.1
Tahal, 01/75/25
AUTHORS: Abraham Mercado, Mordechai Avron, Yair Kahanowitz
PUBLISHER: Tahal, Water Planning for Israel
PAGES: 68
PUBLICATION DATE: August 1975
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: The report estimates the components of the balance of chlorides in the coastal aquifer of Israel and assesses the trends of salinization in the future. The sources of chloride which have been identified and estimated include: rainfall, dry fallout, leakage from adjacent aquifers, sea water intrusion, artificial recharge, import of water from Lake Kinneret and the mountain aquifer for direct supply, percolation of surface water, and the addition of chlorides to the sewage which percolates into the aquifer. The computations are based on a subdivision of the aquifer into strips perpendicular to the coastline with a further subdivision of a strip into cells. A multicell model of a strip was used to simulate advection of chloride as an inert solute under unidirectional steady flow conditions in the saturated zone. The transport of chloride through the unsaturated zone is vertical by advection only. It is characterized by the travel time from the surface of the ground to the groundwater table. A computer code based on this model was used to reconstruct the map of chloride concentration in the 30's, to reconstruct the rate of increase in the decade 1965-1975, and to obtain an assessment of the concentration trend in the future. The special data file of chloride concentrations in pumping wells, which was prepared for the project, contained data from 1800 wells for the period 1950 - 1971. Apart from the predicted changes in the concentration of chloride in the pumped water and in the aquifer, the report also reviews possible ways of suppressing the rate of salinization.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: Out of print. Available for viewing in the library only.

50
TITLE: Hydrologic summary of the winter 1993/94
AUTHORS: Staff of the Hydrological Service
PUBLISHER: Hydrological Service of Israel
PAGES: 9 + tables, graphs and maps
PUBLICATION DATE: August 1994
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: The report describes the spatial distribution of rainfall depths and intensities in the reported winter season, and summarizes the hydrologic events which occurred during the rainfall season, such as: surface runoff including volumes and peak discharges; changes in water levels of Lake Kinneret and the Dead Sea; springflow and changes in groundwater levels. The report also includes data on artificial recharge of the major aquifers and some components of the Lake Kinneret water balance. Also presented are graphs of the statistical relationship between rainfall and runoff, water level graphs of Lake Kinneret and of the Dead Sea during the period 1980/81-1993/1994, hydrographs of selected springs, water level graphs of selected observation wells in the Yarkon-Taninim aquifer for the period 1971/72 - 1993/94 and maps of water level changes in the coastal aquifer of Israel.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service of Israel, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request

51
TITLE: Hydrologic summary of the winter 1995/96
AUTHORS: Staff of the Hydrological Service
PUBLISHER: Hydrological Service of Israel
PAGES: 10 + tables, graphs and maps
PUBLICATION DATE: August 1996
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: The report describes the spatial distribution of rainfall depths and days, and extreme storms in the reported winter season. This is followed by a description of the hydrologic events which occurred during the reported season, such as: surface runoff volumes and peak discharges; changes in water levels of Lake Kinneret and the Dead Sea; springflow and changes in groundwater levels. The report also includes data on artificial recharge of the major aquifers and some components of the Lake Kinneret water balance. Also presented are graphs of the statistical relationship between rainfall and runoff, graphs of Lake Kinneret water levels, inflows and outflows, volumes of diverted saline water, and pumpage from the Lake during the period 1981/82-1995/ 96; a graph of the water level of the Dead Sea for the above period; hydrographs of selected springs; water level graphs of selected representative observation wells in the Yarkon-Taninim aquifer for the period 1970/71 - 1995/96, bar graphs of rainfall depths over the outcrops of the aquifer and annual pumpage from the aquifer for the above period; and, maps of water level changes in the coastal aquifer of Israel.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service of Israel, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request

52
TITLE: Representative hydrologic data
AUTHORS: Staff of the Hydrological Service of Israel
PUBLISHER: Hydrological Service of Israel
PAGES: 26
PUBLICATION DATE: April 1996
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: This publication is the most recent issue of a monthly bulletin of the Hydrological Service. It includes data on water levels at the beginning of the reported month in selected representative observation wells in the coastal aquifer and the Yarkon-Taninim aquifer, Lake Kinneret and Dead Sea water levels, and discharges of selected springs and perennial streams. Also included in the bulletin is a graphical presentation of the variation of the above data over the period of the preceding 4 years.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Library, Hydrological Service of Israel, P.O.Box 6381, Jerusalem 91063, Israel
AVAILABILITY: At request

53
TITLE: Who is who in the water economy of Israel
AUTHORS: Staff of the Information Center, Water Research Institute
PUBLISHER: Information Center, Water Research Institute, Technion-Israel Institute of Technology
PAGES: 296
PUBLICATION DATE: February 1996, May 1997
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: The publication includes a listing in alphabetical order of persons and institutions who are associated with the water industry of Israel. The list of persons contains the name, address, present and previous occupation, education, telephone and fax numbers. The list of institutions contains the name of the institution, its address, person of contact, telephone and fax numbers, and activities. The lists are also indexed by category of activity.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Information Center, Water Research Institute, Technion-Israel Institute of Technology, Faculty of Agricultural Engineering, Technion City, Haifa 32000
AVAILABILITY: By order from the publisher

54
TITLE: Information for the Israeli water economy: The present situation and the forming up for the future
AUTHORS: Persons associated with information systems related to water in Israel
PUBLISHER: Information Center, Water Research Institute, Technion-Israel Institute of Technology
PAGES: 89
PUBLICATION DATE: February 1996
LANGUAGE OF PUBLICATION: Hebrew
ABSTRACT: The publication contains a compendium of lectures presented at a workshop on the status of water-related information systems in Israel. The workshop was organized by the Information Center of the Water Research Institute. The lectures describe the information systems of the Hydrological Service, the Planning Department of the Water Commission, Tahal and Mekorot companies, the Ministries of Agriculture, Environment and Health, the Geological Survey, the Meteorological Service, the Natural Reserves Authority, and the Lake Kinneret Research Laboratory.
ADDRESS FROM WHICH THE PUBLICATION CAN BE OBTAINED:
Information Center, Water Research Institute, Technion-Israel Institute of Technology, Faculty of Agricultural Engineering, Technion City, Haifa 32000
AVAILABILITY: By order from the publisher

Jordanian Publications

1
TITLE: A study of Spas in Jordan
AUTHOR(S): E. Salameh
PUBLISHER:
PAGES: 148
PUBLICATION DATE: 1990
LANGUAGE OF PUBLICATION: Arabic

ABSTRACT:
The study described the curative characteristics of hot springs (Spas) in Jordan and their locations throughout the kingdom (Ma'in, Zarqa, North and South Ghor, Azraq and Southern Jordan Spa).

It also discussed the scientific, medicinal and economic importance of such natural resources in Jordan, and called at their development as being one of the important supports of Jordan's future national economy.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

University of Jordan
Water Research and Study Center
Amman - Jordan

Ministry of Health
Amman - Jordan

AVAILABILITY OF REPORT: Available

2
TITLE: Wastewater Reuse in Irrigation at King Hussein Medical Center & Queen Alia International Airport
AUTHOR(S): University of Jordan / (Water Research and Study Center)
in cooperation with the Center for Consultation and Technical Services and Studies
PUBLISHER:
PAGES: 140
PUBLICATION DATE:
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The study investigated the possibility of the reuse of treated wastewater from King Hussein Medical Center (HMC) and Queen Alia International Airport (QAA) in irrigation.

This involved individual analysis of the wastewater depending on its source and the consideration of the environmental and health impacts of its reuse in agriculture.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
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Amman - Jordan

University of Jordan
Water Research and Study Center
Center for Consultation and Technical Services and Studies
Amman - Jordan

AVAILABILITY OF REPORT: Available

3
TITLE: Water Resources Policies Planning and Management (Hydrogeology of the Disi Sandstone Aquifer)
AUTHOR(S): Hydrogeological Services International
PUBLISHER:
PAGES: 44
PUBLICATION DATE: February 1990
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This study was funded by the United Nations Development Program for the Government of the Hashemite Kingdom of Jordan.

The study investigated the thickness and extent of the Disi Sandstone aquifer, groundwater storage, static water levels, groundwater flow and the groundwater recharge.

It also investigated the effect of abstractions on water levels and on groundwater reserves. Analysis of the chemical quality of the Disi groundwater was also included, as well as delineation of the areas of potential new well fields.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Water Authority of Jordan / The Library
Amman - Jordan

Hydrogeological Services International
172B Epsom Road,
Guildford, Surrey GU1 2RR
United Kingdom

AVAILABILITY OF REPORT: Available

4
TITLE: Storage Facilities in Wadi Mallaha - Karameh Dam Project (Report on the Effects of Reservoir Impoundments on Drainage of Irrigated Lands)
AUTHOR(S): Sir Alexander Gibb & Partners in association with Masar
PUBLISHER:
PAGES: 18
PUBLICATION DATE: May 1992
LANGUAGE OF PUBLICATION: English

ABSTRACT:
A study of the area around the reservoir perimeter was conducted to determine the effects of impoundment on drainage of irrigated lands.

A topographic survey work undertaken in 1986 has been used in conjunction with farm layout and drainage network drawings, supplemented with additional fieldwork as necessary, to determine the potential impact of impoundment on existing irrigated lands. Fieldwork included additional survey work and visual confirmation of drainage layouts and of current land usage.

Assessment of effects have been made superimposing relevant reservoir levels on suitably modified plans of farm and drainage layouts. This has allowed potential changes in land use to be quantified and possible disruptions to the existing drainage system to be identified.

Overall the effects of reservoir impoundment on the drainage of existing irrigated lands was evaluated to be small. Approximately 90 ha of farmland would potentially be affected and a small number of drainage outfalls would require minor modifications.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Ministry of Water and Irrigation / The Library
Amman - Jordan

Masar
P.O. Box 5278
Amman - Jordan

Sir Alexander Gibb & Partners
P.O. Box 7323
Amman - Jordan

AVAILABILITY OF REPORT: Available

5

TITLE: Storage Facilities in Wadi Mallaha - Karameh Dam Project (Report on Water Tightness on the Right Bank Ridge)
AUTHOR(S): Sir Alexander Gibb and Partners in association with Masar
PUBLISHER:
PAGES: 35
PUBLICATION DATE: September 1992
LANGUAGE OF PUBLICATION: English

ABSTRACT:
An investigation comprising some 26 bore holes has been carried out to quantify the potential leakage through the Right Bank Ridge after impounding of the Karameh Reservoir.

Detailed geophysical logging of the boreholes has enabled the delineation of thin, high permeability sand layers within the ridge which appear to be laterally continuous. A number of long term permeability tests were also taken to augment testing carried out as part of previous investigations. The investigations have confirmed the general nature of the geology in the ridge, particularly the complexity of the Ghor El Katar / Lisan contact where a number of talus-derived sand and gravel fans have been identified.

As a result of the investigations it was predicted that the leakage through the Right Bank Ridge to the north of the contact area will be modest. The losses were estimated to be of the order of 20 to 30 l/s when the reservoir was at full storage level. Losses to the south of the contact, in the Ghor El Katar were likely to be negligible

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Jordan Valley Authority / The Library
Amman - Jordan

Masar
P.O. Box 5278
Amman - Jordan

Sir Alexander Gibb & Partners
P.O. Box 7323
Amman - Jordan

AVAILABILITY OF REPORT: Available

6
TITLE: Storage Facilities in the Wadi Mallaha - Karameh Dam Project (Reservoir Water Quality Studies)
AUTHOR(S): Sir Alexander Gibb & Partners in association with Masar
PUBLISHER:
PAGES: 57
PUBLICATION DATE: November 1992
LANGUAGE OF PUBLICATION: English

ABSTRACT:
A detailed study of the water quality in Karameh Reservoir was conducted to predict the suitability of the stored water for irrigation in the southern zone.

The study included qualitative testing of the constituent water source of the reservoir together with quantitative flow measurements in Wadi Mallaha and the reservoir basin.

Water sampling stations were established and positioned to allow qualitative monitoring of all potential sources of inflow to the reservoir.

A number of special soil tests were undertaken during the study in order to establish the potential quantities of salts which may be leached from soil in the reservoir basin over a long period.

The study report contains all the acquired data, investigations and discussions which have taken place at the Jordan Valley Authority throughout the study.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Jordan Valley authority / The Library
Amman - Jordan

Masar
P.O. Box 5278
Amman - Jordan

Sir Alexander Gibb & Partners
P.O. Box 7323
Amman - Jordan

AVAILABILITY OF REPORT: Available

7
TITLE: Groundwater Investigation in the Azraq Basin
AUTHOR(S): Consulting Engineers, Salzgitter GmbH, Arabtech Consulting Engineers
PUBLISHER:
PAGES: Three Volumes
PUBLICATION DATE: November 1993
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This investigation includes three volumes:

- Vol. 1 - Main report
- Vol. 2 - Station details and tables
- Vol. 3 - Maps

The main report included background information about the basin and the quantities of water pumped from Azraq, deterioration of water quality and the declining water levels.

The report also included analysis and processing of collected data, pumping tests evaluation as well as modeling of the aquifer.

The investigation recommended a future program for monitoring water levels and water quality, establishment of a data base, modeling, performance of pumping tests and geophysical investigation.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Water Authority of Jordan / The Library
Amman - Jordan

CES Consulting Engineers, Salzgitter GmbH

Arabtech Consulting Engineers
Tel. : (+) 962 - 6 - 665297 / 663391
Telex : 21705 Rabtec Jo
P.O. Box 7323
Amman - Jordan

AVAILABILITY OF REPORT: Available

8
TITLE: Jordan Valley Irrigation Project
(Stage II - Technical and Economic Feasibility of the Al-Wehda Dam Project)
AUTHOR(S): Harza Engineering Company (Consulting Engineers)
PUBLISHER:
PAGES: 190
PUBLICATION DATE: 1988
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The Jordan Valley Irrigation Project was conceived to maximize the contribution of the land and the water resources of the East Jordan Valley to the economy of Jordan.

Stage II of the project was concerned primarily with control and regulation of the Yarmouk River, which is Jordan's largest river, and the introduction to modern high-efficiency irrigation methods and agricultural techniques on a total of 21,750 hectares of land in the Jordan Valley.

The major components of the project included the Maqarin Dam and Reservoir on the Yarmouk River, including power facilities, downstream diversion facilities near Adasiyeh, the rehabilitation and extension of the existing East Ghor Main Canal on the east bank of the Jordan River, the conversion of 11,930 hectares from an open-distribution to a closed-distribution system, and the development of 9,820 hectares of presently non- irrigated lands.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Harza Engineering Company (Consulting Engineers)
Wacker Drive
Chicago, Illinois 60606 - 4288

AVAILABILITY OF REPORT: Available

9
TITLE: Yarmouk Basin Resources Study
AUTHOR(S): Water Authority of Jordan (WAJ)
PUBLISHER:
PAGES: 162
PUBLICATION DATE: November 1989
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This study was a part of North Jordan Water Resources Investigation Project.

This project evaluated the available water potential in Yarmouk basin and Northern Rift Side (NRS) catchment to cover the future water demands for water supply and irrigation purposes.

The study also summarizes the most important geological and hydrogeological findings of Yarmouk River Basin and NRS catchment.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Water Authority of Jordan (WAJ)
Water Resources Department
P.O. Box 2412
Amman - Jordan

AVAILABILITY OF REPORT: Available

10
TITLE: Groundwater Resources Study in the Shidiya Area
AUTHOR(S): Howard Humphreys Ltd. (Consulting Engineers)
PUBLISHER:
PAGES: 25
PUBLICATION DATE: January 1986
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The report presented the results of investigations into the hydrogeology and the hydrochemistry of the Mesozoic - Cainozoic aquifers of the Ma'an - Shidiya - El Jafr region in southern Jordan.

In addition, it included a reconnaissance study of the Paleozoic (Disi) sandstone aquifer south and southeast of Shidiya.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Natural Resources Authority / The Library
Amman - Jordan

Howard Humphreys Ltd. (Consulting Engineers)
P.O. Box 950437
Amman - Jordan

AVAILABILITY OF REPORT: Available

11
TITLE: Hydrogeological and Water Use Study of the Mujib Watershed
AUTHOR(S): Japan International Cooperation Agency (JICA)
PUBLISHER:
PAGES: 200
PUBLICATION DATE: July 1987
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The study aimed at providing an overall evaluation of the potentials of the water resources within the Mujib watershed by implementing a hydrogeological and water use investigation.

Four reports were submitted; an inception, a progress, an interim and draft final reports.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Water Authority of Jordan / The Library
Amman - Jordan

Japan International Cooperation Agency (JICA)
Tokyo - Japan

AVAILABILITY OF REPORT: Available

12
TITLE: Aquifer Modeling of the Disi-Saq Sandstone (Southern Jordan and Northern Saudi Arabia - Report)
AUTHOR(S): Howard Humphreys Ltd. (Consulting Engineers)
PUBLISHER:
PAGES: 100
PUBLICATION DATE: 1986
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The presented model was based on an earlier model which was developed by Howard Humphreys in 1982. Whilst the new model utilized the same mathematical solutions and computer programs as the 1982 model, it processed features such as a cyclic simulation of abstractions, a different geometry and new input data, which made it distinct from the earlier version.

The model covered an area of 21,747 km2 and stretched from Ras En Naqab - Ma'an in the north to Tabuk, in Saudi Arabia, in the south. It contained a total of 2004 nodes of which 219 represent abstraction points.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Water Authority of Jordan / The Library
Amman - Jordan

Howard Humphreys Ltd. (Consulting Engineers)
P.O. Box 950437
Amman - Jordan

AVAILABILITY OF REPORT: Available

13
TITLE: North Jordan Water Use Strategy
AUTHOR(S): Howard Humphreys & Sons (Consulting Engineers)
PUBLISHER:
PAGES: 22
PUBLICATION DATE: June 1978
LANGUAGE OF PUBLICATION: English

ABSTRACT:
Brief proposals were made for investigations which were necessary for each of the proposed schemes so that more detailed studies can be undertaken.

The work covered two areas in detail:
- The hydrological and hydrogeological aspects of the Zarqa Basin in connection with the water supply for the Amman - Zarqa basin.
- Ground water studies for the Samasdoud wellfield area and preliminary reconnaissance of the Maqarin scheme in connection with the water supplies to Irbid.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Howard Humphreys & Sons (Consulting Engineers)
Tel. : Reading 57321
Kennet House,
Kings Road, Reading,
Berkshire RG1 3BT,
England

AVAILABILITY OF REPORT: Available

14
TITLE: Al-Wehdah Dam Project
AUTHOR(S): Harza Engineering Company (Consulting Engineers)
PUBLISHER:
PAGES: 243
PUBLICATION DATE: April 1988
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The report contained a description of the derivation of the historic and anticipated future water supply available to the Valley, the anticipated demands on the water supply and the Yarmouk River and Valley system yields resulting from simulations of various conditions.

The study was performed in two parts:-
- First, the Yarmouk River system was analyzed to determine the available yield and its change with time due to the increased withdrawal of water by the Syrians up to the limits of the Jordan-Syrian protocol and how the recommended project development will mitigate the problems caused by the Syrian withdrawals and the degree to which formerly unusable water could be put to beneficial use.
- Second, the impact of the Syrian withdrawal and project development was analyzed in conjunction with supplies from the Zarqa River and the side wadis.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Jordan Valley Authority / The Library
Amman - Jordan

Harza Engineering Company (Consulting Engineers)
Wacker Drive
Chicago, Illinois 60606-4288

AVAILABILITY OF REPORT: Available

15
TITLE: Desert Dams
AUTHOR(S): Canadian International Development Agency
PUBLISHER:
PAGES: (Two Volumes) 213
PUBLICATION DATE: 1989
LANGUAGE OF PUBLICATION: English

ABSTRACT:
Feasibility study and preliminary designs were prepared for five sites in the desert areas of Jordan for the construction of small storage dams to be used primarily for the recharge of groundwater and storage of flood waters for irrigation and other uses. The proposed sites were Siwaga, Jurdana, Abu Safat, Rajil and Errattam.

Hydrological and Meteorological data from stations in the study areas formed the database for the Hydrological feasibility study of the sites. Flood studies were also performed to establish risk parameters for the dams.

Extensive field investigations were performed at each site in order to gather the geological and geotechnical information necessary for designing the dam and spillway structures. Investigations included geotechnical boreholes, test pits, geological mapping, and geophysical surveying. Soil and rock samples were taken from the boreholes, and permeability tests were performed in them.

Topographic surveying was done to precisely position the dam axes and to map the reservoirs for volume calculations.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Water Authority of Jordan / The Library
Amman - Jordan

Canadian International Development Agency

AVAILABILITY OF REPORT: Available

16
TITLE: Prefeasibility of a Master Plan for Desert Dams in Jordan
AUTHOR(S): Jean Claude Rassam
PUBLISHER:
PAGES: 252
PUBLICATION DATE: 1990
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This mission had investigated the possibility of saving excess rainfall by building mud dams in the lower part of the valleys.

The hydrological conditions in Jordan, especially in the desert area were examined in order to establish the hydrological feasibility of desert dams, taking into account the scarcity of rainfall, intensity of potential evaporation and amount of sediment transport. Based on data from existing and designed desert dams, it was stated that a desert reservoir is viable in Jordan.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

United Nations Educational, Scientific and Cultural Organization (UNESCO)
Paris

Jean Claude Rassam
Montreal - Canada

AVAILABILITY OF REPORT: Available

17
TITLE: Mujib and Southern Ghors Irrigation Project
AUTHOR(S): Binnie & Partners (Consulting Engineers)
Jouzy & Partners (Consulting Engineers Bureau)
Ove Arup & Partners
PUBLISHER:
PAGES: Seven Volumes
PUBLICATION DATE: January 1979
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The study was undertaken to re-assess the development of irrigated agriculture in the Southern Ghors, in the light of changed economic conditions and of recent developments in irrigation techniques.

The project was implemented in two stages. Stage 1 consisted of the agricultural development of each Ghor making maximum use of the local Wadi base flow. Also under this first stage, the existing irrigation distribution networks were replaced by piped systems and the irrigation method converted to drip. The resulting saving in water would allow extensions of the area presently under irrigation onto adjacent uncultivated areas. The Stage 1-works should allow cultivation of 50,740 dunums net including existing areas. Stage 2 of the Project considered the further extension of the irrigated areas using water derived from the Wadi Mujib. This stage should permit cultivation of a further 35,220 dunums net.

The study comprised of a feasibility report and a number of technical appendices and sets of drawings which covered the carried out investigation in detail:
- Appendix A - Topography
- Appendix B - Water Resources
- Appendix C - Geology
- Appendix D - Engineering
- Appendix E & F - Agricultural Soil Survey
- Appendix G - Economic and Sociology
- Appendix H - Project Economic

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Jordan Valley Authority / The Library
Amman - Jordan

Binnie & Partners (Consulting Engineers)
Tel. : 01 - 222 7755
Telex : 24552
Artillery House, Artillery Row,
Westminster,
London SW1P 1RX

Jouzy & Partners (Consulting Engineers Bureau)
Tel. : (+) 962 - 6 - 662818 / 663902
Fax. : (+) 962 - 6 - 682984
Telex : 21381 Jouzy Jo
P.O. Box 9112
Amman 11191 Jordan

Ove Arup & Partners
13 Fitzroy Street,
London W1P 6BQ

AVAILABILITY OF REPORT: Available

18
TITLE: Water Use Strategy - North Jordan (1978)
AUTHOR(S): Howard Humphreys & Sons (Consulting Engineers)
PUBLISHER:
PAGES: Five Volumes
PUBLICATION DATE: 1978
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This study report comprises five volumes covering the water resources, agricultural water requirements as well as the development of the sources in the whole of North Jordan.

The study area included the largest centers of population in the whole country where supplies of potable water are generally insufficient (Amman, Zarqa and Irbid). The study aimed at preparing a domestic and industrial water use strategy for the north part of the kingdom for a 25- year period up to the year 2002. The study area covered the Jordan Valley, the Highlands and Desert.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Howard Humphreys & Sons (Consulting Engineers)
Tel. : Reading 57321
Kennet House,
Kings Road, Reading,
Berkshire RG1 3BT
England

AVAILABILITY OF REPORT: Available

19
TITLE: Aqaba Water Supply Study
AUTHOR(S): Howard Humphreys & Sons (Consulting Engineers) in association with Peat, Marwick, Mitchell
PUBLISHER:
PAGES: 329
PUBLICATION DATE: July 1977
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The study comprises of a feasibility report and a hydrogeological study report. The feasibility study aimed at determining the best means of supplying water to Aqaba. A considerable amount of work had been undertaken, and the objective of the feasibility study was to review that work, taking into account all possible alternative projects, and to recommend the optimum solution to the problem.

The hydrogeological study involved field investigations comprising three main elements:
- The logging of twelve specified boreholes.
- The collection of available abstraction and drawdown records for Qa' Disi.
- An aquifer test using long duration pumping at a selected site near Qa' Disi.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Howard Humphreys & Sons (Consulting Engineers)
Tel. : Reading 57321
Kennet House,
Kings Road, Reading,
Berkshire RG1 3BT
England

AVAILABILITY OF REPORT: Available

20

TITLE: Study of the Primary and Secondary Conveyance System for Domestic Water Supply in the Amman, Balqa and Irbid Governorates (1983)
AUTHOR(S): Watson Hawksley and Sir Alexander Gibb & Partners in association with Arabtech Consulting Engineers
PUBLISHER:
PAGES: 22
PUBLICATION DATE: November 1983
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This report describes the various options that were investigated for the terminal arrangements for a trunk pipeline to Amman from the Yarmouk River via the North Jordan Highlands, and for the first stage pipeline from the River Euphrates.

Alternative arrangements were considered which included both independent and combined terminal facilities.

The report included nine alternative schemes.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Watson Hawksley and Sir Alexander Gibb & Partners
P.O. Box 7323
Amman - Jordan

Arabtech Consulting Engineers
Tel. : (+) 962 - 6 - 665297 / 663391
Telex: 21705 Rabtec Jo
Amman - Jordan

AVAILABILITY OF REPORT: Available

21
TITLE: Study of the Primary and Secondary Conveyance Systems for Domestic Water Supply in the Amman, Balqa and Irbid Governorates (1985)
AUTHOR(S): Watson Hawksley and Sir Alexander Gibb & Partners in association with Arabtech Consulting Engineers
PUBLISHER:
PAGES: Four Volumes
PUBLICATION DATE: April 1985
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The project fundamentally involved a study to determine the best method for developing the existing primary and secondary conveyance systems throughout North Jordan to meet future municipal and industrial water requirements.

The study comprised four volumes; the Final report, Maps, Figures, Drawings and Appendices.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Watson Hawksley and Sir Alexander Gibb & Partners
P.O. Box 7323
Amman - Jordan

Arabtech Consulting Engineers
Tel. : (+) 962 - 6 - 665297 / 663391
Telex : 21705 Rabtec Jo
P.O. Box 7323
Amman - Jordan

AVAILABILITY OF REPORT: Available

22
TITLE: North Jordan Water Use strategy - Azraq
AUTHOR(S): Howard Humphreys & Sons (Consulting Engineers)
PUBLISHER:
PAGES: 98
PUBLICATION DATE: 1977
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This report described the state of knowledge of the water resources of Azraq, and recommended a program of investigation for immediate implementation directed specifically at water resources evaluation in the area.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Howard Humphreys & Sons (Consulting Engineers)
Tel. : Reading 57321
Kennet House,
Kings Road, Reading,
Berkshire RG1 3BT
England

AVAILABILITY OF REPORT: Available

23
TITLE: Supervisory Control and Data Acquisition System Project (SCADA)
AUTHOR(S): Haiste International Ltd., Sir William Halcrow and Partners
PUBLISHER:
PAGES: 144
PUBLICATION DATE: January 1987
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The document was presented in the form of a main report supported by technical appendices. Within the main report, the major elements which comprised the SCADA system were discussed and recommendations were given as to the most appropriate solution for the Water Authority of Jordan (WAJ), together with the capital and revenue cost.

The supporting appendices deal with each element of the system in detail, presenting the available options, the cost implications of these and the recommended solution in each case.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Water Authority of Jordan / The Library
Amman - Jordan

Haiste International Ltd.

Sir William Halcrow and Partners

AVAILABILITY OF REPORT: Available

24
TITLE: Aqaba Water Distribution and Sewerage Preliminary Engineering Design
AUTHOR(S): Howard Humphreys Ltd. (Consulting Engineers) in association with Arabtech Consulting Engineers
PUBLISHER:
PAGES: 322
PUBLICATION DATE: 1978
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This study covers the preliminary engineering design, economic and financial analysis of both the water distribution and the sewerage and sewage treatment for the city of Aqaba.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Howard Humphreys Ltd. (Consulting Engineers)
P.O. Box 950437
Amman - Jordan

Arabtech Consulting Engineers
Tel. : (+) 962 - 6 - 665297 / 663391
Telex : 21705 Rabtec Jo
P.O. Box 7323
Amman - Jordan

AVAILABILITY OF REPORT: Available

25
TITLE: Storage Facilities in the Jordan Valley
AUTHOR(S): Harza Overseas Engineering Company (Consulting Engineers) in association with Arabtech Consulting Engineers
PUBLISHER:
PAGES: Four Volumes
PUBLICATION DATE: November 1988
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This study consists of four volumes:
- Volume 1 : Pre-feasibility study
- Volume 2 : Main report
- Volume 3 : Appendices to main report
- Volume 4 : Draft report on technical, economic and financial feasibility and preliminary design.

Preliminary design studies have been performed to raise Kafrein Dam and for the regulating structure. The design have been based on the surveys and site investigations performed for these studies and the information available from previous studies.

The preliminary design have been performed in sufficient detail to define the type, size, capacities, layouts and dimensions of the various components. The additional studies, site investigations, and surveys required for final design were discussed.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Jordan Valley Authority / The Library
Amman - Jordan

Harza Overseas Engineering Company (Consulting Engineers)
Wacker Drive
Chicago, Illinois 60606-4288

Arabtech Consulting Engineers
Tel. : (+) 962 - 6 - 665297 / 663391
Telex : 21705 Rabtec Jo
P.O. Box 7323
Amman - Jordan

AVAILABILITY OF REPORT: Available

26
TITLE: Feasibility Study for the Raising of King Talal Dam
AUTHOR(S): Harza Overseas Engineering Company (Consulting Engineers)
PUBLISHER:
PAGES: 204
PUBLICATION DATE: November 1981
LANGUAGE OF PUBLICATION: English

ABSTRACT:
A reconnaissance study conducted in 1980 in order to assess the potential for additional storage development on the Zarqa River concluded that raising of the King Talal Dam by 9.5 meters would be technically and economically viable and preferable over the construction of a second dam.

The benefits would stem primarily from additional irrigation in the Jordan Valley and generation of hydroelectric energy.

The scope of this feasibility study covered the following:-

1. Development of plans for the raising of the King Talal Reservoir to the maximum possible level from a technical as well as an economic viewpoint in order to regulate the inflows, to minimize losses through spillage which in the flood season of 1979-1980 amounted to 80 million cubic meters, as well as to limit the effect of reservoir sedimentation which rapidly reduces the available active reservoir storage.
2. Study the technical and economic feasibility of diverting water from the Qa'Khanna depression to the Zarqa River basin water instead of having it lost by evaporation.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Jordan Valley Authority / The Library
Amman - Jordan

Harza Overseas Engineering Company (Consulting Engineers)
Wacker Drive
Chicago, Illinois 60606 - 4288

AVAILABILITY OF REPORT: Available

27
TITLE: The Water Master Plan of Jordan (A paper)
AUTHOR(S): Dr. H.R. Frantz in collaboration with the Preparatory Committee
PUBLISHER:
PAGES: 74
PUBLICATION DATE: March 1978
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This paper was presented at Jordan's National Water Symposium of (19-22) March 1978 in Amman.

The paper presents background information and data about the water resources and water demand in Jordan. It discusses the available strategies and policies in 1978 and suggests plans and development priorities for Jordan taking into consideration the importance of monitoring pollution of water resources and recycling of used water to compensate for the imbalance in the supply-demand situation in Jordan.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Dr. H.R. Frantz,
AHT - Essen / BGR - Hanover
Germany

The Property Committee

AVAILABILITY OF REPORT: Available

28
TITLE: Euphrates Water Supply Project (1981)
AUTHOR(S): Howard Humphreys & Partners (Consulting Engineers) in association with Merz and McLellan, Peat Marwick Mitchell & Co., Arabtech Consulting Engineers
PUBLISHER:
PAGES: 152
PUBLICATION DATE: 1981
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This Feasibility Study was concerned primarily with the choice between the differing options open; these covered a wide range from location of intake through choice of pipe materials, pipe route and pipelaying methods, to location and size of terminal reservoirs.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Howard Humphreys & Partners (Consulting Engineers)
Tel. : (+) 44 - 3723 76190
Thorncroft Manor, Dorking Road,
Leatherhead, Surrey KT22 8JB
England

Merz and McLellan

Peat Marwick Mitchell & Co.
London

Arabtech Consulting Engineers
Tel. : (+) 962 - 6 - 665297 / 663391
Telex : 21705 Rabtec Jo
P.O. Box 7323
Amman - Jordan

AVAILABILITY OF REPORT: Available

29
TITLE: Water Supply Project from the Euphrates River (1983)
AUTHOR(S): Howard Humphreys & Partners (Consulting Engineers)
PUBLISHER:
PAGES:
PUBLICATION DATE: February 1983
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This project involved the building of a dam on the Yarmouk River at Maqarin and a sprinkler irrigation system for a net area of 25,353 hectares.

The construction of the Maqarin Dam would regulate the water of the Yarmouk River and thereby provide nearly 60% of the total surface water resources of the country.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Howard Humphreys & Partners (Consulting Engineers)
Tel. : (+) 44 - 3723 76190
Thorncroft Manor, Dorking Road,
Leatherhead, Surrey KT22 8JB
England

AVAILABILITY OF REPORT: Available

30
TITLE: Water Supply Project from the River Euphrates (1985)
AUTHOR(S): Howard Humphreys & Partners (Consulting engineers)
PUBLISHER:
PAGES: Three volumes
PUBLICATION DATE: April 1985
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This report was the second of a series of three main reports presented during the feasibility study. The first, Volume 1, Technical assessment, examined the numerous options possible for abstracting and treating resources from the River Euphrates, and for their transmission and delivery to North Jordan. It also reviewed and updated assessments of water resources and forecasts of future water demands, thereby enabling the implementation and staging of the project to be established.

The purpose of this report was to further refine the preliminary options selected in the Technical Assessment, and to illustrate and describe the outline design of the works proposed.

The aspects of the project examined in this report were:
- Final optimization of the water transmission system.
- Pre-design engineering.
- Environmental impact.
- Project implementation.
- Cost estimate.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Howard Humphreys & Partners (Consulting Engineers)
Tel. : (+) 44 - 3723 76190
Thorncroft Manor, Dorking Road,
Leatherhead, Surrey KT22 8JB
England

AVAILABILITY OF REPORT: Available

31
TITLE: Jordan Water Resources Sector Study (Report - June 1988)
AUTHOR(S): The World Bank
PUBLISHER: The World Bank (Report No. 7099 - JO)
PAGES: 124
PUBLICATION DATE: June 1988
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This report was prepared by the World Bank for the Government of Jordan. It contains an analysis of the available water resources in the country.

It also discusses the water requirements for irrigation, domestic and industrial uses and provides recommendations on how water can be managed more efficiently. A preliminary strategy on investment priorities for the water sector based primarily on technical and financial considerations is also proposed.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

The World Bank

AVAILABILITY OF REPORT: Restricted

32
TITLE: Azraq - Amman Water Supply Project
AUTHOR(S): Howard Humphreys Ltd. (Consulting Engineers)
PUBLISHER:
PAGES: 12
PUBLICATION DATE: November 1981
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This report summarizes the hydrogeology of the project area based mainly on data from the well - drilling and considers the likely effects on the Azraq aquifer of major abstractions north of the pools.

Recommendations were made for starting up procedures and for long term operation and a monitoring program was proposed which would provide information for an understanding of the aquifer behavior and also an early warning of likely saline contamination.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Howard Humphreys Ltd. (Consulting Engineers)
Kennet House,
Kings Road, Reading,
Berkshire, RG1 3BT
England

AVAILABILITY OF REPORT: Available

33
TITLE: Amman Water And Sewage Works (Water Resources Investigation and Feasibility Study for Amman Water and Sewerage Facilities)
AUTHOR(S): VBB Vattenbyggnadsbyran in association with Fawzi & Associates
PUBLISHER:
PAGES: 473
PUBLICATION DATE: September 1977
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The project comprised an extension of the transmission of water from King Talal Dam and construction of facilities for transmission of water from the Upper Wala dam to Amman.

The study considered the following aspects for the selection of alternative for construction of transmission line between the Upper Wala Dam and Amman:-
- Point of introduction of water to existing network in Amman
- Economic pipe diameter
- Location of transmission line
- Location and volume of reservoir
- Location and number of pumping stations
- Location of treatment plant

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

VBB Vattenbyggnadsbyran
Stockholm - Amman

Fawzi Associates
Amman - Jordan

AVAILABILITY OF REPORT: Available

34

TITLE: Ramtha, Mafraq, Anjara, Ajloun & Ein Janneh - Water Distribution, Storm Water and Sanitary Sewerage Systems

AUTHOR(S): Engineering - Science, Inc. in association with Jouzy & Partners (Consulting Engineers Bureau)

PUBLISHER:

PAGES: 503 (Three Volumes)

PUBLICATION DATE: July 1983

LANGUAGE OF PUBLICATION: English

ABSTRACT:
This feasibility report was for a proposed project to improve the water distribution systems, provide critical storm water drainage improvements, install sanitary sewers and construct wastewater reclamation plants (sewage treatment plants) for the cities of Ramtha, Mafraq, Anjara, Ajloun and Ein Janneh in the northern sector of the Hashemite Kingdom of Jordan.

The feasibility studies and report constitute stage 1 of a three-stage effort (feasibility, final design and construction).

The report was submitted in three volumes:

- Volume 1 : Ramtha
- Volume 2 : Mafraq
- Volume 3 : Anjara, Ajloun and Ein Janneh

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Engineering - Science, Inc.
Tel. : (213) 445 - 7560
Telex : 67 - 5428
Cable Address : Enginsci
125 W. Huntington Drive
Arcadia, California 91006
USA

Jouzy & Partners (Consulting Engineers Bureau)
Tel. (+) 962 - 6 - 662818 / 663902
Fax. (+) 962 - 6 - 682984
Telex : 21381 Jouzy Jo
P.O. Box 9112
Amman 11191 Jordan

AVAILABILITY OF REPORT: Available

35
TITLE: Simulation Study for A Water Use Strategy for the Qa Disi-Upper Wadi Yutm Sandstone Aquifer System (Evaluation of Alternative Water Resources)
AUTHOR(S): Robert L. Raikes & Partners S.r.1 (Consulting Engineers and Hydrologists)
PUBLISHER:
PAGES: 84
PUBLICATION DATE: March 1976
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The study involved the construction and operation of a mathematical model of the Qa' Disi group of aquifers, as distinct from that of the Qa Disi aquifer itself. The model covered not only the Qa Disi aquifer, but also the similar but smaller Paleozoic sandstone aquifer of upper Wadi Yutm near Quweira, and its extension into the alluvial aquifer of Wadi Yutm between there and Aqaba.

The new model enables the whole aquifer system to be studied from the points of view of both water availability and the economics of water use not merely for irrigation at Qa Disi, but also for combinations of that with the various possible requirements of Aqaba for domestic and industrial water.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Robert L. Raikes & Partners S.r.1 (Consulting Engineers and Hydrologists)
Consulting Engineers and Hydrologists
Viale Kennedy 18,
00046 Grottaferrata,
Rome - Italy

AVAILABILITY OF REPORT: Available

36
TITLE: National Water Master Plan of Jordan.
AUTHOR(S): Agrar und Hydrotechnik GmbH (Consulting Engineers)
PUBLISHER:
PAGES: 2199 (Seven Volumes)
PUBLICATION DATE: 1977
LANGUAGE OF PUBLICATION: English

ABSTRACT:
In April 1976, a multi-disciplinary Jordanian-German team of professional staff began the task of preparing documents for the formulation of a National Water Master Plan of Jordan.
These joined efforts resulted from a technical cooperation agreement between the government of the Hashemite Kingdom of Jordan and the Government of the Federal Republic of Germany.

In line with the objectives of the work, a systematic approach incorporating all the most significant aspects of nationwide water resources planning was adopted, and the documentation now available allows a comparative review of the water resources and water use in Jordan (East Bank). This documentation is based on existing data and information, and incorporates projections taking into consideration development potentials and medium- term (1985) and long-term (2000) development plans. Particular attention was paid to an analysis of Socio- Economic and regional development trends, in order to assess their effects on projections and to facilitate the identification of development priorities in cases where available water resources and their regional distribution constitute constraints.

In this way, the framework and procedures for the formulation of the National Water Master Plan of Jordan (the Plan) have been established. The findings of the studies and reviews - although they have had to be based on a number of estimates and assumptions because of insufficient data sources - were considered to be adequate for realistic first conclusions. Accordingly, recommendations have been drawn up for a nationwide water allocation program. They were intended to be of help in the making of high-level decisions on the policies and strategies to be adopted for the optimum utilization of water resources.

The Plan is in seven volumes:
- Vol. 1 - Main Report
- Vol. 2 - Atlas
- Vol. 3 - Surface Water Resources
- Vol. 4 - Groundwater Resources
- Vol. 5 - Irrigation Water Demand
- Vol. 6 - Domestic/Industrial Water Demand
- Vol. 7 - Socio-Economic Aspects

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Agrar und Hydrotechnik GmbH (Consulting Engineers)
Essen - Germany

AVAILABILITY OF REPORT: Available

37
TITLE: Project of Monitoring Water Quality in King Talal Reservoir
AUTHOR(S): Royal Scientific Society (RSS) / (Environment Research Center)
PUBLISHER:
PAGES: 108
PUBLICATION DATE: April 1990
LANGUAGE OF PUBLICATION: Arabic

ABSTRACT:
This project began in 1980 as a result of an agreement between the Royal Scientific Society (RSS) and the Jordan Valley Authority (JVA). The project aims at monitoring the quality of the water in King Talal Reservoir (KTR).

The monitoring process is implemented by RSS where samples are regularly taken to be tested from the following locations:

1. Inlet to KTR
2. Wadi Rimeimin
3. Middle of KTR
4. Outlet of KTR

In order to monitor the pollution level (if any) of the KTR water and its suitability for irrigation, the samples are tested for their physical, chemical and biological characteristics.

The Royal Scientific Society produces two reports every year to the Ministry of Water and Irrigation (JVA) and the Ministry of Planning who is funding this project in collaboration with RSS.
The project is still ongoing.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Jordan Valley Authority / The Library
Amman - Jordan

Royal Scientific Society (RSS)
Environment Research Center
Amman - Jordan

AVAILABILITY OF REPORT: Available

38
TITLE: A study of the Water Quality of Wadi Arab Dam
AUTHOR(S): Royal Scientific Society (RSS) / (Environment Research Center)
PUBLISHER:
PAGES: 59
PUBLICATION DATE: July 1989
LANGUAGE OF PUBLICATION: Arabic

ABSTRACT:
This study aimed at monitoring the quality of water entering the dam, within its lake and that extracted from it. This involved testing the water samples from those locations to determine their physical, chemical and biological characteristics.

This monitoring program was also essential in order to assess the natural purification tendency of the dam, the extent of eutrophication and the suitability of its water for irrigation use and aquatic life.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Royal Scientific Society (RSS)
Environment Research Center
Amman - Jordan

AVAILABILITY OF REPORT: Available

39
TITLE: Water Supply for the Agricultural Sector
AUTHOR(S): F. Natur
PUBLISHER:
PAGES: 77
PUBLICATION DATE: November 1984
LANGUAGE OF PUBLICATION: English

ABSTRACT:
In this paper, the physical, institutional, economic, financial and informational environments of the water resources systems of Jordan were described. The activities, decisions and policy instruments of the water resources systems were also discussed. Activity analysis and general verbal descriptive modelling was attempted. The model was meant to describe the working system without optimization attempts.

Aggregation was made over the major system components and details were used only as the interaction between the water resources system and the crop production system became more direct.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

F. Natur

AVAILABILITY OF REPORT: Available

40
TITLE: Hydraulic Analysis of the Water System in the Greater Amman Area
AUTHOR(S): Sogreah (Consulting Engineers) in association with Jouzy & Partners and WCS Operations Management
PUBLISHER:
PAGES: 49
PUBLICATION DATE: February 1988
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The main aims of this study were:-
- To provide the Water Authority of Jordan with up to date drawings and exact data of the existing conditions of the system layout in the Greater Amman Area.
- To utilize the obtained data to develop a computer model.
- To conduct a survey of Unaccounted For Water, to prepare a System Optimization and from the gathered information, to assess the rehabilitation required to be done to the system and design new lines required to replace, corroding leaky and undersized pipes.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Water Authority of Jordan / The Library
Amman - Jordan

Sogreah (Consulting Engineers)
Grenoble, France

Jouzy & Partners (Consulting Engineering Bureau)
Tel. (+) 962 - 6 - 662818 / 663902
Fax. (+) 962 - 6 - 682984
P.O. Box 9112
Amman 11191 Jordan

WCS Operations Management
Bedford - UK

AVAILABILITY OF REPORT: Available

41
TITLE: Zarqa River Basin Project (Feasibility Study Report)
AUTHOR(S): Agrar und Hydrotechnik GmbH (Consulting Engineers)
PUBLISHER:
PAGES: 884 (Four Volumes)
PUBLICATION DATE: September 1986
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This feasibility report formed part of a general technical assistance agreement between the Government of the Hashemite Kingdom of Jordan (Ministry of Agriculture) and the Government of the Federal Republic of Germany (GTZ).

The project have been divided into three separate sub-projects complementing each other. Each project contributed to the overall project purpose of reducing soil erosion and fostering safe land use principles in the Lower Zarqa River Catchment Area (LZC).

These sub-projects were as follows:-
- "Safe Land Use Program" - Sub-project 1.
  This sub-project involved the construction of structural soil conservation measures together with recommended land use changes / improvements covering the existing and future farm activities.
- "Forestry and Range Development" - Sub-project 2.
  This sub-project aimed at accelerating and expanding the activities of the department of Forests and Range to include the existing oak and pine forests as well as the bare lands.
- "Erosion Control in Wadis and Road Rehabilitation: - Sub-project 3.
  This sub-project was concerned with bank protection of the Zarqa River and its main tributaries in the LZC, as well as the rehabilitation of some existing roads.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Agrar und Hydrotechnik GmbH (Consulting Engineers)
Essen - Germany

AVAILABILITY OF REPORT: Available

42

TITLE: Zarqa - Russeifa Water Distribution, Sewerage and Storm Water Systems
AUTHOR(S): Malcolm Pirnie, Inc. in association with Jouzy & Partners (Consulting Engineering Bureau)
PUBLISHER:
PAGES: 436
PUBLICATION DATE: 1980
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The report consisted of five volumes which comprised a feasibility study for the Water Distribution, Sewerage, and Storm Water Systems Improvements. The five volumes are:-

- Vol. 1- Summary report.
- Vol. 2- Investigations, Preliminary Engineering Design, Financial and Socio-Economic Analysis Report.
- Vol. 3- Industrial Effluents Treatment Report.
- Vol. 4- Appendix to the Investigations Preliminary Engineering Design, Financial and Socio-Economic Analysis Report.
- Vol. 5- Map Atlas for the Investigations, Preliminary Engineering design, Financial and Socio Socio-Economic Analysis.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Malcolm Pirnie, Inc. (Consulting Environmental Engineers)
Telex : 21381 Jouzy Jo
P.O. Box 9112
Amman - Jordan

Jouzy & Partners (Consulting Engineering Bureau)
Tel. (+) 962 - 6 - 662818 / 663902
Fax. (+) 962 - 6 - 682984
P.O. Box 9112
Amman 11191 Jordan

AVAILABILITY OF REPORT: Available

43

TITLE: Municipal Water Distribution Improvements and Sewerage and Stormwater Drainage Systems in Madaba, Karak, Tafila and Ma'an
AUTHOR(S): MBC (A Joint Venture), James M. Montgomery (Consulting Engineers) Inc., Brown and Caldwell (Consulting Engineers) in association with Consulting Engineering Center (CES)
PUBLISHER:
PAGES:
PUBLICATION DATE: June 1981
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The objective of this project was to provide feasibility studies, final design and supervision of construction of the Municipal Water Distribution Improvements and Sewerage and Storm Water Drainage systems in Madaba, Karak, Tafila and Ma'an.

The general objective of the feasibility study was to evaluate the existing and future conditions of water, wastewater and stormwater facilities in the target cities of the project, in order to improve those facilities. The study also investigated the Socio-Economic conditions and the public health conditions in the cities concerned.
A separate report was prepared for each of the four project cities.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

MBC (A Joint Venture)
James M. Montgomery (Consulting Engineers) Inc.
Brown and Caldwell (Consulting Engineers)
Consulting Engineering Center (CES)
Tel. : (213) 796 - 9141
250 N. Madison Ave.
Pasadena, California 91101
USA

Tel. : 41735
P.O. Box 3351
Amman - Jordan

AVAILABILITY OF REPORT: Available

44
TITLE: Al Wehdah Dam Project
AUTHOR(S): J. Barry Cooke
Horst Papenfuss
John Newberry
Ivor L. Pinkerton
PUBLISHER:
PAGES: 23
PUBLICATION DATE: June 1988
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The Al Wehdah Dam Project is a part of the Jordan Valley Irrigation project, which provides water supply for irrigation in the Jordan Valley and the Yarmouk Triangle, municipal and industrial (M&I) use in and around Amman and Irbid, and also generates electricity.

The main features of the project were:-
- Diversion Tunnel located on the right bank (Syrian Shore).
- Dam : Gross storage capacity of 225 million cubic meters.
- Spillway.
- Irrigation Tunnel.
- Power Plant containing two generating units and have a rated capacity of 8.0 MW (approximately).

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Jordan Valley Authority / The Library
Amman - Jordan

J. Barry Cooke
1050 Northgate Dr., Suite 300,
San Rafael, CA 94903
Tel. : (415) 479 - 6151
Telex : 6714067 JBC UW
Fax : (415) 479 - 5064
USA

Horst Papenfuss
Lyoner St. 22,
D-6000 Frankfurt / Main
Tel. : (69) 6677255
Telex : 413478 LI D
Fax : (69) 6677 - 571, 572
Germany

John Newberry
19 Broomfield Ride,
Oxshott, Surrey KT 22 OLP,
Tel. : 0372 - 842266
Telex : 929333 HH LHD G
Fax : 0372 - 377605
United Kingdom

Ivor L. Pinkerton
Tel. : (062) 583266
Telex : AA 62085 TXT COM
Fax : 61 - 62 - 731 792
14 Meithke Place Flynn,
Canberra ACT 2615,
Australia

AVAILABILITY OF REPORT: Available

45
TITLE: Range Rehabilitation in the Eastern Low Rainfall Areas
AUTHOR(S): United Nations Environment Program Mission (U.N.E.P)
PUBLISHER:
PAGES: 63
PUBLICATION DATE: December 1983
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The report discussed the low rainfall areas, their importance, the Jordanian Government's concern for these areas, and the problems of development encountered. The report included a description of the existing situation, an analysis of constraints to development, and other issues and sectoral considerations.

Strategic guidelines to development and national planning are discussed in the light of the need for a development strategy for the low rainfall area.

A description of sectoral components and recommendations which were made for a long-term multi-faceted strategy leading to rational range management plan is also covered by the report.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

United Nations Environment Program Mission (U.N.E.P)

AVAILABILITY OF REPORT: Available

46
TITLE: Immediate Relief of Overloaded Conditions at Ain Ghazal Sewage Treatment Plant Utilizing the Waste Stabilization Ponds Method (Investigation Report)
AUTHOR(S): JMM / DMJM (A Joint Venture) in association with Consulting Engineering Center (CEC)
PUBLISHER:
PAGES: 160
PUBLICATION DATE: May 1982
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This investigation report provided the engineering feasibility investigations, conclusions, and the technical aspects of the immediate relief project.

In order to provide relief from the overloaded condition as rapidly as possible, the Amman Water and Sewerage Authority had elected to pursue waste stabilization pond treatment as an interim measure.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

JMM / DMJM (A Joint Venture)
Tel. : 213 - 796 - 9141
Telex : 67 - 5420
555 E. Walnut Street,
Pasadena, California 91101
USA

Consulting Engineering Center (CEC)
Tel. : 24951
Telex : 1350 RAJA Jo
P.O. Box 2293
Amman - Jordan

AVAILABILITY OF REPORT: Available

47
TITLE: Wastewater Disposal and Stormwater Drainage for City of Salt
AUTHOR(S): Scan Plan Coordinator A/S, Jouzy & Partners (Consulting Engineers Bureau)
PUBLISHER:
PAGES: 64
PUBLICATION DATE: December 1975
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This report was based on the recommendations presented in the preliminary report and the draft final design, which was approved by the National Planning Council for the design of the Sewerage and the Storm Water systems for the city of Salt.

The sewerage and storm drainage facilities were planned to serve the entire municipal areas for the next forty years starting from the date of commissioning of the system (1980).

The report also included cost analysis for the entire project.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Scan Plan Coordinator A/S
Tel. : 292522
3 Sankt Kjelds Gade,
DK - 2100 Copenhagen,
Denmark

Jouzy & Partners (Consulting Engineers Bureau)
Tel. (+) 962 - 6 - 662818 - 663902
Telex : 21381 Jouzy Jo
P.O. Box 9112
Amman 11191 Jordan

AVAILABILITY OF REPORT: Available

48
TITLE: Water Balance Study in Azraq Area
AUTHOR(S): U. Mudallal / Natural Resources Authority
PUBLISHER:
PAGES: 82
PUBLICATION DATE: December 1967
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This investigation aimed at:

- Evaluating the water potential and calculating the groundwater recharge into the study area.
- Detecting the area of regional recharge and direction of water movement.
- Determining the aquifers characteristics and delineating the aquifers extensions.

This study also evaluated the previous works done in the area, and previous results and recommendations in view of the recent hydrological studies and additional data obtained.

Additionally the study determined the hydrogeological interrelationships of the study area with the adjacent areas in order to recommend the best scheme for utilizing the maximum surface and groundwater without upsetting the groundwater balance and causing serious hydrological problems.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

U. Mudallal
Natural Resources Authority (NRA)
Department of Research and Investigation
Groundwater Division
Amman - Jordan

AVAILABILITY OF REPORT: Available

49
TITLE: Development of the Aqaba Coastline (Hydrogeological Survey of the South of Aqaba)
AUTHOR(S): Jordan Office for Geological and Engineering Services, Doxiadis Associates
PUBLISHER:
PAGES: 66
PUBLICATION DATE: September 1967
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The work described in this report was directed to understand the geologic and hydrologic characteristics of the area as pre-requisites for the evaluation of the groundwater recharge and storage, this being an indicator of the degree of the development that could be achieved in the area. A soil survey was conducted to investigate the feasibility of planting light green belt of trees in the area. The sea coast was investigated for the availability of recreational beaches.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Jordan Office for Geological and Engineering Services
Amman - Jordan

Doxiadis Associates
Athens 136,
Greece

AVAILABILITY OF REPORT: Available

50
TITLE: Water Supply Corporation West of Swaqa-Qastal Line (Feasibility Study)
AUTHOR(S): Satari Consulting Office
PUBLISHER:
PAGES: 111
PUBLICATION DATE: May 1981
LANGUAGE OF PUBLICATION: English

ABSTRACT:
A general study for the west of Swaqa-Qastal area that included population estimates within the area until the year 2000 and the total quantity of water required. The study also involved an investigation of the sources of water available in the area (springs and boreholes) and their yields.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Satari Consulting Office
TEL. 37263
P.O. Box 921417
Amman - Jordan

AVAILABILITY OF REPORT: Available

51
TITLE: Yarmouk River Development, Irbid Water Supply (Feasibility study)
AUTHOR(S): Crown Agents Water Supply Corporation
PUBLISHER:
PAGES: 319
PUBLICATION DATE: January 1977
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The study was essentially concerned with a supply scheme that would terminate at a new service reservoir to be built 3 km north of Irbid. Therefore, it examined the feasibility of taking water from the River Yarmouk and pumping it, after treatment with chemical coagulation followed by settlement and/or filtration with final sterilization and pH adjustment before discharging into a contact and balancing tank at the works.

Three possible levels of future water demand were analyzed and presented in the form of high, intermediate and low demand projections.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Crown Agents
4 Millbank,
London SW1P 3JD

Water Supply Corporation
P.O. Box 5012
Amman - Jordan

AVAILABILITY OF REPORT: Available

52
TITLE: Monitoring and Evaluation of the Amman - Zarqa Aquifers
AUTHOR(S): Howard Humphreys Ltd. (Consulting Engineers)
PUBLISHER:
PAGES: 156
PUBLICATION DATE: 1983
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The report defined the situation of the carbonate aquifers of Amman - Zarqa in 1983 and their relationship to the surface flows of the Seil Zarqa. It examined the possibility of augmenting the available supplies from the Hummer aquifer by artificial recharge of secondary effluent from Ain Ghazal and commented on the need to render the Amman - Wadi Sir aquifer and the Seil Zarqa free of population. The report investigated the potential for exploitation of the Kurnub sandstone and other deep aquifers and forward recommendations for exploration by boreholes. Additionally, proposals for a program of monitoring of the flows of Seil Zarqa and of the hydrochemical and hydrogeological parameters of the aquifers were also included in the report.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Howard Humphreys Ltd. (Consulting Engineers)
P.O. Box 950437
Amman - Jordan

AVAILABILITY OF REPORT: Available

53
TITLE: Water Treatment and Water Resources Planning
AUTHOR(S): Thames Water International
PUBLISHER:
PAGES: 182
PUBLICATION DATE: June 1988
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The main objective of this study was primarily to provide a review of the sources of water supply in Amman, the water treatment process and to develop a long term strategy for water resources.

The produced report was in two volumes:
- Volume one dealt mainly with water quality and treatment.
- Volume two dealt with reviewing the demand for water in Jordan. It also contains a summary of groundwater resources and a review of the alternative strategies to meet projected demand from available sources and the likely costs. A hydrogeological study was also prepared as an appendix to this volume.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Thames Water International
Nugent House, Vastern Road,
Reading, RG1 8DB
United Kingdom

AVAILABILITY OF REPORT: Available

54
TITLE: Mujib and Southern Ghors Irrigation Project
AUTHOR(S): Binnie & Partners (Consulting Engineers)
PUBLISHER:
PAGES: 127
PUBLICATION DATE: February 1976
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This project comprised of a study of water sources on the east side of the Dead Sea, a study of the transfer of water to the best lands for irrigation and agricultural production, and the design of systems for conveyance and use of the available water.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Binnie & Partners (Consulting Engineers)
Tel.: 01 - 222 7755
Telex: 24552
Artillery House, Artillery Row,
Westminster,
London SW1P 1RX

AVAILABILITY OF REPORT: Available

55
TITLE: Technical and Economic Feasibility Study for the Development of Rainfed Agriculture in the Amman Governorate of the Hashemite Kingdom of Jordan
AUTHOR(S): Arab League, Arab Organization for Agricultural Development (AOAD)
PUBLISHER:
PAGES: 351
PUBLICATION DATE: 1977
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This study was carried out to evaluate the economic and technical feasibility to develop the Amman Governorate. The study was concerned with the natural, human, and economic resources available in order to arrive at the most suitable methods for best exploitation of those resources in the project area. The study also attempted to recognize the difficulties and constraints that may be / have been arising in the way of maximizing agricultural production and suggested means to overcome and handle such difficulties, thus leading to higher economic returns.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Arab League, Arab Organization for Agricultural Development (AOAD)

AVAILABILITY OF REPORT: Available

56
TITLE: Water Quality in Jordan, (Springs)
AUTHOR(S): Natural Resources Authority / (Water Resources Development Directorate) / (Water Quality and Pollution Control Division)
PUBLISHER:
PAGES: 256
PUBLICATION DATE: February 1979
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This report contains records of chemical analysis of spring flow in Jordan. It should serve as basis for determining the suitability of water for various uses and to meet other interim requirements.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Natural Resources Authority / The Library
Water Resources Development Directorate
Water Quality and Pollution Control Division
Amman - Jordan

AVAILABILITY OF REPORT: Available

57
TITLE: Wadi Arab Dam and Irrigation Project
AUTHOR(S): Japan International Cooperation Agency (JICA)
PUBLISHER:
PAGES: 388
PUBLICATION DATE: November 1976
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The study aimed at the assessment of technical and economic feasibility of the project giving due consideration to its integration with the Northeast Ghor Irrigation and Rural Development Project.

The study covered the following aspects:
- Metero-hydrological survey and analysis.
- Topographic survey on dam site, reservoir area, quarry site and borrow area, and along the proposed alignment of carrier pipe.
- Dam material survey and soil mechanic tests and analysis of the results.
- Pedagogical survey, tests and analysis of the results.
- Establishment of agricultural production plan, land use plan, irrigation and drainage plan.
- Preliminary design and cost estimates of dam and related structures, irrigation and drainage system, and roads.
- Estimation of project benefits and economic evaluation of the project.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Japan International Cooperation Agency (JICA)
Tokyo - Japan

AVAILABILITY OF REPORT: Available

58
TITLE: Wadi Arab Dam-Raising Project (Report on Feasibility Study)
AUTHOR(S): Nippon Koei Co., Ltd. (Consulting Engineers)
PUBLISHER:
PAGES:
PUBLICATION DATE: January 1982
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This Feasibility Study on the Wadi Arab Dam-Raising Project consists of the following major items:
1. Site reconnaissance to principal structure sites.
2. Collection and review of existing data necessary for study of the project.
3. Determination of optimum scale and layout of the raising plan of the Wadi Arab dam.
4. A feasible design of the raised-dam and its appurtenant structures.
5. Estimates of construction cost, technical and economical viability of the project.

As a result of this study, it was concluded that this project is technically and economically sound, and financially feasible.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Jordan Valley Authority / The Library
Amman - Jordan

Nippon Koei Co., Ltd. (Consulting Engineers)
4, Kojimachi, 5 - Chome,
Chiyoda - Ku,
Tokyo - Japan

AVAILABILITY OF REPORT: Available

59
TITLE: Water Resources Study on the Jafr Basin
AUTHOR(S): Japan International Cooperation Agency (JICA)
PUBLISHER:
PAGES: 107
PUBLICATION DATE: March 1990
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This report consists of three volumes; a Summary Report, a Main Report which comprises the result of the water resources potential study in the upper Hasa and Jafr basin. The computer simulation study indicates that it is worth to develop the water resources in two aquifers such as "Amman - Wadi Sir" and "Lower Ajlun", and a Supporting Report containing the analysis and discussions in the sector of surface hydrology and groundwater to support the main report.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Water Authority of Jordan / The Library
Amman - Jordan

Japan International Cooperation Agency (JICA)
Tokyo - Japan

AVAILABILITY OF REPORT: Available

60
TITLE: Studies of Raising Kafrein Dam
AUTHOR(S): Salzgitter Consult GmbH in association with Jordanian Consulting Engineer Co.
PUBLISHER:
PAGES: Four Parts
PUBLICATION DATE: May 1992
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This study report concerning the Raising of the Kafrein Dam contains four parts:

- Part I : Covers a summary of the project, conclusions and recommendations.
- Part II : Contains geotechnical and seepage investigation programs, studies of water resources in the project area as well as irrigation water demand studies. A financial and economic evaluation and an environmental impact study are also included.
- Part III : Includes reservoir operation studies, preliminary design and cost estimates.
- Part IV : Site investigation report.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Jordan Valley Authority / The Library
Amman - Jordan

Salzgitter Consult GmbH

Jordanian Consulting Engineer Co.

AVAILABILITY OF REPORT: Available

61
TITLE: National Project Study of Water Quality in Jordan (Annual Report)
AUTHOR(S): Royal Scientific Society (RSS) / (Environment Research Center)
PUBLISHER:
PAGES: 123
PUBLICATION DATE: September 1991
LANGUAGE OF PUBLICATION: Arabic

ABSTRACT:
This project, considered to be the first of its kind in Jordan, was concerned with monitoring the quality of water all over the Kingdom except for Aqaba. The project commenced in 1986 to stretch over the following five years from that date.

Throughout the project period, the quality of the following types of water were monitored:
1. Industrial Wastewater
2. Treated Wastewater Effluents
3. Water in streams and dams outlets
4. Bottled mineral water

Samples were taken from different locations of concern and analyzed in special laboratories. Results of tests along with recommendations were filed to the Environmental Department of the Ministry of Municipal and Rural Affairs.

This report also contains a summary of the results and recommendations concerning the water quality monitoring results over the period of five years between 1986-1990.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Royal Scientific Society (RSS)
Environment Research Center
Amman - Jordan

AVAILABILITY OF REPORT: Available

62
TITLE: National Project Study of Water Quality in Jordan (Annual Report)
AUTHOR(S): Royal Scientific Society (RSS) / (Environment Research Center)
PUBLISHER: Royal Scientific Society (RSS) and Ministry of Municipal & Rural Affairs (MMARA)
PAGES: 118
PUBLICATION DATE: September 1995
LANGUAGE OF PUBLICATION: Arabic

ABSTRACT:
This project is considered one of the leading ones in Jordan concerning the monitoring of water quality throughout the Kingdom.

The project period was originally between 1986-1990. However, three one-year extensions were made, and this annual report covers the eighth year of the project where some water resources in Aqaba have become included in the national monitoring program.

This report includes analytical results of water samples acquired from several locations in Jordan:
1. King Abdulla Canal
2. Dams and Reservoirs
3. Gulf of Aqaba
4. Drinking Water in the City of Aqaba
5. Aqaba Wastewater Treatment Plant
6. Water of Palm Forest Well

The report also provides evaluation and discussion of the analysis of those samples, conclusions and recommendations regarding the water quality in the above locations.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Royal Scientific Society (RSS)
Environment Research Center
Amman - Jordan

Ministry of Municipal & Rural Affairs (MMARA)
Amman - Jordan

AVAILABILITY OF REPORT: Available upon permission from (RSS & MMARA)

63
TITLE: The Study and Design of Tannur Dam
AUTHOR(S): Howard Humphreys & Partners (Consulting Engineers) in association with Studio Pietrangeli, and Consulting Engineering Center (Sajdi & Partners)
PUBLISHER:
PAGES:
PUBLICATION DATE: November 1993
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This study report investigates the technical, economic and financial feasibility of building the Tannur Dam to store flood flows in the Wadi Hasa. The construction of this dam is one of the projects allocated for in The Economic and Social Plan (1993 - 97).

Three types of potential demand for the water from Tannur Dam were discussed in this report:
- Industrial
- Agricultural (in the Southern Ghors)
- Municipal

The report also contains hydrological and geological studies of Wadi Hasa area, Dam engineering construction details, an Environmental Impact Assessment of the project as well as project cost estimates and benefits analysis.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Jordan Valley Authority / The Library
Amman - Jordan

Howard Humphreys & Partners (Consulting Engineers)
Tel. : (+) 44 3723 76190
Thorncroft Manor, Dorking Road,
Leatherhead, Surrey KT22 8TB,
England

Studio Pietrangeli
Rome - Italy

Consulting Engineering Center (Sajdi & Partners)
Fax. : (+) 962 - 6 - 662827 / 661251
P.O. Box 8180
Amman - Jordan

AVAILABILITY OF REPORT: Available

64
TITLE: Dams on Wadi Wala and Wadi Mujib
AUTHOR(S): Howard Humphreys & Partners (Consulting Engineers) in association with Studio Pietrangeli and Masar
PUBLISHER:
PAGES: 18
PUBLICATION DATE: May 1991
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This study covered all aspects of the Mujib Basin and in particular hydrogeology and selection of suitable dam sites. It comprises of three volumes and a summary report:

- Volume 1 : Technical, Economic and Financial Feasibility Report.
- Volume 2 : Preliminary Design.
- Volume 3 : Site Investigation.

The study concluded that the Wala dam should not be constructed as it appears to be economically not viable, with a cost ratio of less than unity. However, the Mujib development was seen as technically less risky than Wala since reservoir losses are likely to be relatively low. The greatest single technical challenge, reservoir slope stability is considered to be manageable.

A supplementary study report presented by the same agency concerning the construction of dams on Wadi Wala and Wadi Mujib conducted in May 1994, concluded that the development of water resources of Wala and Mujib forms an essential element of an integrated regional water resource program that would provide water for the Southern Ghors as well as Amman. The report also stated that these water supplies were essential for industrial and agricultural expansion which would provide valuable employment opportunities. The unit cost of water would be inevitably expensive, but nevertheless cheaper than the Disi wellfield and desalinated water. That study, hence recommended that the Jordan Valley Authority proceed with the implementation of the project.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Masar
P.O. Box 5278
Amman - Jordan

Howard Humphreys & Partners (Consulting Engineers)
Tel. : (+) 44 3723 76190
Thorncroft Manor, Dorking Road,
Leatherhead, Surrey KT22 8JB,
England

Studio Pietrangeli
Rome - Italy

AVAILABILITY OF REPORT: Available

65
TITLE: Groundwater Artificial Recharge in Jordan
AUTHOR(S): Prof. Dr. E. Salameh, Assist. Prof. Dr. O. Rimawi, Eng. H. Bannayan
PUBLISHER:
PAGES:
PUBLICATION DATE: April 1991
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This study was mainly concerned with artificially recharging water into two sites in Jordan. The first site is at the Muwaqqar area / Central Jordan, lying in the 150-200 mm/yr precipitation zone and the other in the northern Jordan Valley area with 200-300 mm precipitation per year. The study involved an evaluation of the recharge techniques and their efficiency in quantitative and qualitative terms in order to achieve an efficient groundwater management.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

University of Jordan
Water Research and Study Center
Amman - Jordan

AVAILABILITY OF REPORT: Available

66
TITLE: Strategies on Use of Water from Al - Wehda Dam and Mukheiba
AUTHOR(S): National Committee / Ministry of Water and Irrigation
PUBLISHER:
PAGES:
PUBLICATION DATE: August 1988
LANGUAGE OF PUBLICATION: Arabic

ABSTRACT:
This report aimed mainly at delineating the main water resources in the Yarmouk Basin and North Jordan Valley area, and presenting the potential alternatives for their use and conveyance to the consumers according to the drinking water demands in Irbid, Mafraq, Amman, Zarqa and Balqa Governorates. The water quantities needed for the main irrigation projects in the Jordan Valley were also taken into consideration.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

National Committee
Ministry of Water and Irrigation
Amman - Jordan

AVAILABILITY OF REPORT: Available

67
TITLE: Water Quality in Jordan (Investigation Report)
AUTHOR(S): Japan International Cooperation Agency (JICA), Ministry of Health and Welfare / (Water Supply and Environmental Sanitation Department)
PUBLISHER:
PAGES: 124
PUBLICATION DATE: 1985
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This investigation was carried out to evaluate the quality of water in Jordan in conjunction with the Zay Water Purification Plant. The Study investigated various characteristics of the water quality along the East Ghor Canal; forming the source of water for the Zay Plant.

Sample analysis throughout the investigation indicated heavy contamination between Wadi Yabis and Deir Alla, deriving from vigorous human and agricultural activities in the region.

The report suggested several alternatives, and means for the purification of the water obtained from the Zay Plant so that it could be safely consumed by the people in Jordan.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Japan International Cooperation Agency (JICA)
Tokyo - Japan

Ministry of Health and Welfare
Water Supply and Environmental Sanitation Department
Amman - Jordan

AVAILABILITY OF REPORT: Available

68
TITLE: Water Resources and Water Use in Jordan (A seminar Paper)
AUTHOR(S): Dr. O. Judeh
PUBLISHER:
PAGES: 55
PUBLICATION DATE: September 1985
LANGUAGE OF PUBLICATION: Arabic

ABSTRACT:
This paper had been prepared on behalf of the Water Authority of Jordan (WAJ) for the Seminar on "Water Resources and Water Use in the Arab World", held in Kuwait in December 1986.

The paper mainly discussed groundwater and surface water resources in Jordan as well as unconventional water resources. The paper also investigated the problems encountered by the Water Sector in Jordan. A review of water demands and uses and a presentation of the implemented projects between 1970-1980 was also presented in the paper.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Water Authority of Jordan / The Library
Dr. O. Judeh
Amman - Jordan

AVAILABILITY OF REPORT: Available

69
TITLE: Alternatives to the Use of Water from Mujib Area
AUTHOR(S): Jordan Valley Authority
PUBLISHER:
PAGES: 21
PUBLICATION DATE: December 1984
LANGUAGE OF PUBLICATION: Arabic

ABSTRACT:
This paper contains a summary of the analysis of the available alternatives to the use of water from Al-Mujib area for irrigation purposes for the Southern Ghor Project - Stage II. The analytical study concluded that it is not economically feasible to convey water from Mujib to the Southern Ghors. Rather, it seemed more feasible to transfer water from Mukheiba.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Jordan Valley Authority / The Library
Amman - Jordan

AVAILABILITY OF REPORT: Available

70
TITLE: Water Situation in Jordan and the Proposed Water Policy Until the Year 2000
AUTHOR(S): Water Authority of Jordan (WAJ)
PUBLISHER:
PAGES: 45
PUBLICATION DATE: April 1985
LANGUAGE OF PUBLICATION: Arabic

ABSTRACT:
This paper contains an overview summary of preceding studies related to water resources in Jordan. It then summarizes the available water resources; groundwater, surface water and the possibility of the development of such resources to conform with the economic and social development in the country.

The paper proposes the main features of a water policy in Jordan and suggests methods for its implementation based on a water balance until the year 2000.

The paper also contains graphical presentation of water needs in all sectors and proposes a strategy for optimum use and distribution of the water resources in order of priority throughout the Kingdom.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Water Authority of Jordan / The Library
Amman - Jordan

AVAILABILITY OF REPORT: Available

71
TITLE: An Assessment of Groundwater Resources in Mughayer Jaber - Mughayer Sirhan - Um Es-Serab Area
AUTHOR(S): Dr. A. A. Wishah
PUBLISHER:
PAGES: 72
PUBLICATION DATE: June 1979
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The study area in this report, consisted of Jaber Sirhan, Jaber Mughayer, and Um Es-Serab areas, being a part of the great Sama Sdoud area (367 km2) located in the northern part of Jordan.

A water-level contour map and a flow-net analysis were prepared for the study area, and indicated that the recharge area is located in the north-east and is thought to be Djabal Druze which is the main source of the groundwater.

The temporary storage in the study area was found to be about 5 MCM per annum, whereas the total storage is about 236 MCM. However, the total annual discharge of the area is about 7 MCM, which is more than the total annual recharge of the area (about 6 MCM). This was indicated by the decline of the water table in the study area.

The study recommended that additional drilling activities should be discontinued and control of the amount of water extracted be enforced using water meters. Furthermore, in order to accumulate additional hydrogeological data and manage the exploitation of groundwater in the area, it was recommended to make continuous observation of the water table and the water quality.

Additionally, it was concluded that the traditional irrigation method used in the area should be replaced by a more water saving method such as drip irrigation. This could allow for additional drilling of new wells, since most of the extracted water is used for irrigation.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Natural Resources Authority / The Library
Amman - Jordan

AVAILABILITY OF REPORT: Available

72
TITLE: Land and Water Policies in the Middle East
AUTHOR(S): Dr. M. Haddadin, Regional Office for Integrated Development.(ROID)
PUBLISHER:
PAGES: 48
PUBLICATION DATE: October 1994
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This paper has been presented at the Economic Summit for the Middle East and North Africa in Casablanca - Morocco, in October 1994.

The paper included a general overview of the land and water resources and their policies in the region. It also touched on regulatory measures, water pricing, legislation and international waters.

The development of land and water resources in Jordan was then further discussed as a case study within the paper.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

M. Haddadin
Regional Office for Integrated Development (ROID)

AVAILABILITY OF REPORT: Available

73
TITLE: Water Quality of Dams in Jordan
AUTHOR(S): University of Jordan / (Water and Environment Research and Study Center)
PUBLISHER:
PAGES: 118
PUBLICATION DATE: December 1992
LANGUAGE OF PUBLICATION: Arabic & English

ABSTRACT:
In this study the impacts of collecting water in a dam on the quality of the impounded water from physical, chemical and biological aspects were assessed. The dams chosen for this study were:

- King Talal Dam
- Wadi El - Arab Dam
- Zeqlab Dam
- Shueib Dam
- Kafrain Dam

Water samples were collected from the inlet, outlet, the surface, at every 10m depth, depending on the depth of water in the reservoir, and the bottom of each reservoir. Samples were preserved according to the Standard Methods of Water Analysis (1986) and brought back to the laboratory for analysis.

On-site analysis and measurements included: Electric Conductivity (EC), pH, Temperature, Dissolved Oxygen (DO), Hydrogen Sulfide (H2S), Ammonia (NH4), and Light Intensity.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

University of Jordan
Water and Environment Research and Study Center
Amman - Jordan

AVAILABILITY OF REPORT: Available

74
TITLE: Jordan's Water Sector "Water Use, Conservation, Utilization and Management in Jordan"
AUTHOR(S): Dr. H. El-Naser and Z. Elias / Ministry of Water and Irrigation
PUBLISHER:
PAGES: 32
PUBLICATION DATE: 1993
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This paper was presented in the "Regional Symposium On Water Use And Conservation" held in Amman between 28th November - 2nd December 1993, and organized by ESCWA, WHO (CEHA) and UNEP.

The paper contained an overview of the groundwater and surface water resources in Jordan and water use in general within the different sectors; municipal, industrial and irrigation.

The paper also discussed the wastewater treatment in terms of facilities available, costs and reuse efficiency. It then discussed the water demand projection and suggested some demand - management methods in order to face future challenges and required future supply in Jordan.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

H. El-Naser and Z. Elias
Ministry of Water and Irrigation
P.O. Box 2412
Amman - Jordan

AVAILABILITY OF REPORT: Available

75
TITLE: East Bank Jordan Water Resources
AUTHOR(S): Hunting Technical Service Ltd., Sir M. Macdonalds & Partners (Consulting Engineers)
PUBLISHER:
PAGES: Six Volumes
PUBLICATION DATE: 1965
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The purpose of the survey of the East Bank Jordan area was to establish by geological, hydrological and engineering surveys the sources of both groundwater and surface water supplies in the project area and to make proposals for their development.

This report summarizes the outcome of the Geological Survey and Engineering Investigations which were carried out during the period September 1962 to November 1964 on the Water Resources of the East Bank Jordan area. The report also included Water Resources Survey of the Zarqa District and Investigation of the East Bank Main Wadis, and Water Resources Survey of the North-East Bank Jordan area and Investigation of the Main Wadis. The survey covered the geology and groundwater studies of the North-Eastern Jordan Area from the River Yarmouk to Madaba.

The Engineering Studies for development of irrigation, storage and hydro-power on the main Wadis were extended to include, in addition to this area, the southern Wadis outfalling into the Dead Sea.

The study comprises six volumes:
- Vol. 1 : Summary Report.
- Vol. 2 : East Ghor Side Wadis.
- Vol. 3 : Southern Wadis.
- Vol. 4 : Part I - Hydrology and Sediment. Part II - Floods.
- Vol. 5 : Spring Development. (Appendix A - Class One Project, Appendix B - Inventory of Springs)
- Vol. 6 : Part I - Hydrogeology, Part II - Recharge, Part III - Maps, Appendix - Stratigraphic Micropaleontology, and Geological Maps and Sections.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Hunting Technical Services Ltd.
6E1 Street Way,
Boreham Wood, Hertfordshire,
England

Sir M. Macdonalds & Partners (Consulting Engineers)
Lion House, Red Lion Street,
London, W. C. 1

AVAILABILITY OF REPORT: Available

76
TITLE: Groundwater Resources of Northern Jordan
AUTHOR(S): Water Authority of Jordan (WAJ)
Federal Institute for Geoscience and Natural Resources
Bundesanstalt Fur Geowissenschaften Und Rohstoffe (BGR)
PUBLISHER:
PAGES: Five Volumes
PUBLICATION DATE: November 1994
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The main objective of the project was to strengthen the Water Authority of Jordan by Improving the self-reliance of the staff of the Water Resources Studies Department in the preparation of modern planning instrument and documents in the groundwater sector.

One of the main project tasks was the assessment of the groundwater resources of the Northern Jordan. This included an improvement of the hydrogeological data base, the preparation of thematic maps on all important aspects of Hydrogeology, the preparation of other documents relevant to the assessment and exploitation of the groundwater resources, and the preparation of groundwater models.

The project study area for the assessment of the groundwater resources of Northern Jordan included the areas between the Jordan Valley in the west to the borders with Iraq and Saudi Arabia in the east and from the Syrian border in the north to latitude 070 N (Palestine Grid) in the south. The important surface water catchment in that area included the Jordan Valley with its eastern side catchment, the Yarmouk and the Zarqa River Basin, the northern part of the Mujib Basin, as well as the Azraq Basin and the Jordanian part of the Hamad Basin (Risha area). The project approach to an overall assessment of the hydrogeological situation in Northern Jordan comprised studies of all the major aquifers and aquitards and the interrelationship between different aquifer basin and hydrogeological units.

The study comprised of the following reports:
- Vol. 0 : Advisory Services to the Water Authority of Jordan in the Field of Hydrogeology Summary Results.
- Vol. 1 : Rainfall, Springs and Baseflow.
- Vol. 2 : Groundwater Monitoring, Groundwater Abstraction.
- Vol. 3 : Structural Features of the Main Hydrogeological Units in Northern Jordan.
- Vol. 4 : Hydrogeological Features of Northern Jordan.
- Vol. 5.1 : Three - Dimensional Groundwater Flow Model of Northern Jordan.
- Vol. 5.2 : Well Field Models in Northern Jordan.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Water Authority of Jordan / The Library
Amman - Jordan

Federal Institute for Geoscience and Natural Resources
Hanover - Germany

Bundesanstalt Fur Geowissenschaften Und Rohstoffe (BGR)
Hanover - Germany

AVAILABILITY OF REPORT: Available

77
TITLE: Groundwater Resources of Southern Jordan
AUTHOR(S): Bundesanstalt fur Geowissenschaften Und Rohstoffe (BGR), H. Manfred
PUBLISHER:
PAGES: Five Volumes
PUBLICATION DATE: June 1991
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The project was aimed at the elaboration of basic information for planning and management of groundwater abstraction and the presentation of the results in hydrogeological thematic maps.

The project aims included:
- Preparation of a synopsis of the groundwater resources of Hasa, Jafr and Disi basins (based on the evaluation of existing hydrogeological studies and data), and the presentation of the results in maps.
- Definition of existing gaps in knowledge, and proposing means to close them.
- Setting up of a hydrogeological data bank for Southern Jordan.
- First calculation of a three-dimensional hydraulic model of southern Jordan which takes all major aquifers in the entire area into consideration.
- Preparation of a detailed groundwater flow model for the well fields in the Siwaqa/Qatrana / Wadi Hasa area (originally planned as a separate project).
- Reconnaissance survey of the Wadi Sirhan area.

The main project activities involved the following:
- Evaluation of existing reports and relevant data.
- Hydrogeological inventory, setting up of a data bank.
- Hydrogeological data interpretation.
- Representation of results in maps.
- Setting up of hydraulic models.
- Model simulation.
- Interpretation of results.
- Definition of relevant gaps in knowledge.
- Recommendations for future investigations.

This study comprises five volumes:
- Vol. 1 : Main Report.
- Vol. 2 : General Maps.
- Vol. 3 : Hydrogeological Data Base and Hydrochemical Data.
- Vol. 4 : Groundwater Model Investigations (Figures).
- Vol. 5 : Maps.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Water Authority of Jordan / The Library
Amman - Jordan

Bundesanstalt fur Geowissenschaften Und Rohstoffe (BGR)
Hanover - Germany

H. Manfred
Tel. : (+) 962 - 6 - 680100 ext. 544
P.O. Box 926238
Amman - Jordan

AVAILABILITY OF REPORT: Available

78
TITLE: Groundwater Investigation in the Hammad and Sirhan Basins
AUTHOR(S): Gitec Consult GmbH, Hydrogeological Services International Ltd. (HSI)
PUBLISHER:
PAGES: Five Volumes
PUBLICATION DATE: September 1995
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The investigations were primarily aimed at evaluating the groundwater resources and exploitation potential of the shallow Shallala and Rijam limestone aquifers of the Hammad and Sirhan Basins.

A comprehensive program of studies was undertaken consisting of borehole drilling, pump testing, borehole geophysics, chemical and isotopic analysis, aquifer modelling and the preparation of a hydrogeological map.

An additionally study was also made of the deeper aquifers namely; the Amman - Wadi Sir, Amman - Ajlun, Kurnub Sandstone, Jurassic - Triassic, and Disi Sandstone.

Surface water studies comprised hydrological analysis in connection with the utilization of surface runoff for storage and / or artificial recharge.

The study comprised of five volumes:
- Vol. I : Main Report.
- The rest are Appendices.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Gitec Consult GmbH
Duesseldorf, Federal Republic of Germany

Hydrogeological Services International Ltd. (HSI)
172B Epsom Road,
Guildford, Surrey GU1 2RR,
England

AVAILABILITY OF REPORT: Available

79
TITLE: Review of Water Resources Development and Use in Jordan
AUTHOR(S): CES Consulting Engineers & Arabtech Consulting Engineers
PUBLISHER:
PAGES: Two Volumes
PUBLICATION DATE: 1993
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The objectives of the study were to look into the water resources availability, the available management, and the use of water in the Hashemite Kingdom of Jordan.

The study also evaluated the conditions and efficiency of the water works and supply systems, including the facilities producing reusable effluent from treated sewage.

Strategies have been formulated to increase the efficiency of the production and use of water, within the framework of the existing water sector infrastructure and management.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Water Authority of Jordan / The Library
Amman - Jordan

CES Consulting Engineers
Tel. : 41735
P.O. Box 3351
Amman - Jordan

Arabtech Consulting Engineers
Tel. : (+) 962 - 6 - 665297 / 663391
Telex : 21705 Rabtec Jo
P.O. Box 7323
Amman - Jordan

AVAILABILITY OF REPORT: Available

80
TITLE: Thermal Springs of Wadi Ibn Hammad
AUTHOR(S): A. Swarieh & R. Massarweh / Natural Resources Authority
PUBLISHER:
PAGES: 30
PUBLICATION DATE: 1993
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This study is a part of the Geothermal Energy Project conducted by the National Resources Authority of Jordan.

The aim of the study was to find the cause of the thermality in Wadi Ibn Hammad and to give recommendations for optimum use of both thermal and cold water in the study area to help its development.

The investigation involved the preparation of a geologic map of the area and sampling surveys of five cold springs and six hot springs for chemical analysis purposes. The springs were also monitored for the physical characteristics of their waters on a monthly basis throughout the year 1992.

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
Natural Resources Authority (NRA)
Geology Directorate
Hydrogeology Section
Amman - Jordan

AVAILABILITY OF REPORT: Available

81
TITLE: Geothermal Water in Zara & Zarqa Ma'in Area
AUTHOR(S): A. Swarieh & R. Massarweh / Natural Resources Authority
PUBLISHER:
PAGES: 33
PUBLICATION DATE: 1996
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This study is a part of the Geothermal Project Plan implemented by the Subsurface Geology Division in the National Resources Authority of Jordan. The project aims at studying all sites of geothermal water in Jordan.

Zara - Zarqa Ma'in area is one of the most number of thermal springs lying close to the Dead Sea. This study aimed at re-evaluating the existing data relative to the study area.

The report contains a review of the geology and hydrogeology of the area and suggests geothermal utilization of the water. It also contains conclusions and recommendation for maximum utilization of the area in terms of geothermal energy and investments in tourism and industry.

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
Natural Resources Authority (NRA)
Geology Directorate
Hydrogeology Section
Amman - Jordan

AVAILABILITY OF REPORT: Available

82
TITLE: Jordan's Water Resources and Their Future Potential (Proceeding of Symposium)
AUTHOR(S): (Several)
PUBLISHER: Friedrich Ebert Stiftung
PAGES: 122
PUBLICATION DATE: 1992
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This book contains the proceedings of a symposium held in Amman, in October 1991, on "Jordan's Water Resources and Their Future Potential". The symposium was organized by Friedrich Ebert Stiftung, The Higher Council for Science and Technology and Water Research and Study Center - University of Jordan.

The symposium proceedings discussed the scarcity of water resources in Jordan, its growing degradation and increasing demand due to population growth, higher standards of living, industrialization and irrigation, needs.

Papers on Regional-shared waters in the Yarmouk and Jordan Rivers as well as groundwater resources were also presented in the symposium. These issues were discussed to clarify the situation and offer recommendations for relevant future actions.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Amman - Jordan

Friedrich Ebert Stiftung
P.O. Box 926238
Amman - Jordan

AVAILABILITY OF REPORT: Available

83

TITLE: Hydrological and Hydrochemical Study of the Major Springs in Wadi Shu'eib Catchment Area (Thesis)
AUTHOR(S): R. Ta'any
PUBLISHER:
PAGES: 302
PUBLICATION DATE: June 1992
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This thesis dealt with the hydrological and hydrochemical characteristics of the major springs in Wadi Shu'eib Catchment Area. The study area was dominated by the sedimentary rocks of the Balqa and Ajlun Groups which are underlined by the Kurnub Sandstone rocks exposed at its lower limit.

The determination of runoff was done by applying the "Curve Number Approach" of the United States Soil Conservation Services. The flow duration techniques were used to differentiate the main groundwater sources feeding the spring area. Water samples representing springs issue from different aquifers were collected and subjected to a hydrochemical study.

The main objectives of this research were as follows:
- To study the long-term temporal fluctuation of springs and to fill the missing records of the spring discharge measurements.
- To study the discharge of the main springs in Wadi Shu'eib catchment area for a long period of time, and to identify the relationship between spring discharge and the groundwater storage of the main springs under consideration.
- The use of flow-duration curves, to calculate the stored amounts of groundwater in winter and summer season.
- To study the water quality of the springs discharge in different seasons, in order to investigate the effect of the surrounding areas (recharge areas) on the hydrochemical characteristics of each spring.
- To specify the type of pollutants and the sources of pollution.

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Amman - Jordan

AVAILABILITY OF REPORT: Available

84
TITLE: Hydrological and Hydrogeological Study of the Azraq Basin
AUTHOR(S): R. Ta'any
PUBLISHER:
PAGES: 208
PUBLICATION DATE: February 1996
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The main objectives of this study were:

- To estimate synthetically, the runoff volumes, runoff coefficient, peak discharge and the frequency of peak floods for the major Wadis in the Azraq Basin.
- To calculate the potential evapotranspiration for determining the relationship between the measured class A pan evaporation and the potential evaporation and consequently defining the pan coefficient.
- To estimate the recharge to the groundwater of the Upper Aquifer System from the rainfall precipitated over the basin and over the individual sub-basins.
- To study and identify the groundwater flow system, as well as the hydrological characteristics of the Upper Aquifer System in the study area.
- To study the hydrogeological characteristics of the Upper Aquifer waters and identify the inter-relationship between the hydrochemical parameters. In addition to the evaluation of the reliability of these waters for domestic and irrigation purposes.

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Amman - Jordan

AVAILABILITY OF REPORT: Available

85
TITLE: Water Conveyance System from Adasiya to Deir Alla - Zay (Feasibility Study)
AUTHOR(S): WS Atkins International (WSAI) and Jordanian Consulting Engineers
PUBLISHER:
PAGES:
PUBLICATION DATE: January 1996
LANGUAGE OF PUBLICATION: English

ABSTRACT:
WS Atkins International (WSAI) has been appointed by the Ministry of Public Works and Housing, through their Agents, The Water Authority of Jordan (WAJ) to carry out the preparations of:
- a technical, economic and financial feasibility study;
- the conceptual design;
- environmental impact assessment;
- preliminary engineering design;
- cost estimate.

The design to Deir Alla conveyance system will be used to supply raw water to the existing Deir Alla - Zay Conveyance System, which supplies Amman with potable water, with a tie - in point at or near the existing Deir Alla Pumping Station.

The purpose of this project is to separate raw water supplies for domestic use from those for irrigation and to avoid deterioration of the water quality during transmission by conveying it in a pipeline instead of a canal. The design of the new Adasiya to Deir Alla conveyance system is to take into account the additional water arising from the Peace Treaty.

As a result of the Peace Treaty between Jordan and Israel, and the existing developments in Jordan, the sources of raw water identified in the Terms of Reference for the conveyance are:
- The Yarmouk River
- The Mukheiba Wells
- Lake Tiberias via the Deganya Conveyance from proposed desalination plants in Israel.

Reports submitted:
- Inception Report (16 pages + Appendices)
- Draft Feasibility Study (106 pages)
- Feasibility Study (104 pages)

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Amman - Jordan

WS Atkins International (WSAI)
Tel. : (0115) 9857700
Fax : (0115) 9857255
1 Clumber Court Pelham Avenue,
Sherwood Rise Nottingham,
NG5 1AJ England

Jordanian Consulting Engineers
Amman - Jordan

AVAILABILITY OF REPORT: Available

86
TITLE: Wadi Mousa Water Supply and Wastewater Project (Final Report on the Feasibility Study)
AUTHOR(S): CDM Camp Dresser & McKee International Inc. in association with Associated Consulting Engineers (AEC), MIMAR Consulting Engineers and Architects, Environmental Resources Management Consultants
PUBLISHER:
PAGES:
PUBLICATION DATE: May 1996
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The objectives of the study were to prepare an engineering review and environmental assessment leading to design and construction of water and wastewater facilities, including effluent reuse, to serve the needs of the connected areas to the year 2020. A supplementary goal is to address the environmental issues, and conduct participatory processes, so that the recommended facilities and actions are both environmentally sound and accepted.

The Final Report on the conceptual Study presented the results of the basic studies and comparisons of component options in such a way as to generate several viable system alternatives, and so as to facilitate preliminary decisions on the general nature of the water supply and wastewater management program.

This report compares the system alternatives on the basis of additional data and more developed engineering than in an earlier report, and with the use of comparative economic and environmental feasibility analysis. The results of these comparative analysis are presented together with preliminary engineering and detailed feasibility analysis for the program that is proposed on the basis of the comparative studies, to serve as the basis for decision-making and funding.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Amman - Jordan

CDM Camp Dresser & McKee International Inc.

Associated Consulting Engineers (AEC)

MIMAR Consulting Engineers

Architects Environmental Resources Management Consultants

AVAILABILITY OF REPORT: Available

87

TITLE: Geotechnical Investigation - Wadi Hassan Wastewater Treatment Plant Pump Station and Network (Final Report - Wastewater Collection and Treatment Systems in the Greater Irbid Area)
AUTHOR(S): Geotechnical Engineering & Materials Testing Co. (GEMT)
PUBLISHER:
PAGES: 23 + Appendices
PUBLICATION DATE: January 1996
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This report concerns the construction of a wastewater treatment plant in Wadi Hassan area for collecting wastewater from three towns namely An Nuayyima, Kitm and Shatana. The project is located at Greater Irbid Area approximately 20 km east of Irbid city. It includes a wastewater treatment plant, pump station, force main, network and connecting gravity pipelines.

The purposes of the study were to determine soil and foundation conditions at the site of the proposed project and to develop recommendations to guide design and construction of foundations and facilities. These purposes were accomplished in the following phases:

1. Reconnaissance study of the site which was descriptive in nature.
2. Drilling of borings and insitu testing to determine subsurface conditions and obtaining samples for laboratory analysis.
3. Performing laboratory tests on samples recovered from the sample boreholes to evaluate pertinent physical and mechanical properties of the materials.
4. Analysis of all field and laboratory data in order to develop the required recommendations.

The project can be divided into two geomorphologic areas as follows:
- Wastewater Treatment Plant Area.
- Network Areas.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Amman - Jordan

Geotechnical Engineering & Materials Testing Co. (GEMT)
Tel. : (+) 962 - 6 - 642806
Fax : (+) 962 - 6 - 641547
P.O. Box 5382
Amman - Jordan

AVAILABILITY OF REPORT: Available

88
TITLE: Water Reuse Study Report for Fuheis / Mahis and Wadi Mousa Sewage Treatment Plants (Final Report)
AUTHOR(S): GKW Consult in association with Consulting Engineers Center (Sajdi & Partners) (CEC)
PUBLISHER:
PAGES:
PUBLICATION DATE: June 1994
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This study was set out to develop a concept for the reuse of treated effluent at two wastewater treatment plants in the country. (At the time this study was undertaken these plants had been designed but not constructed.)

The objectives of the study were to:
- Describe the existing situation and conditions,
- Establish technical alternatives,
- Estimate costs / benefits, and
- Determine institutional requirements.

The report has been presented in four main information sections, including a summary of the existing and past practices and experiences of water reuse in Jordan as a whole.

A detailed review of the key factors which affect the estimated volumes of wastewater anticipated over the 20+ year operational period was also included in the report, as well as a review of the existing situation and proposed sewage disposal projects for Wadi Mousa and Fuheis / Mahis. Two alternative reuse schemes were suggested, with associated costs, economic evaluations, social and environmental considerations, culminating in the recommendation of the performed alternative.

Institutional aspects associated with the reuse scheme within the context of the existing organization were also reviewed.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Amman - Jordan

GKW Consult
Tel. : (0) 621 - 8790 - 01
Fax : (0) 621 - 8790 - 302
P.O. Box 10 13 61 , D-68013 Mannheim,
Besselstrasse 26, D-68219 Mannheim,
Germany

Consulting Engineers Center (Sajdi & Partners) (CEC)
Fax : (+) 962 - 6 - 662827 - 661251
P.O. Box 8180
Amman - Jordan

AVAILABILITY OF REPORT: Available

89
TITLE: As-Samra Wastewater Stabilization Ponds (Emergency Short-Term Improvement Program)
AUTHOR(S): Camp Dresser & McKee International Inc. (CDM) in association with Associated Consulting Engineers (ACE) and Environmental Resources Management Consultants
PUBLISHER:
PAGES: 50
PUBLICATION DATE: October 1995
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The purpose of this report was to provide a brief overview of the up-to-date progress of construction activities on this project.

The As-Samra Wastewater Stabilization Ponds Emergency Short-Term Improvement Program is one of an Improvement Program for the rehabilitation and expansion of the Amman wastewater system. This contract included the removal of sludge from four anaerobic ponds, construction of two anaerobic ponds, an inlet structure, inter-pond pipelines and attendant structures, odor control facilities, chlorination facilities and installation of surface aerators.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Amman - Jordan

Camp Dresser & McKee International Inc. (CDM)

Associated Consulting Engineers (ACE)

Environmental Resources Management Consultants

AVAILABILITY OF REPORT: Available

90

TITLE: As-Samra, Madaba & Ma'an Waste Stabilization Ponds (Study of the Design of Wastewater Stabilization Ponds in Jordan)

AUTHOR(S): A. Al-Homoud & R. Khashman, Royal Scientific Society (RSS) / Environment Research Center / Water and Soil Division

PUBLISHER:

PAGES: 88 (Final Report Only)

PUBLICATION DATE: January 1995

LANGUAGE OF PUBLICATION: English

ABSTRACT:

The main purpose of this study was to develop simple, sound and practical models for designing WSP utilizing the actual performance data obtained from the WSP's in Jordan.

The final results obtained from the study of the design of Waste Stabilization Ponds (WSP) in Jordan are presented in this report, which is a part of an agreement between the Royal Scientific Society and the Water Authority of Jordan in 1991 for the monitoring of three WSP treatment plants and studying their design criteria. The plants are As-Samra, Madaba and Mafraq WSP's.

Empirical equation for anaerobic and facultative ponds were obtained. Moreover, design equations for facultative ponds in Jordan were derived. These equations give the relation between maximum allowable surface organic loading rate and average ambient daily temperature.

The study comprised of:

- Preliminary Report 1992
- Final Report 1995
- Annexes 1995

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:

Water Authority of Jordan / The Library
Amman - Jordan

A. Al-Homoud & R. Khashman
Royal Scientific Society (RSS)
Environment Research Center
Water and Soil Division
Amman - Jordan

AVAILABILITY OF REPORT: Upon permission from Water Authority of Jordan (WAJ) & Royal Scientific Society (RSS)

91
TITLE: Wadi Araba Development Project - Water Resources
AUTHOR(S): B. Hirzalla
PUBLISHER:
PAGES: 25
PUBLICATION DATE: July 1974
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This paper dealt with previous investigations and presented available hydrological data about the Wadi, in order to evaluate its water resources which would be the stem for future development plan in the Wadi. The paper is of two parts; Part I presents the surveyed hydrological data, Part II presents a proposal for the development of the potential water resources of the Wadi.

The scope of this study was to survey all the available data about the potential water resources of the Wadi starting from Ghor Feifa in the north down to the vicinity of Aqaba City in the south. Preliminary evaluation of water resources was considered as the next step. A plan to develop potential water resources was proposed with cost estimates for its implementation.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Amman - Jordan

AVAILABILITY OF REPORT: Available

92
TITLE: Land and Water Use in the Hashemite Kingdom of Jordan
AUTHOR(S): Mr. A. Labadi
Mr. U. Mudallal
Dr. S. Shamoot
Dr. K. Husseini
PUBLISHER:
PAGES: Three Parts
PUBLICATION DATE: May 1969
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This paper was submitted to the FAO conference "Land and Water Use in the Near East" held in Jordan from May 12 to 18, 1969.

The paper was submitted in three parts:
- Part I : Dealing with "Land Resources in Jordan"
- Part II : Dealing with "Groundwater Resources in Jordan"
- Part III : Dealing with "Surface Water Hydrology in Jordan"

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Natural Resources Authority (NRA)
Amman - Jordan

AVAILABILITY OF REPORT: Available

93
TITLE: Hydrologic Study for Wadi Abdoun Diversion Dam Project
AUTHOR(S): B. Naber, Hydrology Division / Natural Resources Authority (NRA)
PUBLISHER:
PAGES: 17
PUBLICATION DATE: February 1970
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The scope of this reconnaissance study encompassed a small catchment area (Wadi Hannutiya catchment area) which drains into Wadi Abdoun near Amman at a point whose coordinates are 150.00 North and 230.70 East and which was the proposed diversion point of Wadi Abdoun Diversion dam Project.

This study was based on records available at the Hydrology Division of the Directorate of Investigation and Research, Natural Resources Authority, and did not involve any field surveys or on-site investigations.

The object of this study was to develop a method that can be applied to the available data rapidly in order to estimate for design purposes, the peak discharges and flood volumes of specified frequencies for any Wadi in Jordan.

For the purpose of this study, two flood frequencies were selected; that which determines the flood flow that is expected to occur on average once in every 10 years, and the other once in every 100 years.

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Natural Resources Authority (NRA)
Water Research Division
Amman - Jordan

AVAILABILITY OF REPORT: Available

94
TITLE: Groundwater Resources of the Jordan Valley
AUTHOR(S): B. Hirzalla, Natural Resources Authority (NRA) / (Ground Water Section) / (Water Resources Division)
PUBLISHER:
PAGES: 145
PUBLICATION DATE: April 1973
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This report presented a review of the prevailing groundwater conditions, and the geologic factors, such as lithology and structure that control its occurrence, quality, and availability. Emphasis was made on discussing presentations and interpretations of the groundwater hydraulics quality, and geologic structure in relation to the groundwater occurrence and movement.

The purpose of this report was to review and refine the previous investigations and to collect, evaluate and interpret data in order to gain better understanding of the groundwater situation and water problems of the Jordan Valley, and finally to suggest or set up possible solutions to the prevailing problems of undesirable water quality, inadequate groundwater supply and excessive water level decline.

The report was intended to be a basis for further investigations and development of water supplies in the Valley. Hence, the data of the previous investigations were studied, analyzed and interpreted. In addition, water samples from the pumping wells were collected for the year 1965, 1967. The surface geology was studied in detail in the southern portion of the valley for both the west and east banks. Chemical analysis of the water samples was also carried out and the results were interpreted for the groundwater bodies of the Valley and the River of Jordan. Flow net analysis were carried out only in areas where sufficient data was available.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library

Natural Resources Authority (NRA)
Ground Water Section
Water Resources Division
Amman - Jordan

AVAILABILITY OF REPORT: Available

95
TITLE: Wadi Jurei'a and Wadi Shu'eib Groundwater Evaluation
AUTHOR(S): B. Hirzalla, Natural Resources Authority (NRA) / (Water Resources Division)
PUBLISHER:
PAGES: 9
PUBLICATION DATE: March 1974
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The Karameh-Dead Sea Water Supply Project was an integrated part of the Jordan Valley Development and Rehabilitation Plan. This project necessitated a hydrological investigations which was carried in the area to evaluate and confirm the potential water resources.

The area covered by this report encompassed the fresh groundwater wellfields. It lies to the east of Southern Shuneh village within the eastern escarpment and bounded on the south by the Grid Line N-145 and on the north by the Grid Line N-150. It was found that the area was characterized by the presence of highly fractured limestone due to the tectonic action of the Rift Valley System.

There are two main wadis in the area, namely; Wadi Shu'eib, which has a perennial baseflow of approximately 8 MCM/ yr and Wadi Jurei'a which flows during the flood season. Both Wadis converge at the Wadi Shu'eib Dam Reservoir near the escarpment foothills.

The area was hydrogeologically divided into two main systems; the first lies almost above the topographic contour line - 200m Below Sea Level, to the east of the main Rift Fault and belongs to the escarpment system. The second lies below the contour line - 200 m, and belongs to the Valley groundwater system

Several pumping tests were conducted in the area to determine the aquifer parameters and the potential groundwater. The pumping test data, the well records, the prevailing hydraulic gradient, and the areal extent of the usable aquifer in the concerned area were employed.

It was recommended to drill two more wells in Wadi Jurei'a. This should lead to spread groundwater extraction from a wider area within the wellfield. The groundwater extraction should not exceed the estimated output, in order to alleviate over exploitation of the aquifers and salinity problems.

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Jordan Valley Commission
Natural Resources Authority (NRA)
Amman - Jordan

AVAILABILITY OF REPORT: Available

96
TITLE: Groundwater Resources in Jordan
AUTHOR(S): U. Mudallal
PUBLISHER:
PAGES: 21
PUBLICATION DATE: 1973 (reprinted)
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This paper was prepared to give a general description of the groundwater situation in Jordan. It contains an overview of the topography of the country and a general briefing of its geology. A survey of the types of aquifers available in Jordan is included along with a hydrogeological brief of selected groundwater fields, namely; Azraq, Dhuleil, Amman-Zarqa, El Jafr, Qabatya and Dura El Fawwar. Finally, the paper discussed the quality of water in Jordan within its limited scope.

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Natural Resources Authority (NRA)
Water Research Division
Amman - Jordan

AVAILABILITY OF REPORT: Available

97
TITLE: Preliminary Mathematical Model on the Upper Aquifer System in Amman-Zarqa Area
AUTHOR(S): University of Strasbourg / University of Louis Pasteur /Service De La Carte Geologique D'Alsace Et De Lorrain, Natural Resources Authority (NRA) / Water Research Division
PUBLISHER:
PAGES: -
PUBLICATION DATE: 1973
LANGUAGE OF PUBLICATION: English

ABSTRACT:
A detailed hydrogeological study of the area had been made, and many data was collected concerning rainfall, evapotranspiration, recharge and pumping yields as well as transmissivity and storage coefficient of the aquifers. This data gave the possibility to elaborate groundwater models, which would help to reach the best management of groundwater resources in the area. A mathematical model was used rather than any other kind of model, for its simplicity. As a first illustration, a very simple model was developed on the upper aquifer system; its purpose was to check in steady-state flow the coherence of the data collected.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Natural Resources Authority (NRA)
Water Research Division
Amman - Jordan

University of Strasbourg
University of Louis Pasteur,
Service De La Carte Geologique D'Alsace Et De Lorraine,
Strasbourg

AVAILABILITY OF REPORT: Available

98
TITLE: Investigation of the Sandstone Aquifers of East Jordan
AUTHOR(S): D. H. Parker
PUBLISHER:
PAGES: 4 Volumes
PUBLICATION DATE: 1969
LANGUAGE OF PUBLICATION: English

ABSTRACT:

The object of this report was to examine the information available on the hydrogeology of the Mesozoic and Cainozoic aquifers of East Jordan in order to evaluate their economic potential. To achieve this objective the recorded data on more than 400 wells drilled prior to the project have been complied and reviewed. In addition more than 80 exploratory or test production wells have been drilled under project supervision.

The spatial distributions of the various aquifer systems have been defined. Equipotential maps of water level have been prepared on the aquifers for which adequate data were available. Water level recorders have been maintained on observation wells tapping important aquifers. Numerous wells have been pump tested and aquifer characteristics computed to supplement previously recorded data. Detailed chemical analysis have been made of the water from pre-project wells. Maps have been prepared showing aspects of the chemical characteristics of the waters. A number of wells have been sampled monthly to observe changes in water quality. In cooperation with the International Atomic Energy Agency, Vienna, numerous samples of groundwater have been examined for the environmental isotopes, carbon 14, tritium, deuterium and oxygen-18 to help elucidate rates of groundwater movement and recharge characteristics. In addition, rainfall samples from selected stations have been analyzed for isotope content in an attempt to relate precipitation to recharge.

Geophysical techniques, including gravity, magnetic and geo-electrical measurements, have been used to obtain stratigraphical and structural data and supplement information obtained from boreholes.

The study comprised of four volumes:
- Vol. 1 : Geology and Hydrology
- Vol. 2 : Hydrogeology
- Vol. 3 : Appendices
- Vol. 4 : Enclosures

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
United Nations Development Program (UNDP)
Shmeisani
Amman - Jordan

Food and Agriculture Organisation of the United Nations (FAO)

Water Authority of Jordan / The Library
Natural Resources Authority (NRA)
Amman - Jordan

AVAILABILITY OF REPORT: Available

99

TITLE: Investigation of the Sandstone Aquifers of East Jordan, The Hydrogeology of the Southern Desert of Jordan (Technical Report No. 1)
AUTHOR(S): J. W. Lloyd
PUBLISHER:
PAGES: 169
PUBLICATION DATE: 1969
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This report described the geology, hydrology and hydrogeology of an area of approximately 8,000 square kilometers in the Southern Desert of Jordan.

Two groundwater areas have been defined. The most important was the Qa Disi Groundwater Area which extends through the central and eastern parts of the region. The second was the Upper Wadi Yutm Groundwater Basin which is in the western part of the study area. The flow dynamics in the principal aquifer of the two areas were described in detail and those of the Qa Disi Groundwater Area were simulated by a digital model. Time- drawdown forecasts were made for production pumping at various rates. The report included a design for the first phase of groundwater extraction.

The purpose of this study was to determine where groundwater can be economically exploited and to estimate the rate of recharge and the safe yield of the extraction area. It had also been necessary to prepare a quantitative analysis in order to ascertain the feasibility of mining the groundwater and predict the length of time that this can be effectively exploited under prescribed economic conditions.

In order to acquire the necessary data for the study, a hydrometeorological network had been established in the area, and exploratory and test production wells have been drilled. Pump-tests have been carried out to obtain information on aquifer characteristics and flow-net analysis was employed to provide estimates of the quantity of groundwater available in the area. Certain detailed geological studies have been made, particularly in regard to the effect of structure on groundwater movement and well yield. Hydrochemical studies provided information on water quality.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Natural Resources Authority (NRA)
Amman - Jordan

United Nations Development Program (UNDP)
Shmeisani
Amman - Jordan

Food and Agriculture Organisation of the United Nations (FAO)

AVAILABILITY OF REPORT: Available

100
TITLE: A Water Management Study for Jordan
AUTHOR(S): Project in Development and the Environment (PRIDE)
PUBLISHER:
PAGES:
PUBLICATION DATE: August 1992
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The aim of a Water Management Study for Jordan was to help the country meet its looming crisis in water supply. It focused on ways to enhance Jordan's future water availability, suitability, and sustainability.

The report had two main parts. The first part briefly presents findings and recommendations. The other longer and detailed part contains annexes with data and analytical bases for the findings.

The studies leading to this report were based mainly on information developed by previous analysts. The PRIDE team believed that the answer for Jordan's water problems must be sought by developing a comprehensive water management plan in four priority action areas:

1. Strengthen the capability of the Ministry of Water and Irrigation (MWI), so it can develop and fully implement sound water policies and programs for the Kingdom and can provide water-related services to the people -its customers- more effectively, efficiently, responsively, and encourage appropriate private sector participation in water resources management and pollution prevention and control.
2. Get all the water possible from all sources in a continuing effort. Reduce the water demand by all feasible means. Make water conservation a part of everyday living, an issue of constant awareness throughout the society.
3. Create real incentives to encourage efficient water conservation and to discourage waste. Enforce fully the existing regulations on water use. Develop legislation to close gaps in the laws.
4. Build and maintain a public opinion setting in which knowledge of this vital resource and the means of conserving it stay on the agenda of groups and individuals throughout the land.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Amman - Jordan

Project in Development and the Environment (PRIDE)

AVAILABILITY OF REPORT: Available

101

TITLE: North Jordan Water Resources Investigations Project (Surface Water Inventory and Artificial Recharge in Azraq Basin - Wadi Al - Butum)
AUTHOR(S): Turan Otova / Senior Water Resources Advisor USAID / WAJ, R. Ta'any / Senior Hydrologist / WAJ
PUBLISHER:
PAGES: 56
PUBLICATION DATE: May 1988
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The purpose of this report was to estimate the surface water potential of the Wadi, and also to provide information to the Ministry of Agriculture on the possibility of the use of this water for cattle and for pasture.

The method adopted for estimation of floods and flows is the Unit Hydrograph Theory and the Curve Number Procedure. Each storm of the period of record was analyzed by The Curve Number Procedure to derive the flow duration curves.

The project had four major components:
1. The dam and the intake structures (one for ground, and one for surface water).
2. The setting tanks.
3. The injection and the observation wells.
4. The subsurface dams and intake structures (including production wells).

It was recommended that the exploratory boreholes should be drilled at the dam site as well as downstream from the dam in alluvial deposits. Also a field topographic survey should include the reservoir area, so that a new "Area - Capacity" curve would be defined and incorporated in determining the final height of the dam.

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
USAID / Water Authority of Jordan (WAJ)
R. Ta'any
Amman - Jordan

AVAILABILITY OF REPORT: Available

102
TITLE: Water Resources and Water Needs in Jordan
AUTHOR(S): Dr. U. Mudallal
PUBLISHER:
PAGES: 39
PUBLICATION DATE: July 1975
LANGUAGE OF PUBLICATION: Arabic

ABSTRACT:
This study investigated the water requirements for different sectors in Jordan, including agriculture, industry, mining, and drinking water requirements. The investigation was concerned with short-term as well as long-term needs in the light of the available studies and information within the relevant authorities and ministries.

The adopted approach for the study was based on dividing the country into eight units as follows:
1. Jordan Valley area
2. Southern Ghors
3. Wadi Araba area
4. Northern area (Irbid)
5. Amman - Balqa area (including Zarqa)
6. Karak area (excluding Southern Ghor)
7. Ma'an area (including Jafr, Qa'Dissi and Aqaba)
8. Eastern Desert area (including Azraq and Dhuleil)

The water requirements of the above classified units for the different considered sectors were estimated for the three periods of 1975, 1980, and 2000, taking into consideration the expected development within those areas over these periods.

The study also discussed the available and the future water resources and touched on an approximate evaluation of the future water shortage in Jordan.

Finally the study recommended the following:
1. A Comprehensive Water Resources Plan covering the evaluation of present and future water resources in Jordan, its management and feasible exploitation.
2. The need to conduct a technical study for efficient wastewater reuse after treatment, whether for irrigation and/or other purposes according to best possible produced quality.
3. Formation of a Higher Water Board to be concerned and responsible for all the scientific aspects and to be consisting of highly qualified members to supervise the important water-related projects implemented in the country.

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Amman - Jordan

AVAILABILITY OF REPORT: Available

103
TITLE: Amman - Zarqa Basin Water Resources Study
AUTHOR(S): The North Jordan Resources Investigations Project Staff
PUBLISHER:
PAGES: 190
PUBLICATION DATE: November 1989
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The purpose of this report was to evaluate the available water potential in the Amman - Zarqa Basin.

Hydrologically, the area was divided into two separate basins, one of them in Amman - Zarqa and the other Wadi Dhuleil including Northeastern Desert area. The two basins are separated by two big faults uplifting the area between Wadi Dhuleil and Amman - Zarqa Sub-basins.

The report contains a survey of all the available literature and previous studies on the Amman - Zarqa Basin.

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Amman - Jordan

AVAILABILITY OF REPORT: Available

104
TITLE: The Environmental Effects of Russeifa Land Fill on Groundwater
AUTHOR(S): Mr. A. Abu Hmoud, Dr. S. Al-Tal
PUBLISHER:
PAGES: 19
PUBLICATION DATE: December 1996
LANGUAGE OF PUBLICATION: Arabic

ABSTRACT:
The study aimed at evaluating the effects of the leachates from the Waste Disposal Site at Russeifa on the surface and groundwater within the area. The effects of the solid waste disposal on the air quality was also evaluated.

Several observation wells were drilled at certain locations within the area in order to monitor any change that might occur in the groundwater quality. Samples were taken from those wells and analyzed for this purpose.

The study was concluded with some suggestions and recommendations as to the best means of disposal of solid and liquid wastes. This covered the choice of locations for such landfills taking into consideration the health safety of the communities residing in the vicinity of those landfills. The study also suggested ways and means for lining and isolating the landfills to prevent leachates from polluting the existing surface and groundwater within the areas.

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Amman - Jordan

AVAILABILITY OF REPORT: Available

105
TITLE: Jordan River Basin Study
AUTHOR(S): Dr. M. Haddadin, The Regional Office for Integrated Development (ROID)
PUBLISHER:
PAGES: One Volume and Two Annexes
PUBLICATION DATE: August 1993
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The International Bank for Reconstruction and Development (IBRD) contracted the services of the Regional Office for Integrated Development (ROID) of Amman - Jordan, to perform a study of the Jordan River Basin Management.

The report covered the major aspects related to the water sector such as population, labor force, economic and social indicators and the demand for and economics of water. Demand for water under future conditions was estimated. Possible means for satisfying projected demand were also explored, as well as predictions on the socio-economic implications of various scenarios. Future total demand for municipal water was calculated for the years 2000, 2015, and 2040. The total demand for industrial water was calculated for the years 2015 and 2040. In projecting future demand for irrigation water, several criteria were considered; these included:

a) Maintaining a constant per capita irrigated area.
b) Considering the demand for irrigation water was as a residual demand in the sense that the demand for municipal and industrial water should be met first and the remainder of the water supply be used for irrigation.

The future water shortages were also calculated, this indicated that huge shortages of water will emerge in the future.

In the study, three cases were assumed in order to explore the options and possibilities to meet the demand of water in Jordan; these cases were:
- Case I : No Construction of Major Water Development Works.
- Case II : Implementation of Current Water Development Plans.
- Case III : Prospect of Joint Integrated Development of the Jordan River Basin.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Amman - Jordan

The Regional Office for Integrated Development (ROID)
Dr. M. Haddadin

AVAILABILITY OF REPORT: Available

106

TITLE: Leaching of Russeifa Phosphates and Maqarin Bituminous Limestone and its Effect on the Quality of Groundwater
AUTHOR(S): H. Khoury & E. Salameh
PUBLISHER:
PAGES: From page 81 to 98
PUBLICATION DATE:
LANGUAGE OF PUBLICATION: English

ABSTRACT:
In this study the amount of trace elements in the circulating waters in Russeifa phosphate rocks and the Maqarin bituminous limestone were compared to the amounts in groundwater in these areas. Leaching of phosphate rocks with their high trace metal contents is responsible for high trace element concentrations in the groundwater of Russeifa. In the Maqarin area, the leaching of the high temperature mineralization zone was responsible for the high pH waters enriched with base metals. The uncalcined bituminous limestone yielded normal pH waters without any indication of leaching. Mixing of the alkaline waters with the normal waters could give trace element values.

In the Russeifa area, the groundwater was not recommended for drinking purposes, in accordance with WHO Standards.

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
University of Jordan
Dr. H. Khoury
Dr. E. Salameh
Amman - Jordan

AVAILABILITY OF REPORT: Available / Dirasat XII (1985) No. 2

107
TITLE: Some Problems Relating to the Exploitation of Groundwater in Jordan
AUTHOR(S): Hellmut Vierhuff
PUBLISHER: Institution for Scientific Cooperation
PAGES: 7
PUBLICATION DATE: 1977
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This study was prepared by the Federal Institute for Geoscience and Natural Resources - Germany, as a part of the work relating to the groundwater supply in Jordan for the purpose of the Water Master Plan for the entire country prepared by GTZ during 1976 - 77.

This paper was presented as a result of the study. It contains an overview of the general hydrogeological situation. This includes the types of aquifers existing in Jordan, precipitation, the quality of the groundwater, and the groundwater supply.

It was stated in the paper that the groundwater was to a large extent unusable throughout the entire eastern part of the country because of natural contamination with salt water. Signs that groundwater of originally good quality has been spoiled by human influence were evident in various places, e.g.:

1. The alkalization and increasing salification caused by the return flow of irrigation water (Jafr, Dhuleil).
2. The pollution and salification caused by waste waters in densely populated areas percolating into the groundwater.
3. The ascent of extremely salty deep-lying water in regions where large amounts of groundwater have been extracted (Southern part of the Jordan River Valley).

Examples of problematical groundwater extraction within Jordan were also presented. The paper was concluded by remarks reflecting the authors views regarding those problems.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Federal Institution for Geoscience and Natural Resources
Hellmut Vierhuff
P.O. Box 510153, D-3000,
Hanover 51, Germany

Institution for Scientific Cooperation
Natural Resources and Development - Volume 8,
(A biannual collection of recent German contributions concerning the exploration and exploitation of natural resources)
Germany

AVAILABILITY OF REPORT: Available

108
TITLE: Water Resources Policies, Planning and Management
(Water Reference Book for Jordan - Volume II, Groundwater Resources)
AUTHOR(S): United Nations Development Program (UNDP)
Department of Economic and Social Development
PUBLISHER:
PAGES: 54
PUBLICATION DATE: September 1992
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This sectoral report on groundwater resources availability and use in Jordan provided an overall assessment of groundwater resources in Jordan, and indicated how much groundwater was being used, and how the aquifers were responding. It suggested guidelines for future monitoring and exploitation of those resources.

The report also presented a description of the main aquifers in Jordan and included comments on the groundwater hydrology, abstractions, recharge and discharge.

Maps were prepared to show the location of existing well fields, indicating areas that were fully or over-exploited and areas that might have water available for further development.

The Water Reference Book consisted of the following six volumes:
- Vol. 1 : Surface Water Resources.
- Vol. 2 : Groundwater Resources.
- Vol. 3 : Irrigation Sector.
- Vol. 4 : Water Supply and Sanitation for Municipal and Industrial Purposes.
- Vol. 5 : Socio-economic Aspects.
- Vol. 6 : Legislation Aspects (Industrial Effluent Discharge).

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
United Nations
Department of Economic and Social Development
United Nations Development Program (UNDP)

AVAILABILITY OF REPORT: Available

109
TITLE: Rainfall Intensity - Duration - Frequency in Jordan (Paper No. 3)
AUTHOR(S): Mr. A. Sa'ad
PUBLISHER: Water Authority of Jordan / Department of Water Resources Development, Surface Water Division
PAGES: 78
PUBLICATION DATE: April 1986
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This paper described a statistical study on rainfall intensity, duration, and frequency in Jordan. The author analyzed the records of 40 recording main stations distributed over several regions of the Kingdom. The periods of records ranged from (9 - 17) years. Gumbles theory of distribution was applied in finding quantities of rainfall intensities for short and fixed durations and their frequencies for fixed return periods. Frequency curves for rainfall intensity - duration were also drawn for each of the 40 stations.

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Department of Water Resources Development
Surface Water Division
Amman - Jordan

AVAILABILITY OF REPORT: Available

110
TITLE: Achievements of Department of Water Resources Development for 1986 (Annual Report)
AUTHOR(S): Water Authority of Jordan (WAJ)
PUBLISHER:
PAGES: 72
PUBLICATION DATE: 1986
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The report contains a description of the annual achievements of the Department of Water Resources Development for 1986 regarding surface water monitoring network and its development between 1985 - 1987, monitoring of groundwater, collecting data, reports and wells drilling. It also includes updating on other activities held by the department concerning water data banks and geophysical surveys.

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Amman - Jordan

AVAILABILITY OF REPORT: Available

111
TITLE: Spring Flow Data in Jordan (Prior to October 1985 - Technical Paper No. 51)
AUTHOR(S): Ministry of Water and Irrigation, Department of Water Resources Development (DWRD)
PUBLISHER:
PAGES: 690
PUBLICATION DATE: September 1986
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This technical paper is the 3rd of its kind. It was preceded by Technical Paper No's 40 and 23.

The paper presented discharges of some 800 springs in the East Bank of Jordan, and contains all basic data available in each individual spring field.

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Amman - Jordan

AVAILABILITY OF REPORT: Available

112
TITLE: Spring Flow Data in Jordan (September 1990 - October 1993)
AUTHOR(S): Ministry of Water and Irrigation, Directorate of Planning, Development and Information
PUBLISHER:
PAGES: 26 + Appendices
PUBLICATION DATE: July 1994
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This document represents the discharge flows of some 826 springs in Jordan, and contains the basic data available on each spring.

The data in this document was collected by the Surface Water Monitoring Section at the Water Resources Studies Department in Water Authority of Jordan (WAJ). It covered spring flow data for the water years 1990/91, 1991/92, and 1992/93, respectively. The information in this document was intended to help those involved in Water Resources Development and Studies in Jordan.

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Amman - Jordan

AVAILABILITY OF REPORT: Available

113
TITLE: Stream Flow Data for Water Year 1991 / 1992
AUTHOR(S): Ministry of Water and Irrigation, Directorate of Planning Development and Information
PUBLISHER:
PAGES:
PUBLICATION DATE: July 1994
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The document consisted of tables containing stream flow data on 53 gauging stations established in Jordan. The data was collected by the Surface Water Monitoring Section in the Water Resources Department in Water Authority of Jordan, covering the water year 1991/1992 (the water year starts in October and ends in May the following year).

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Amman - Jordan

AVAILABILITY OF REPORT: Available

114
TITLE: Rainfall Data in Jordan (1985 - 1990) (Technical Paper No. 54)
AUTHOR(S): Ministry of Water and Irrigation Department of Water Resources Development (DWRD)
PUBLISHER:
PAGES: 339
PUBLICATION DATE: July 1992
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This technical paper consisted of five tables containing rainfall data from 268 established stations in the Kingdom. The data covered the water years (1985/86 - 1989/90). In addition to the rainfall data presented in the tables, an assessment of the water year with histograms for twelve selected rainfall stations was represented, namely; Salt, Irbid, Mafraq, Ajlun, Amman Airport, Karak, Shoubak, Ma'an, Wadi-El-Sir, South Shuna, Azraq and Aqaba. Moreover, five isohyetal maps were attached.

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Amman - Jordan

AVAILABILITY OF REPORT: Available

115
TITLE: Rainfall Data in Jordan (1991 / 1992 & 1992 / 1993)
AUTHOR(S): Ministry of Water and Irrigation, Directorate of Planning Development and Information, Information Section
PUBLISHER:
PAGES:
PUBLICATION DATE: July 1994
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The document consisted of tables containing rainfall data on 292 stations established in Jordan. Out of these stations, 244 have daily rain gauges, 71 have recording rain gauges, 10 have automatic rain gauges and 44 stations located in remote areas have totalizers that measure rainfall at the end of the rainy season.

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Amman - Jordan

AVAILABILITY OF REPORT: Available

116
TITLE: Water Level Data for Monitoring Wells in Jordan (Prior to March 1994)
AUTHOR(S): Ministry of Water and Irrigation, Directorate of Planning Development and Information, Information Section
PUBLISHER:
PAGES:
PUBLICATION DATE: July 1994
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This document consisted of graphs representing water levels in 94 monitoring wells in Jordan. The data was collected by the Groundwater Section in Water Resources Studies Department in Water Authority of Jordan. The document covered all the data that have been collected since the monitoring had started.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Amman - Jordan

AVAILABILITY OF REPORT: Available

117
TITLE: Rainfall Data in Jordan (Technical Paper No. 52) (1980 - 1985)
AUTHOR(S): Ministry of Water and Irrigation, Department of Water Resources Development (DWRD)
PUBLISHER:
PAGES: 321
PUBLICATION DATE: November 1986
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This technical paper consisted of tables containing rainfall data from 268 established stations in the East Bank of the Kingdom. The data contained covered 5 water years (October - May of the following year).

Computerization of water resources data in Water Authority of Jordan began in 1983, and this was the first rainfall publication to be produced by the computer.

In addition to rainfall data, an assessment of each water year has been prepared together with histograms for 8 selected rainfall stations, namely, Irbid, Mafraq, Ajlun, Salt, Amman Airport, Karak, Shoubak and Ma'an. Moreover, five isohyetal maps were prepared and attached to the end of this publication.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
Ministry of Planning / Documentation Section
Amman - Jordan

Water Authority of Jordan / The Library, Amman - Jordan

AVAILABILITY OF REPORT: Available

118
TITLE: Groundwater Quality Data in Jordan (Technical Paper No. 53 - Prior to October 1985)
AUTHOR(S): Ministry of Water and Irrigation, Department of Water Resources Development (DWRD)
PUBLISHER:
PAGES: 517
PUBLICATION DATE: February 1987
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This technical paper was the first of its kind to be published by Water Authority of Jordan. It contains complete chemical analysis for (781) observation wells in the East Bank of Jordan prior to 1985.

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library, Amman - Jordan

AVAILABILITY OF REPORT: Available

119
TITLE: The Pollution in Some Underground Waters of Ain Ghazal (Report)
AUTHOR(S): Dr. Raja H. Gedeon, Natural Resources Authority
PUBLISHER:
PAGES: 24
PUBLICATION DATE: March 1973
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The study involved testing samples from 3 wells (after pumping) for chemical toxins in Ain Ghazal Area, in order to investigate the effect of Al-Seil Stream on the water resources in the area.

ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED:
Water Authority of Jordan / The Library
Amman - Jordan

AVAILABILITY OF REPORT: Available

120
TITLE: Radiological and Chemical Hazards Associated with Natural Series Radionuclides the Amman - Zarqa Basin (Case Study)
AUTHOR(S): B. Smith, J. H. Powell, R. Gedeon, H. Amro
PUBLISHER:
PAGES: 20
PUBLICATION DATE: 22 - 25 April 1996
LANGUAGE OF PUBLICATION: English

ABSTRACT:
This paper describes studies investigating the vulnerability of groundwater resources in the Amman - Zarqa Basin of Jordan to contamination by natural series radionuclides (U, Th, 226Ra and 222Rn) potentially derived from sedimentary phosphorite deposits which overlie aquifers within the basin. Data are presented from: (a) the analysis of groundwater samples and soils for natural series radionuclides and other potentially harmful trace elements, and (b) an assessment of the potential hazard resulting from the presence of these elements.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
British Geological Survey (BGS)
Keyworth
Nottingham
NG12 5GG
Tel. : (+) 441-15-936-3100
Fax : (+) 441-15-936-3200
United Kingdom

Water Authority of Jordan
Laboratories and Water Quality Department
Wadi Sir,
P.O. Box 2412
TEL. : (+) 962 - 6 - 680100
FAX : (+) 962 - 6 - 679143
Amman - Jordan

AVAILABILITY OF REPORT: Available

121
TITLE: Groundwater Protection in the Arab Region (ACSAD)
AUTHOR(S): Working Group: Kamal F. Saad
Jean Khouri
Abdullah Al-Drouby
Raja Gedeon
Abdin Salih
PUBLISHER: Arab Center for Studies of Arid Zones and Dry Lands (ACSAD)
PAGES: 158
PUBLICATION DATE: 1995
LANGUAGE OF PUBLICATION: English

ABSTRACT:
The present work was supported by UNESCO and ACSAD to promote wider and effective regional and international efforts in the field of Groundwater Protection and Sustainable Management.

This report, which constitutes the First Phase of a further comprehensive study, will focus on identifying the state-of-the-art of groundwater situation in the Arab region. This implies exploring and exploiting groundwater basins with reference to the basic concepts, actions and impacts of the prevailing forms of the groundwater deterioration. Part I presents a general overlook of groundwater availability and utilization in the Arab region including the groundwater basins and their quantitative and qualitative aspects. Part II covers the basic concepts of prevailing groundwater deterioration problems in respect to depletion, contamination, and deterioration due to climatic changes.

Part III is concerned with the state-of-the-art of groundwater deterioration in the Arab region based on four subregions, namely, the Arabian Peninsula (Saudi Arabia, Kuwait, Bahrain, Qatar, U.A. Emirates, Oman, and Yemen), the Mashrek (Iraq, Syria, Jordan, Lebanon and Palestine), the Nile Valley (Egypt, Sudan, Somalia and Djibouti), and the Maghreb (Morocco, Algeria, Tunisia, Libya and Mauritania). Adequate methods for groundwater protection are described in part IV. The final part contains conclusions of the overall aforementioned study and presents some specific recommendations, in form of sub-projects, for future actions.

ADDRESSES FROM WHICH THE REPORT CAN BE OBTAINED:
United Nations Educational, Scientific and Cultural Organization (UNESCO)
Tel. : (202) 3551177 / 3556319
Fax : (202) 3545296
Tlx. : 9772 Rost UN
E-Mail : UHSAL@UNESCO.org
8 Abdel Rahman Fahmy St.,
Garden City, Cairo 11511
Egypt

Arab Center for Studies of Arid Zones and Dry Lands (ACSAD)

AVAILABILITY OF REPORT: Available

Palestinian Publications

1
TITLE: Water Resources Data for Decision Making in the Middle East.(3-Volumes)
AUTHOR(S): J. M. Trolldalen, N. P. Fjeld, J. Gjessing
PUBLISHER: Centre for Environmental Studies And Resource Management (CESAR)
PAGES: Volume 1, 68P. Volume 2, 184P. Volume 3, 531P.
PUBLICATION DATE: 1995
LANGUAGE OF PUBLICATION: English
ABSTRACT: This publication aims to reflect the various needs for information related to water resources; to provide the regional core parties with an overview of available scientific information and data related to water resources; give input to the <regional data-bank> initiative under the Multilateral Peace Talks on Water Resources; and give input to the Palestinian endeavour in establishing a Palestinian Water Authority.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: CESAR, P.O. Box 1140, Blindern, N-0317, Oslo, Norway. Fax: +4722858172
AVAILABILITY OF REPORT: A copy is available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

2
TITLE: Water Sector Capacity Building in Palestine
AUTHOR(S): International Institute for Infrastructural, Hydraulic and Environmental Engineering (IHE) Birzeit University (BZU)
PUBLISHER: IHE, The Netherlands
PAGES: 37
PUBLICATION DATE: February 1996
LANGUAGE OF PUBLICATION: English
ABSTRACT: BZU and IHE worked out a 5-year programme to develop training, education, and research capacity at Birzeit university. This proposal contains the plans for the establishment of a course in Masters in Water Engineering with a minimum duration of 3 semesters, and covering the fields of water supply, sanitation, and groundwater resources management. It also proposes to develop applied research capacity to establish a 'knowledge' base within the Department of Civil Engineering (DCE) that will serve the M.Sc. Course and the Palestinian Authority in developing is water sector. The project will further contribute to the strengthening of DCE through the improvement of its curricula, training of staff and upgrading of the library and laboratory facilities, and develop activities for the dissemination of knowledge and information.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Birzeit University, P.O. Box 14, Birzeit. Tel: (02)9982000
AVAILABILITY OF REPORT: A copy is available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

3
TITLE: Gaza Water Resources
AUTHOR(S): Anonymous
PUBLISHER: Ministry of Planning, Gaza
PAGES: 55
PUBLICATION DATE: March 1996
LANGUAGE OF PUBLICATION: English
ABSTRACT: This book summarizes the results of water resources assessments carried out by the Gaza Environmental Profile (GEP) project jointly with the Water Resources Action Programme (WRAP). In addition it simplifies the results of many studies, workshops and discussions into pragmatic and realistic policy directions.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Ministry of Planning, Gaza. Tel: (07)829260, (07)821655
AVAILABILITY OF REPORT: A copy is available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

4
TITLE: Palestinian Water Resources, a Rapid Interdisciplinary Sector Review and Issues Paper
AUTHOR(S): The Water Resources Action Programme (WRAP) Taskforce
PUBLISHER: WRAP
PAGES: 52
PUBLICATION DATE: October 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: This report reviews the status of the water resources sector in the Palestinian territories and identifies and prioritize the issues - threats, constraints, and opportunities - that the sector faces. In addition, the report is aimed at the numerous external agencies supporting the sector, as it provides information on sector needs, guidance on priorities and a road map of active institutions and their current and planned activities.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: Out of print, photocopies available at PWA library

5
TITLE: Water Conservation in Palestine
AUTHOR(S): Centre for Engineering and Planning (CEP)
PUBLISHER: CEP
PAGES: 70
PUBLICATION DATE: March 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: This report provides a review of the existing water resource sector including the natural resources, the institutions and human resources, and the infrastructure devoted to the sector. The potential water conservation measures and practices applicable to Palestine are described, and a recommendation of investment and technical assistance priorities is also included.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: CEP, P.O. Box 301, Ramallah, West Bank
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

6
TITLE: Water in the Middle East, Conflict or Co-operation?
AUTHOR(S): Thomas Naff, Ruth C. Matson (Ed.)
PUBLISHER: Westview Press, United States of America
PAGES: 236
PUBLICATION DATE: 1984
LANGUAGE OF PUBLICATION: English
ABSTRACT: This study examines the hydrological, legal, and strategic dimensions of water problems in the Middle East and discusses their implications for the future.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA) library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: Out of print, a copy is available at PWA library

7
TITLE: Legal Status of West Bank Groundwater Resources
AUTHOR(S): Palestinian Hydrology Group (PHG), Land and Water Establishment for Legal Services
PUBLISHER: PHG
PAGES: 55
PUBLICATION DATE: 1991
LANGUAGE OF PUBLICATION: English
ABSTRACT: The case document observes that present and previous modes of exploitation of West Bank water resources by Israel run contrary to international practise; it includes that the ending of unilateral, exclusive and discriminatory measures in respect of West Bank water resources are both requirements in the context of occupation and necessary prerequisites for regional water sharing and for future peace in the region.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: PHG, P.O. Box 25220, Shu'fat, West Bank. Tel: (02) 6565890
AVAILABILITY OF REPORT: Available at PHG library

8
TITLE: Hydrological Monitoring in Palestine - Status and Planning of the National Programme
AUTHOR(S): The Water Resources Action Programme (WRAP)
British Geological Survey (BGS)
Institute of Hydrology (IH)
PUBLISHER: Palestinian Water Authority (PWA)
PAGES: 31
PUBLICATION DATE: June 1996
LANGUAGE OF PUBLICATION: English
ABSTRACT: The body of the report documents the state of hydrological monitoring in the West Bank and Gaza Strip, and provides background material to aid in the planning and assessment of the Palestinian National Hydrological Monitoring Programme.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: PWA, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: Available free of charge from the PWA

9
TITLE: Joint Management of Shared Aquifers (two volumes)
AUTHOR(S): Eran Feitelson, Marwan Haddad (Ed.)
PUBLISHER: Truman Institute and the Palestine Consultancy Group (PCG)
PAGES: Volume 1 (167 p.); Volume 2 (322 p.)
PUBLICATION DATE: Volume 1-June 1994, Volume 2-December 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: In the first volume, the papers by the participating experts are presented in several sections. The purpose is to identify appropriate structures for joint Israeli-Palestinian management of their shared aquifers. The aim of the workshop was to identify the main issues such structures would need to address, as well as to survey current thinking and experience regarding the joint management of shared aquifers. The second volume concentrates on three issues that are of particular importance in our setting: The potential of water markets in the context of joint management and shared aquifers; institutional structures for joint management of such aquifers; and the legal aspects of joint management of shared aquifers with special attention to the Israeli-Palestinian case.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: PCG, P.O. Box 19322, East Jerusalem
AVAILABILITY OF REPORT: A copy is available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

10
TITLE: Watershed, The Role of Fresh Water in the Israeli-Palestinian Conflict
AUTHOR(S): Stephen C. Lonergan, David B. Brooks
PUBLISHER: International Development Research Centre (IDRC) Canada
PAGES: 312
PUBLICATION DATE: 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: This book reviews the "three crises" of water: the water quantity crisis, which is economic in character; the water quality crisis, which is ecological; and the geostrategic crisis, which is political. The authors conclude with a set of regional options and policy recommendations. The analysis is limited primarily to the Israeli-Palestinian conflict, but Syrian and Jordanian interests are also treated on occasion.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: A copy is available at the PWA library

11
TITLE: The Middle East Conflict Viewed Through Water - A Historical View
AUTHOR(S): Gideon Fishelson
PUBLISHER: Tel Aviv University
PAGES: 40
PUBLICATION DATE: November 1989
LANGUAGE OF PUBLICATION: English
ABSTRACT: This study provides the historical background for co-operation in water. However, the study is limited to the area of the west of the Jordan River with only minor extensions to water projects undertaken in the past in countries bordering this area. The history of the development of water resources mainly in Israel and of the relations between Israel and its neighboring countries as they relate to the issue of water.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Tel Aviv University
AVAILABILITY OF REPORT: A copy is available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

12
TITLE: Availability and Reliability of Secondary Source, Hydrogeological Data for the West Bank with Additional Reference Material for Gaza Strip
AUTHOR(S): Ayman Rabi, Fadia Daibes, Amjad Aliewi
PUBLISHER: Palestinian Hydrology Group (PHG)
PAGES: 42
PUBLICATION DATE: June 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: In this report the salient features of the secondary source hydrological data for the West Bank are identified and examined. The report provides background to the available hydrological data in the area.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: PHG, P.O. Box 25220, Shu'fat, West Bank. Tel: (02) 6565890
AVAILABILITY OF REPORT: Available at the PHG library

13
TITLE: Analysis of Secondary Source Rainfall Data From the Northern West Bank
AUTHOR(S): Samar Husary, Taghreed Najjar, Amjad Aliewi
PUBLISHER: Palestinian Hydrology Group (PHG)
PAGES: 214
PUBLICATION DATE: December 1995
LANGUAGE OF PUBLICATION: English
ABSTRACT: This report provides an analysis of secondary source rainfall data for the northern West Bank. The purpose of this report is to bring together in one source rainfall data dispersed between a number of different Palestinian and Israeli data holders; to provide a comprehensive overview and analysis of rainfall data available for the last forty years for the northern West Bank and; to provide clear secondary rainfall data which will help in the establishment of a comprehensive Palestinian water resources information system.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: PHG, P.O. Box 25220, Shu'fat, West Bank. Tel: (02) 6565890
AVAILABILITY OF REPORT: Available at the PHG library

14
TITLE: The Role of Reclamation and Reuse in Addressing Community Water Needs in Israel and the West Bank; found in Water and Peace in the Middle East, Edited by J. Isaac and H. Shuval
AUTHOR(S): Daniel A. Okun
PUBLISHER: Elsevier
PAGES: 10
PUBLICATION DATE: 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: The purpose of this paper is to suggest that water reclamation and reuse be extended beyond solely agricultural irrigation to urban and industrial uses in communities throughout Israel and the West Bank.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Elsevier Science B.V, Molenwerf 1, P.O. Box 211, 1000 AE Amsterdam, The Netherlands
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

15
TITLE: Water Policy in the Context of Palestinian Self-government; found in Water and Peace in the Middle East, Edited by J. Isaac and H. Shuval
AUTHOR(S): Ann Mosely Lesch
PUBLISHER: Elsevier
PAGES: 14
PUBLICATION DATE: 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: An Israeli-Palestinian agreement on an interim period would alter the relationship between the two parties concerning the control and utilization of water. The principles of equity and mutuality form the basis of water use in Israel, the West Bank and Gaza Strip. The Interim Self-Governing Authority (ISGA) would establish a water department to plan and monitor water use and would participate with Israel in joint bodies to regulate the aquifers. Regional water projects might supplement the water projects implemented by Israel and the ISGA.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Elsevier Science B.V, Molenwerf 1, P.O. Box 211, 1000 AE Amsterdam, The Netherlands
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

16
TITLE: Proposed Principles and Methodology for the Equitable Allocation of the Water Resources Shared by the Israelis, Palestinians, Jordanians, Lebanese, and Syrians; found in Water and Peace in the Middle East, Edited by J. Isaac and H. Shuval
AUTHOR(S): Hillel Shuval
PUBLISHER: Elsevier
PAGES: 16
PUBLICATION DATE: 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: This paper presents a methodology to analyze the water needs of the five riparians sharing the international water resources of the area. The methodology proposed concentrates on evaluating the human needs of each partner in an equitable manner. It is proposed that one of the prime considerations in determining the degree of obligation of potential donor riparians, in assisting water short parties.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Elsevier Science B.V, Molenwerf 1, P.O. Box 211, 1000 AE Amsterdam, The Netherlands
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

17
TITLE: The Development of a Water Resource Management Infrastructure for the West Bank and Gaza; found in Water and Peace in the Middle East, Edited by J. Isaac and H. Shuval
AUTHOR(S): S. B. Parsons
PUBLISHER: Elsevier
PAGES: 8
PUBLICATION DATE: 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: This paper outlines the perceived needs for scientific water management, and the components necessary for developing an indigenous management capability that can tackle the pressing water related problems of the region.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Elsevier Science B.V, Molenwerf 1, P.O. Box 211, 1000 AE Amsterdam, The Netherlands
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

18
TITLE: A General View of the Water Situation in the Occupied Palestinian Territories; found in Water and Peace in the Middle East, Edited by J. Isaac and H. Shuval
AUTHOR(S): Mohammed Mousa
PUBLISHER: Elsevier
PAGES: 6
PUBLICATION DATE: 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: Israeli control over water resources and services favor the growth of Israeli agriculture and industry at the expense of these sectors of the Palestinian economy. Palestinian households also suffer from poor quality water which do not always meet the specifications of international health organizations and from Israeli restrictions limiting consumption. Military orders and obstacles obstructing the provision of quality drinking water and sufficient quantities for agriculture and industry are analyzed.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Elsevier Science B.V, Molenwerf 1, P.O. Box 211, 1000 AE Amsterdam, The Netherlands
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

19
TITLE: Nitrate Formation and Transport Through Sandy Soils (M.Sc. Thesis)
AUTHOR(S): Majeda Alawneh
PUBLISHER: Unpublished
PAGES: 30
PUBLICATION DATE: April 1996
LANGUAGE OF PUBLICATION: English
ABSTRACT: The Gaza Strip in Palestine is suffering from a serious pollution problem of nitrate and chloride contaminated groundwater. The report gives an overview and discusses the various sources of the extremely high nitrate concentrations in the Gaza Strip. The work is based on laboratory analyses of solutions in a soil column.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: A copy is available at the PWA library

20
TITLE: Effects of Simulated Palestine Sewage on Lemna-gibba Growth (M.Sc. Thesis)
AUTHOR(S): Bassam Sha'lan
PUBLISHER: Unpublished
PAGES: 27
PUBLICATION DATE: April 1996
LANGUAGE OF PUBLICATION: English
ABSTRACT: The aim of this research is to study the effect of high concentrations of COD and NH4-N, typically present in the wastewater of Palestine, on the growth rate, biomass production and removal efficiencies by Lemna gibba; one of the species of duckweed. The report discussed the use of duckweed plants for wastewater treatment. Duckweed based system is used in secondary and tertiary treatment. The technology and its advantages are discussed.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: A copy is available at the PWA library

21
TITLE: An Assessment of Groundwater Quality and a Reversed Osmosis Pilot Desalination Plant in Palestine (M.Sc. Thesis)
AUTHOR(S): Amal Hudhud
PUBLISHER: Unpublished
PAGES: 56
PUBLICATION DATE: April 1996
LANGUAGE OF PUBLICATION: English
ABSTRACT: A review of the principle aspects of designing and operating a reverse osmosis plant is presented. An evaluation of a brackish water desalination plant at Deir El-Ballah (Gaza Strip) is included as the case study. The investigation touches on the feasibility of treating brackish water in Palestine through the consideration of water quality in different regions.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: A copy is available at the PWA library

22
TITLE: Hydrogeological Investigations in the Eastern Basin of the West Bank (M.Sc. Thesis)
AUTHOR(S): Manal M. Y. Ba'ba'
PUBLISHER: Unpublished
PAGES: 85
PUBLICATION DATE: April 1996
LANGUAGE OF PUBLICATION: English
ABSTRACT: The study focuses on the eastern groundwater basin in the West Bank. Groundwater data from all available sources are processed and analyzed in order to define the aquifer systems in the eastern basin to define groundwater balances for spring flow catchments in the basin and to delineate the spring catchment areas. Series of yearly recharge and discharge volumes for 6 main spring catchment flow systems were established.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: A copy is available at the PWA library

23
TITLE: Computer Modelling of Water Distribution Systems with Intermittent Supply (M.Sc. Thesis)
AUTHOR(S): Maher Omar Rushdi Abu Madi
PUBLISHER: Unpublished
PAGES: 40
PUBLICATION DATE: April 1996
LANGUAGE OF PUBLICATION: English
ABSTRACT: This thesis is on a computer modelling of intermittent water supply systems consisting of roof tanks, taking Tulkarem as a case study. The difficulty in modelling of intermittent supply systems lies in proper description of the relation between water demand and water supply. The concept of nodal demand, used in modelling as direct supply, cannot be used in this case. For this reason another approach is proposed for modelling of roof tanks. A number of houses of similar characteristics located close to each other were represented by one equivalent reservoir having a large surface area and a capacity equal to the volume of all roof tanks.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: A copy is available at the PWA library

24
TITLE: Wastewater Treatment Strategies in Palestine (M.Sc. Thesis)
AUTHOR(S): Majda M. Nashashibi
PUBLISHER: Unpublished
PAGES: 88
PUBLICATION DATE: April 1995
LANGUAGE OF PUBLICATION: English
ABSTRACT: This thesis is aimed at measuring qualities of wastewater in Palestine, quantifying this unconventional resource, formulating treatment strategies based on international guidelines and proposing treatment schemes for wastewater treatment. The performance of the existing treatment plants is evaluated, and recommendations are presented to upgrade them. In the cities where no treatment exists, treatment plants are proposed depending upon several aspects such as annual cost of treatment, complexity of operation and maintenance, etc.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: A copy is available at the PWA library

25
TITLE: Rehabilitation of Jabalia Wastewater Treatment Plant for Agricultural Reuse (M.Sc. Thesis)
AUTHOR(S): Mohammed M. Al-Muqaied
PUBLISHER: Unpublished
PAGES: 70
PUBLICATION DATE: March 1996
LANGUAGE OF PUBLICATION: English
ABSTRACT: There is no available data concerning the characteristics of Jabalia raw wastewater. Therefore, it is the aim of this thesis to measure the composition of the influent and effluent sewage, and the daily hourly flow variations in order to determine the biological load to the treatment plant. It will also examine the performance of the different units of the treatment plant.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: A copy is available at the PWA library

26
TITLE: Groundwater Data Assessment and Model Building for Gaza Strip/Palestine (M.Sc. Thesis)
AUTHOR(S): Ghassan Abu Ju'ub
PUBLISHER: Unpublished
PAGES: 126
PUBLICATION DATE: April 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: This report concentrates on the hydrogeology of the Gaza Strip. It gives a description of the different steps that were followed during the building of the model, the calibration of the model in order to determine the different hydrogeological parameters of the aquifer, and the different scenarios and calculations that were done during the study. Finally, it includes the results, conclusions, and recommendations related to the whole study.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: A copy is available at the PWA library

27
TITLE: Reuse of Saline Wastewater in Gaza City (M.Sc. Thesis)
AUTHOR(S): Husam Muhammed Al-Najar
PUBLISHER: Unpublished
PAGES: 80
PUBLICATION DATE: March 1996
LANGUAGE OF PUBLICATION: English
ABSTRACT: Reuse of saline wastewater for irrigation of selected crops and recharge is the main theme of the research. Groundwater modelling was carried out to determine the effect of recharge on groundwater quality and quantity in Gaza Strip.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: A copy is available at the PWA library

28
TITLE: Impact of Groundwater Pollution on Water Supply in Gaza Strip (M.Sc. Thesis)
AUTHOR(S): Badir Ali Abuzahrah
PUBLISHER: Unpublished
PAGES: 76
PUBLICATION DATE: March 1995
LANGUAGE OF PUBLICATION: English
ABSTRACT: According to the author in absence of measures to protect the environment in the Gaza Strip, groundwater is assumed to be polluted by sewage effluent and cesspools, solid waste and intensive agricultural use of fertilizers. After percolation of waste water and irrigation return flow, pollutants present in these waters will reach the groundwater and finally pollute the aquifer. Suggestions for pollution prevention are given, and to produce potable drinking water from polluted groundwater appropriate water treatment processes are proposed and discussed.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: A copy is available at the PWA library

29
TITLE: Perennial Yield Management and Water Quality Optimisation in the Gaza Strip Aquifer, Palestine (M.Sc. Thesis)
AUTHOR(S): Abdul-Latif M. M. Abdul-Halim
PUBLISHER: Unpublished
PAGES: 90
PUBLICATION DATE: April 1996
LANGUAGE OF PUBLICATION: English
ABSTRACT: This report analyses the major recent and (desired) future trends in water quality and quantity management for the Gaza area, with a special focus on saltwater intrusion and groundwater recovery.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: A copy is available at the PWA library

30
TITLE: Wastewater Collection in Deir El Ballah Region; Technical Institutional and Financial Feasibility (M.Sc. Thesis)
AUTHOR(S): A. Majid Nassar
PUBLISHER: Unpublished
PAGES: 80
PUBLICATION DATE: March 1996
LANGUAGE OF PUBLICATION: English
ABSTRACT: This thesis investigates the appropriateness of various sewer collection systems. Also an assessment was made of present operation and maintenance of sanitation systems through interviews with responsible persons and analysis of available documents.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: A copy is available at the PWA library

31
TITLE: Artificial Recharge of the Coastal Aquifer in the Gaza Strip
AUTHOR(S): J. Blom et.al.
PUBLISHER: Ministry of Foreign Affairs, Netherlands.
PAGES: 70
PUBLICATION DATE: November 1995
LANGUAGE OF PUBLICATION: English
ABSTRACT: According to the author: groundwater abstractions in the Gaza Strip and the Azraq basin exceed the safe aquifer yield. To ensure a sustainability of the aquifer system the pumping has to be increased through artificial recharge. On the demand side water savings could be realized by more efficient use of water. In agriculture, traditionally one of the major water demand sectors, the water consumption could be reduced through changes to crops which require less water or through more efficient irrigation methods.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Ministry of Foreign Affairs, Netherlands.
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

32
TITLE: Developing the Occupied Territories, An Investment in Peace, Vol. 5.
AUTHOR(S): The World Bank
PUBLISHER: The World Bank
PAGES: 110
PUBLICATION DATE: 1993
LANGUAGE OF PUBLICATION: English
ABSTRACT: This study aims at assessing the current situation in the infrastructure sectors (power, water supply and sanitation, transport, housing and solid waste services) in the Occupied Territories, and development needs. Also the report primarily focuses on sectors where public authorities would play a direct role in the provision of services. With the implementation of the recommended strategy for private sector development outlined elsewhere in the study, it is expected that these services will be provided by private enterprises.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: World Bank, Washington
AVAILABILITY OF REPORT: A copy is available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

33
TITLE: Water in the Jordan Catchment Countries: a Critical Evaluation of the Role of Water & Environment in Evolving Relations in the Region
AUTHOR(S): J. A. Allan, J. H. O. Court
PUBLISHER: School of Oriental and African Studies (SOAS)
PAGES: 107
PUBLICATION DATE: 1995
LANGUAGE OF PUBLICATION: English
ABSTRACT: This report presents & discusses the conflict over water resources in the Middle East with possible & alternative solutions to this conflict. The first step of any attempt to solve the conflict depends on the realization that negotiation in good will is the way to solve the conflict, the second step consists of that any solution should be in a comprehensive and integrated in manner including the adaptation of a water charter for the region, the optimization of water use in agriculture and pricing policies for water.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: SOAS, Thornhaugh Street, London, WC1H OXG. Fax: +44(01)1714363844
AVAILABILITY OF REPORT: A copy is available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

34
TITLE: Report on the Workshop on Wastewater Institutional Development held at El-Bireh Municipality - West Bank (15-17 August 1995)
AUTHOR(S): Water Resources Action Programme (WRAP)
PUBLISHER: Unpublished
PAGES: 18
PUBLICATION DATE: August 1995
LANGUAGE OF PUBLICATION: English
ABSTRACT: The objective of the Workshop was defined as: establishing an institutional framework for wastewater management and service delivery in Palestine. As an output of the Workshop, the report makes recommendations on the institutional framework for the wastewater sector in Palestine.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: Out of print, Photocopies available at the Palestinian Water Authority library

35
TITLE: Study of the Hydrological Situation in Gaza Strip; found in Proceedings Volume 1, VIII IWRA World Congress on Water Resources
AUTHOR(S): Yousef Abu-Mailah
PUBLISHER: International Water Resources Association (IWRA)
PAGES: 29
PUBLICATION DATE: November 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: The study discusses the water situation in the Gaza Strip. According to the author, the future water supply in Gaza Strip faces a serious threat in terms of quality and quantity, due to the rapid deterioration, over consumption by Israeli settlers and sea water intrusion; the main characteristic features of the Gaza Strip aquifer are negative water level decrease. Also the study indicates that the hydrological and ecological situation of the groundwater aquifers in the Gaza Strip is facing a real threat and there should be a real and practical solution for this crisis.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: IWRA, Cairo, Egypt
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

36
TITLE: Water Prices as a Tool for Optimising Water Use in Palestine
AUTHOR(S): Abdel-Karim Asa'd
PUBLISHER: Unpublished
PAGES: 17
PUBLICATION DATE: May 1996
LANGUAGE OF PUBLICATION: English
ABSTRACT: Financial and economic measures are important tools for water demand management. Water tariffs and water prices have a direct effect in controlling the water demand in areas where water is considered a rare and scarce commodity as the case is in Palestine. The use of varying water tariff and price categories can result in transferring water use from one economic sector to another or in encouraging water use within the same sector, in accordance to present national plans. Due to the direct impact of prices on national plans, financial measures should be reviewed, monitored, and controlled by the regulating body of the water sector.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Jerusalem Water Undertaking (JWU), Ramallah, West Bank. Tel: (02) 9956551
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

37
TITLE: Water Demand Management
AUTHOR(S): Abdel-Karim Asa'd
PUBLISHER: Unpublished
PAGES: 25
PUBLICATION DATE: June 1996
LANGUAGE OF PUBLICATION: English
ABSTRACT: The deteriorated state of the water infrastructure in Palestine is reflected in huge losses. Unaccounted for water amounts to about 50% of the total water supplied. Rehabilitation of water systems leads to substantial decrease in the water quantities lost due to leakage, seepage, runoff, etc. The rehabilitation process will help control the ever increasing demand on water in the country.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Jerusalem Water Undertaking (JWU), Ramallah, West Bank. Tel: (02) 9956551
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

38
TITLE: World Bank Study of the West Bank and Gaza: Water Supply and Sanitation
AUTHOR(S): The World Bank
PUBLISHER: The World Bank
PAGES: 18
PUBLICATION DATE: 1992
LANGUAGE OF PUBLICATION: English
ABSTRACT: This report discusses the water situation in the West Bank and Gaza, and conflicting Israeli/ Palestinian data on the situation.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: World Bank, Washington
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

39
TITLE: Report on the Brackish Water Desalination Plant at Deir El Ballah
AUTHOR(S): Anonymous
PUBLISHER: Richard Morris and Associates
PAGES: 43
PUBLICATION DATE: October 1993
LANGUAGE OF PUBLICATION: English
ABSTRACT: This is a study of the possibilities for brackish water desalination in the Gaza Strip, within the framework of the regional co-operation on water resources in Middle East countries involved in the peace process. The report also contains a number of recommendations, one of which is that a monitor should be maintained on a brackish water desalination plant which the Israeli Authorities plan to install and commission at Deir El-Ballah during the summer of 1993. The mission felt that plants of this type could play an important role in water supply and improvement in Gaza.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Richard Morris and Associates, 9 Letham Drive, Newlands, Glasgow, G43 2SL. Tel: +41 6373146
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

40
TITLE: Strategy for a Systematic Approach to Training in the Palestinian Water and Sanitation Sector
AUTHOR(S): Tony Richards
PUBLISHER: Unpublished
PAGES: 20
PUBLICATION DATE: August 1996
LANGUAGE OF PUBLICATION: English
ABSTRACT: The purpose of this report is to propose a strategy for the introduction of a systematic national training concept for the Palestinian water and sanitation sector. The report examines the basis for a national training policy and considers the introduction of performance based qualifications. Then, within the proposed policy, the report proposes a strategy for the cost effective implementation of a systematic approach to training. Finally the report sets out a proposal for donor support to finance the technical assistance necessary to implement the strategy, together with preliminary terms of reference for the provision of international consultancy assistance.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: Photocopies available at the PWA library

41
TITLE: Ramallah District Sewerage Management Master Plan
AUTHOR(S): Centre for Engineering and Planning (CEP)
PUBLISHER: CEP
PAGES: 84
PUBLICATION DATE: August 1996
LANGUAGE OF PUBLICATION: English
ABSTRACT: The purpose of this presentation is to update the steering committee on the project status and progress, present an updated project schedule and future activities. The presentation contains an outline of planning principles and proposed physical plans, draft phasing of the physical plans, requirements for the implementation in terms of human resources and capital and recurrent expenditure, and a study of institutional options.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: CEP, P.O. Box 301, Ramallah.
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

42
TITLE: Hydrogeological Data Book of the Gaza Strip/Volume 1: Water Table (1984-1994)
AUTHOR(S): Water Resources Action Programme (WRAP), Gaza Environmental Profile (GEP)
PUBLISHER: Palestinian Water Authority (PWA)
PAGES: 240
PUBLICATION DATE: September 1995
LANGUAGE OF PUBLICATION: English
ABSTRACT: This volume contains location maps of groundwater level monitoring wells, characteristics of monitoring wells, groundwater table contour maps, and water level data.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: A copy is available at the PWA library. Also available in digital form

43
TITLE: Hydrogeological Data Book of the Gaza Strip/ Volume 2: Chloride Content and Electrical Conductivity of Groundwater (1970-1995)
AUTHOR(S): Water Resources Action Programme (WRAP), Gaza Environmental Profile (GEP)
PUBLISHER: Palestinian Water Authority (PWA)
PAGES: 276
PUBLICATION DATE: September 1995
LANGUAGE OF PUBLICATION: English
ABSTRACT: In this data book, some water quality data for the Gaza Strip are presented for the period (1970-1995). The data is basically on chloride concentration and EC values.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: A copy is available at the PWA library. Also available in digital form

44
TITLE: Hydrogeological Data Book of the Gaza Strip/Volume 3: Nitrate Content of Groundwater (1977-1995)
AUTHOR(S): Water Resources Action Programme (WRAP), Gaza Environmental Profile (GEP)
PUBLISHER: Palestinian Water Authority (PWA)
PAGES: 260
PUBLICATION DATE: September 1995
LANGUAGE OF PUBLICATION: English
ABSTRACT: In this data book, some water quality data for the Gaza Strip are presented for the period (1970-1995). The data is basically on nitrate concentration.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: A copy is available at the PWA library. Also available in digital form

45
TITLE: Hydrogeological Data Book of the Gaza Strip/Volume 4: Chemical Analyses of Major Ions in Groundwater (1976-1995)
AUTHOR(S): Water Resources Action Programme (WRAP), Gaza Environmental Profile (GEP)
PUBLISHER: Palestinian Water Authority (PWA)
PAGES: 260
PUBLICATION DATE: September 1995
LANGUAGE OF PUBLICATION: English
ABSTRACT: In this data book, some water quality data for the Gaza Strip are presented for the period (1976-1995). The data is basically on major ions time series per well.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: A copy is available at the PWA library. Also available in digital form

46
TITLE: Hydrogeological Data Book of the Gaza Strip/Volume 5: Lithological Well Logs
AUTHOR(S): Water Resources Action Programme (WRAP), Gaza Environmental Profile (GEP)
PUBLISHER: Palestinian Water Authority (PWA)
PAGES: 160
PUBLICATION DATE: September 1995
LANGUAGE OF PUBLICATION: English
ABSTRACT: This volume contains: a selection of lithological logs for water wells in the Gaza Strip.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: A copy is available at the PWA library. Also available in digital form

47
TITLE: Hydrogeological Data Book of the Gaza Strip/Volume 6: Rainfall and Evaporation (1968-1995)
AUTHOR(S): Water Resources Action Programme (WRAP), Gaza Environmental Profile (GEP)
PUBLISHER: Palestinian Water Authority (PWA)
PAGES: 180
PUBLICATION DATE: September 1995
LANGUAGE OF PUBLICATION: English
ABSTRACT: This volume contains a map showing the distribution of rain stations as will as rainfall and evaporation data for the Gaza Strip.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: A copy is available at the PWA library. Also available in digital form

48
TITLE: Artesian Wells in Palestine - Present Status and Future Aspirations
AUTHOR(S): Hisham Awartani
PUBLISHER: Palestinian Hydrology Group (PHG)
PAGES: 88
PUBLICATION DATE: November 1992
LANGUAGE OF PUBLICATION: Arabic + English Summary
ABSTRACT: This study deals with one of the major water resources in the West Bank and Gaza Strip: artesian wells. It deals with wells owned by the Palestinians as well as those controlled by the Israeli occupation.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: PHG, P.O. Box 25220, Shu'fat, West Bank. Tel: (02)6565890
AVAILABILITY OF REPORT: Available at the PHG library

49
TITLE: Design Construction and Chemical Analysis of Deir Sharaf Well and Assessment of the Properties of the Upper Beit Kahil Aquifer in the Nablus Area
AUTHOR(S): Amjad Aliewi et.al.
PUBLISHER: Palestinian Hydrology Group (PHG)
PAGES: 88
PUBLICATION DATE: May 1995
LANGUAGE OF PUBLICATION: English/Arabic
ABSTRACT: The objective of this report is to document data arising from the drilling, design, construction, pumping, and chemical analysis of the Deir Sharaf well No.2a. used and analyzed. The data is analyzed for investigation of the physical, geological and hydraulic properties of the Upper Beit Kahil Formation. The report also determines the suitability of the aquifer, and other aquifer formations of close proximity.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: PHG, P.O. Box 25220, Shu'fat, Wet Bank. Tel: (02)6565890
AVAILABILITY OF REPORT: Available at the PHG library

50
TITLE: Map of Water Resources and Networks
AUTHOR(S): Health Development Information Project (HDIP)
PUBLISHER: HDIP
PAGES: 1
PUBLICATION DATE: April 1996
LANGUAGE OF PUBLICATION: English
ABSTRACT: This map shows the Palestinian communities, springs, wells, communities with piped water network, and communities without piped water network. The scale of the map is 1:150,000.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: HDIP, P.O. Box 1351, Ramallah, West Bank.
AVAILABILITY OF REPORT: Available - HDIP

51
TITLE: Palestinian Freshwater Springs
AUTHOR(S): Mustafa Nusseibeh, Taher Nasser Eddin
PUBLISHER: Palestine Consultancy Group (PCG)
PAGES: 82
PUBLICATION DATE: 1995
LANGUAGE OF PUBLICATION: Arabic/English
ABSTRACT: This publication presents the importance of the Palestinian freshwater springs concerning the domestic, industrial, and agricultural purposes. It includes monthly measurements of spring discharge and maps showing the location of springs in every catchment area. Water quality data are also included.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: PCG, P.O. Box 19322, East Jerusalem. Fax: (02) 744660
AVAILABILITY OF REPORT: Available - PCG

52
TITLE: Water Resources of the Occupied Palestinian Territory
AUTHOR: United Nations (U.N.)
PUBLISHER: U.N.
PAGES: 105
PUBLICATION DATE: 1992
LANGUAGE OF PUBLICATION: English
ABSTRACT: The first section details the Jordan River Basin and groundwater resources involving the occupied Palestinian territories and introduces major Israeli projects diverting these water resources. The second section focuses on the effects Israeli annexation, land and settlement policies have on the Palestinian water economy. The third section outlines some of the principal legal and institutional constraints placed by Israel on the administration and management of the Palestinian water economy.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: U.N., Litho, New York, USA
AVAILABILITY OF REPORT: A copy is available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank

53
TITLE: A Strategy for Water Sector Capacity Building in Palestine
AUTHOR(S): Anonymous
PUBLISHER: International Institute for Infrastructural, Hydraulic and Environmental Engineering (IHE)
PAGES: 175
PUBLICATION DATE: September 1995
LANGUAGE OF PUBLICATION: English
ABSTRACT: This report focuses on the characteristics of water problems in Palestine. Water sector programmes and projects under implementation and planned are also discussed, in addition to how water sector institutions need to be developed, what capacity should be built and by whom this should be carried out.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Birzeit University, P.O. Box 14, West Bank.
AVAILABILITY OF REPORT: Available - Birzeit University library

54
TITLE: A Projection of the Demand for Water in the West Bank and Gaza Strip 1992-2005; found in Water and Peace in the Middle East, Edited by J. Isaac and H. Shuval
AUTHOR(S): Hisham Awartani
PUBLISHER: Elsevier
PAGES: 23
PUBLICATION DATE: 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: This study analyses the estimated demand for water in the occupied Palestinian territories between 1992-2005 based on a number of assumptions and variables. Per capita consumption is expected to rise as well as population due to birth rate, conditions in the Gulf states, and a peaceful settlement. Industry and agriculture will also require a greater annual allotment, particularly if the occupied territories are to develop and experience economic growth. Moreover, irrigated agriculture is expected to utilize more dunums than at present. Lastly, greater efficiency in water consumption as well as water distribution and conveyance will allow Palestinians to better conserve water.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Elsevier Science B.V, Molenwerf 1, P.O. Box 211, 1000 AE Amsterdam, The Netherlands
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

55
TITLE: Palestinian Water Supplies and Demands; found in Water and Peace in the Middle East, Edited by J. Isaac and H. Shuval
AUTHOR(S): Nader Al-Khatib, Karen Assaf
PUBLISHER: Elsevier
PAGES: 13
PUBLICATION ON DATE: 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: As the water resources in the area are very limited and cannot satisfy the expected increasing demands, it is necessary for the Palestinian people during this interim period to use all possible water enhancement systems, for example, setting-up a system for national water resources management and demand; recycling of wastewater for irrigation purposes; winter rains/flood water storage, including artificial groundwater recharge, rain harvesting and small dams, construction of the western Ghor Canal, and conducting studies and research on transferring appropriate water technology and regional transfer of water.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Elsevier Science B.V, Molenwerf 1, P.O. Box 211, 1000 AE Amsterdam, The Netherlands
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

56
TITLE: An Israeli-Palestinian Water-Sharing Regime; found in Water and Peace in the Middle East, Edited by J. Isaac & H. Shuval
AUTHOR(S): J. W. Moore
PUBLISHER: Elsevier
PAGES: 12
PUBLICATION DATE: 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: This paper outlines one possible approach to the problem of allocating the water of the three aquifers straddling the Green Line (the Yarqon Tanninim, Northern, and Nablus-Jenin aquifers) between Israel and the West Bank. It begins with a discussion of the principles of a comprehensive Israeli-Palestinian water-sharing regime, drawn from the (evolving) international law of transboundary groundwater. This is followed by a description of one set of procedures by which an equitable allocation of these shared groundwater can be determined.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Elsevier Science B.V, Molenwerf 1, P.O. Box 211, 1000 AE Amsterdam, The Netherlands
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

57
TITLE: The Development of the Water Resources of the Occupied Palestinian Territories: Some Key Issues; found in Water and Peace in the Middle East, Studies in Environmental Science 58, Edited by J. Isaac and H. Shuval
AUTHOR(S): D. R. C. Grey
PUBLISHER: Elsevier
PAGES: 10
PUBLICATION DATE: 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: The paper discusses key issues in the development of the water resources of the West Bank and Gaza Strip. First, there is the uniqueness of a situation where the major proportion of the transboundary flows between the OPT and Israel is groundwater, which infiltrates in the West Bank and flows to Israel. Second, perspectives and time frames for problem resolution are an issue in the OPT, due in part to the uncertainties inherent in the peace process. Third, there is a general lack of information and statistics and much of the limited information available is conflicting.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Elsevier Science B.V, Molenwerf 1, P.O. Box 211, 1000 AE Amsterdam, The Netherlands
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

58
TITLE: Approaches to the Legal Aspects of the Conflict on Water Rights in Palestine/Israel; found in Water and Peace in the Middle East, Edited by J. Isaac and H. Shuval
AUTHOR(S): Jonathan Kuttab, Jad Ishaq
PUBLISHER: Elsevier
PAGES: 11
PUBLICATION DATE: 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: Law can play a positive role in the resolution of water disputes between the Israelis and Palestinians. While international Law relating to water resources is not fully developed, it does have a number of specific provisions which relate to the water situation which ought to be respected as a first step towards the complex process of resolution contemplated in the developing law on the subject.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Elsevier Science B.V, Molenwerf 1, P.O. Box 211, 1000 AE Amsterdam, The Netherlands
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

59
TITLE: Water Situation in the Gaza Strip; found in Water and Peace in the Middle East, Edited by J. Isaac and H. Shuval
AUTHOR(S): Isam R. Shawwa
PUBLISHER: Elsevier
PAGES: 10
PUBLICATION DATE: 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: In view of the acute shortage of potable water in the Strip and in view of the ever increasing need in the coming years for both drinking and irrigation water, some intermediate solution must urgently be exploited. The paper presents some suggestions as solutions for study in the future to help in solving the water problem in the Gaza Strip.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Elsevier Science B.V, Molenwerf 1, P.O. Box 211, 1000 AE Amsterdam, The Netherlands
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

60
TITLE: Contribution of Water Imports to Israeli-Palestinian-Jordanian Peace; found in Water and Peace in the Middle East, Edited by J. Isaac and H. Shuval
AUTHOR(S): George E. Gruen
PUBLISHER: Elsevier
PAGES: 16
PUBLICATION DATE: 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: To help meet the projected growth in demand for water and shortages in available domestic sources of supply in the Palestinian-Israeli-Jordanian region, imports from neighboring countries have been proposed. Before resorting to imports, countries should give first priority to conserving and more efficiently utilizing existing supplies. Current efforts and the difficulties in instituting reforms are discussed.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Elsevier Science B.V, Molenwerf 1, P.O. Box 211, 1000 AE Amsterdam, The Netherlands
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

61
TITLE: Replenishment of Palestinian Waters by Artificial Recharge as a Non-Controversial Option in Water Resource Management in the West Bank and Gaza Strip; found in Water and Peace in the Middle East, Edited by J. Isaac and H. Shuval
AUTHOR(S): Karen Assaf
PUBLISHER: Elsevier
PAGES: 14
PUBLICATION DATE: 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: Artificial groundwater recharge is suggested as a possible non controversial method for water reclamation and conservation for use by Palestinians in the OPT. Applicable methods of artificial groundwater recharge using Palestinian water pumped into Palestinian wells or infiltrated into Palestinian land will be presented along with the benefits and disadvantages of this technology. Constraints will be pointed out.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Elsevier Science B.V, Molenwerf 1, P.O. Box 211, 1000 AE Amsterdam, The Netherlands
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

62
TITLE: Groundwater Resources Assessment of the Gaza Strip
AUTHOR(S): Gaza Environmental Profile (GEP)
PUBLISHER: Unpublished
PAGES: 34 + Appendices
PUBLICATION DATE: May 1995
LANGUAGE OF PUBLICATION: English
ABSTRACT: The report describes the different activities under the water resources assessment, focuses on data processing methods. Each chapter describes a specific aspect of the groundwater situation.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: Photocopies available at the PWA library

63
TITLE: Prospects for Brackish Water Desalination in Gaza
AUTHOR(S): European Communities, Directorate General for External Relations
PUBLISHER: Unpublished
PAGES: 21
PUBLICATION DATE: March 1993
LANGUAGE OF PUBLICATION: English
ABSTRACT: The study contains an evaluation of groundwater potential as well as water uses, consumption, and demands. It also discusses options and proposals for the future.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: Photocopies available at the PWA library

64
TITLE: Nature's Apportionment and the Open Market: A Promising Solution to the Arab-Israeli Water Conflict, Water International, Volume 18, No. 1.
AUTHOR(S): Hisham Zarour, Jad Isaac
PUBLISHER: International Water Resources Association (IWRA)
PAGES: 13
PUBLICATION DATE: 1993
LANGUAGE OF PUBLICATION: English
ABSTRACT: The populations and consumption levels of countries throughout the Middle East are steadily increasing and, correspondingly, their water demands. Water resources available to most of these countries remain more or less the same, if not being reduced by abusive utilization or pollution. Many now speculate that the region's next war will be fought over water. Today's international legislative structure is incapable of solving complex water disputes such as that of the Middle East. However, principles of international legislative provide the basis for solution. This paper presents a pragmatic, practical, and dispassionate formula compatible with the principles of international law and legitimacy for dealing with international water resources allocation problems. The presented formula is built around resolving the Middle East's water conflict according to natural apportionment of resources and the open market approach.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: Photocopies available at the PWA library

65
TITLE: Environmental Profile for the West Bank; Volume 3: Hebron District
AUTHOR(S): Applied Research Institute Jerusalem (ARIJ)
PUBLISHER: ARIJ
PAGES: 83
PUBLICATION DATE: November 1995
LANGUAGE OF PUBLICATION: English
ABSTRACT: The profile emphasizes on the primary environment safety, water resources, soil, land use, agriculture, noise, solid wastes and wastewater for the Hebron district In addition, pollution sources the socioeconomic aspects of the problems are reviewed. The profile also includes a section on the historical and archaeological sites in the Hebron district.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: ARIJ P.O. Box 860, Caritas street, Bethlehem. Tel: (02) 741889
AVAILABILITY OF REPORT: Available - ARIJ

66
TITLE: Water: The Red Line
AUTHOR(S): Jerusalem Media Communications Centre (JMCC)
PUBLISHER: JMCC
PAGES: 80
PUBLICATION DATE: May 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: The water issue is one of the most critical issues in the Middle East, particularly in the Arab-Israeli conflict. The publication discusses the water resources, international law, historical background, and the Israeli policies.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: JMCC, P.O. Box 25047, East Jerusalem
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

67
TITLE: Collection Cisterns
AUTHOR(S): Anonymous
PUBLISHER: Arab Thought Forum
PAGES: 3
PUBLICATION DATE: 1988
LANGUAGE OF PUBLICATION: English
ABSTRACT: The article describes the collection cistern, its construction, costs and usage. It also gives recommendations for the improvement of cisterns. Collection cisterns are used to store rain water which is collected from rooftops. A collection cistern is an underground concrete-built reservoir having a volume which ranges from 100-150 m3. Water collected from rooftops is conveyed via pipes to be stored in the cistern. Almost every Palestinian house is equipped with a collection cistern especially at villages where cisterns are the main source of fresh water.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Arab Thought Forum, Sho'on Tanmawiya Magazine (1988)
AVAILABILITY OF REPORT: A copy of the abstract is available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

68
TITLE: Collection and Protection of Rainwater
AUTHOR(S): M. S. Alhmaidi
PUBLISHER: Society Health Unit Publications
PAGES: 5
PUBLICATION DATE: 1992
LANGUAGE OF PUBLICATION: English
ABSTRACT: The booklet presents a full description of local water storage collections systems. Collection cisterns are used to collect and store rainfall water from rooftop catchments. A cistern is an underground storage facility built usually of reinforced concrete. Catchment areas are the rooftops of houses, water is conveyed to cisterns via a guttering systems. Construction methods and material used in construction are also discussed. Potential pollution of stored water is examined and recommendations on how to prevent pollution are presented.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank
AVAILABILITY OF REPORT: A copy of the abstract is available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

69
TITLE: Ponds for Agricultural Use in Jordan Valley
AUTHOR(S): O. Abdul-Razzaq, M. Abu Saleh
PUBLISHER: An-Najah National University
PAGES:
PUBLICATION DATE: November 1991
LANGUAGE OF PUBLICATION: English
ABSTRACT: The booklet starts with an introduction on the importance of irrigation in the Jordan Valley followed by a historical background on the development of irrigation ponds in the area. Details on construction of the ponds, locations, capacities and costs are provided. At the end, a feasibility study of a medium size pond is introduced followed by recommendations and conclusions.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: An-Najah National University, Rural Research Centre, Nablus
AVAILABILITY OF REPORT: A copy of the abstract is available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

70
TITLE: Far'a Irrigation Project - A Feasibility Study
AUTHOR(S): A. Abu-Sheikha
PUBLISHER: An-Najah National University
PAGES:
PUBLICATION DATE: April 1984
LANGUAGE OF PUBLICATION: English
ABSTRACT: Springs are one of the main source for irrigation water in the Jordan Valley. Al Far'a irrigation project replaces an open channel with a pipe system to reduce water losses due to evaporation and percolation. The project included the construction of a conveyance dam, a reinforced concrete settling basin, in addition to sand filters, reservoirs, and the pipeline distribution systems. The booklet describes the project and is divided into five chapters: Chapter 1 gives a background about the area, water resources, and economic situation. Chapter 2 is an economic study on the agricultural section in the west Bank. Chapter 3 focuses on issues such as the study area, location, land ownership and water rights. Chapter 4 describes the projects and compares costs with incomes with and without the project being implemented. Chapter 5 gives conclusions and recommendations.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: An-Najah National University, Nablus, West Bank
AVAILABILITY OF REPORT: A copy of the abstract is available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

71
TITLE: Wastewater treatment Plant for Al-Bireh City
AUTHOR(S): Balasha Jalon
PUBLISHER: Balasha Jalon, Consultant and Engineering Ltd., Israel
PAGES:
PUBLICATION DATE: June 1990
LANGUAGE OF PUBLICATION: English
ABSTRACT: The report discusses the proposed wastewater treatments plants for Al-Bireh area. It introduces four basic processes which can produce high quality effluent. The processes studied are trickling filter, rotating biological contractor (RBC), aerated lagoons and extended aeration. The report also gives a comparison between the four suggested processes clarifying the advantages and disadvantages of each process. Finally the extended aeration process is recommended as the most suitable process for the treatment plant at Al Bireh area. Extended aeration is an activated sludge process, in which a mixture of sewage and activated sludge is agitated and aerated. The activated sludge is subsequently separated from the treated sewage in a settling tank where it is then partly returned to the aeration basin. The treated sewage from the aeration basin is the plant effluent.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Consultants and Engineers Ltd. Haifa, Israel
AVAILABILITY OF REPORT: A copy of the abstract is available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

72
TITLE: Small Scale Sewage Treatment and Reuse Program
AUTHOR(S): Save the Children Federation (SCF)
PUBLISHER: SCF, Jerusalem
PAGES:
PUBLICATION DATE: 1992
LANGUAGE OF PUBLICATION: English
ABSTRACT: SCF assisted in implementing some pilot projects for biological treatment in wastewater in different areas in the West Bank. The systems used are: septic tanks coupled with subsurface drainage(SDT), sequencing batch reactor (SBR), settler-trickling filter-classifier systems, and facultative stabilization ponds. The principle idea behind biological treatment systems is to allow the growth of bacteria which will consume the organic matter found in wastewater. Septic tanks coupled with SDTs are suitable for non-sewer areas, which SBRs and facultative stabilization ponds can be used only where sewage collections systems exist. The report includes a description of each system and a comprehensive evaluation which covers technical, financial, administrative community and environmental aspects.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: SCF, Jerusalem
AVAILABILITY OF REPORT: A copy of the abstract is available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

73
TITLE: Subsurface Drainage Technique Project
AUTHOR(S): Save the Children Federation (SCF)
PUBLISHER: SCF
PAGES:
PUBLICATION DATE: 1992
LANGUAGE OF PUBLICATION: English
ABSTRACT: Over the past 2 years, the SCF has assisted in the construction of more than 275 subsurface drainage systems in the eight, mostly rural communities in the Gaza Strip. In this report, a comprehensive evaluation of the subsurface drainage technique has been done. The evaluation covered health, agricultural, technical, as well as managerial aspects. A comparison between different small scale sewage treatment systems such as soaking pits and barrels is included in the report. The proposed technique has two phases primary one which takes place in a septic tank where the solids settle down, and a secondary phase in which the effluent flows from the tank into a field where it is drained from perforated pipes below the surface. The sewage is treated as it seeps through the soil surrounding the pipes. Recommendations are being made regarding the efficiency of the proposed system.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: SCF, Jerusalem.
AVAILABILITY OF REPORT: A copy of the abstract is available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

74
TITLE: Appropriate Technology in Water Works
AUTHOR(S): Edited by Marwan Haddad
PUBLISHER: Water and Environmental Studies Centre (WESC)
PAGES: 310
PUBLICATION DATE: 1994
LANGUAGE OF PUBLICATION: English
ABSTRACT: This book contains many reports on the economic aspects of water, the assessment of water resources management and distribution, the wastewater treatment and reuse, and the leakage and operation of water systems.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: WESC, P.O. Box 7, Nablus. West Bank Tel: (09) 383121. Email: ANAN@Najah.edu
AVAILABILITY OF REPORT: Available - WESC

75
TITLE: Hydrostrategic Territory in the Jordanian Basin: Water, War and the Arab-Israeli Peace Negotiations
AUTHOR(S): Aaron Wolf
PUBLISHER: University of Alabama
PAGES:
PUBLICATION DATE: 1996
LANGUAGE OF PUBLICATION: English
ABSTRACT: This paper examines the relationship between the location of water sources and strategic territory along Arab-Israeli boundaries, and poses the question: Does territory exist over which sovereignty has been sought politically or militarily, or which would be insisted upon in the course of current territorial negotiations, solely because of its access to water sources, and in the absence of any other compelling strategic or legal rationale?
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Dept. of Geography, 202 Farrah Hall, Box 870322, University of Alabama, Tuscaloosa, AL 35487-0322. Email: awolf@ua1vm.ua.edu
AVAILABILITY OF REPORT: Photocopies available at Birzeit University library, P.O. Box 14, Birzeit, West Bank

76
TITLE: Ein Samia Wellfield: Test Pumping, Well Development, and Evaluation of Potential Well Locations Using Aerial Photography
AUTHOR(S): Amjad Aliewi, Sayel Wishahi, Ernst Doring
PUBLISHER: Unpublished
PAGES: 33 + Appendices
PUBLICATION DATE: August 1996
LANGUAGE OF PUBLICATION: English
ABSTRACT: The objectives of this study are to assess the properties of the utilized aquifers of Ein Samia wellfield. The performance and efficiency of ESW2a will be assessed. The optimal permissible pumping rate of ESW2a will be determined, and the proposed sites for a production well in Ein Samia wellfield will be evaluated.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Jerusalem Water Undertaking (JWU), P.O. Box 337, Ramallah, West Bank
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

77
TITLE: Water Resources Management in Palestine - Developing an Institutional Framework
AUTHOR(S): S.A Bookkelmann, S.R Nijwening
PUBLISHER: Unpublished
PAGES: 80
PUBLICATION DATE: September 1995
LANGUAGE OF PUBLICATION: English
ABSTRACT: This paper presents a public administrative perspective on institutional development in the Palestinian Water Sector (PWS), in which future policy, organization and management are central in assessing the strengths and weaknesses of the (PWS).
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Birzeit University, P.O. Box 14, West Bank
AVAILABILITY OF REPORT: Available - Birzeit University library

78
TITLE: Feasibility of the Integration of the Water and Sewerage Authorities in Palestine as Regional Utilities
AUTHOR(S): Abdel Karim Asa'd et.al.
PUBLISHER: Unpublished
PAGES: 45
PUBLICATION DATE: December 1993
LANGUAGE OF PUBLICATION: English
ABSTRACT: The current situation is very conducive to the effectiveness of this project to create a solid foundation for water and wastewater management in the Palestinian state. At present, there are a very limited number of sewerage systems in the West Bank and Gaza Strip and only one treatment plant. Plans exist to start construction of a number of sewerage systems in cities and villages of the West Bank and Gaza Strip. These plans however, lack an integrated framework of technical, environmental, administrative, and economical issues at a national level.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Jerusalem Water Undertaking (JWU), P.O. Box 337, Ramallah, West Bank
AVAILABILITY OF REPORT: Available - JWU

79
TITLE: Water in Palestine
AUTHOR(S): Juma' Rajab Tanteesh
PUBLISHER: Dar Al Jamahereah - Libya
PAGES:
PUBLICATION DATE: 1989
LANGUAGE OF PUBLICATION: Arabic
ABSTRACT: This is a study on the groundwater and surface water resources problems in Palestine. Various points of view on water projects are included, as well as the historical evolvement of the water problem since the end of the 19th century. From that comes the link to the geographical analysis and the progress of the modern agriculture in Palestine.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: PHG, P.O. Box 25220, Shu'fat, West Bank. Tel: (02) 6565890
AVAILABILITY OF REPORT: Available at the PHG library

80
TITLE: Chemical Analysis of Water from Rivers, Springs, Wadies and Wells
AUTHOR(S): Dept. of land and settlements and water commission
PUBLISHER: Government of Palestine
PAGES: 957
PUBLICATION DATE: 1948
LANGUAGE OF PUBLICATION: English
ABSTRACT: This volume contains records of water analysis of rivers, springs, wadies and wells up to September 1946, made mostly by various departments of the Government of Palestine. Where non-Government records have been included the source has been acknowledged in each cases.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Birzeit University, P.O. Box 14, West Bank
AVAILABILITY OF REPORT: Out of print. Photocopies available at Birzeit University

81
TITLE: Israeli Water Policies in the West Bank, 1967-1990: A critique (M.Sc. Thesis)
AUTHOR(S): Ramzi Musallam
PUBLISHER: School of Oriental and African Studies University of London
PAGES: 59
PUBLICATION DATE: September 1990
LANGUAGE OF PUBLICATION: English
ABSTRACT: This study examines the water policies of Israel with respect to the West Bank which it has occupied since June 1967. It looks at the hydrology of the Palestinians water system, the quality of water, the legal framework which Israel has been adopting, Israeli water policies and practices and their economic effects on the indigenous West Bank Palestinian population, and the possible alternative water sources that Israel will need to turn to if it is to relinquish total control of the West Bank in a political solution to the Palestinian question in the near future.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestinian Water Authority (PWA), P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310
AVAILABILITY OF REPORT: Photocopies available at the PWA library

82
TITLE: A Proposal for the Development of a Regional Water Master Plan
AUTHOR(S): K. Assaf et.al.
PUBLISHER: Israel-Palestine Centre for Research Information (IPCRI)
PAGES: 192
PUBLICATION DATE: October 1993
LANGUAGE OF PUBLICATION: English
ABSTRACT: This study is based on the assumption that both the Israelis and the Palestinians are committed to the peace process initiated at the Madrid Conference in December 1991 with some form of interim stage, evolving eventually into a permanent solution with the establishment of some form of Palestinian entity. It is the intention of this study to analyze as objectively as possible the nature of the water problems faced by the partners to this dispute and to suggest some basic principles and possible conceptual approaches for solutions for considerations by the negotiators on both sides.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: IPCRI, P.O. Box 51358, Jerusalem
AVAILABILITY OF REPORT: Photocopies available at Birzeit University library

83
TITLE: Water Measurements Prior to October 1944
AUTHOR(S): Dept. of Land and settlement of water commissioner
PUBLISHER: Government of Palestine
PAGES: 501
PUBLICATION DATE: 1947
LANGUAGE OF PUBLICATION: English
ABSTRACT: This volume contains a record of hydrological measurements made in Palestine prior to October 1944. It includes not only measurements made by Government but also many taken by the Water Research Bureau of the Jewish Agency, the Palestine Water Company and other organizations.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Birzeit University, P.O. Box 14, West Bank
AVAILABILITY OF REPORT: Out of print. Photocopies available at Birzeit University library

84
TITLE: An Updated Study of Water Supply and Demand in Palestine
AUTHOR(S): Jad Issac et.al.
PUBLISHER: Unpublished
PAGES: 27
PUBLICATION DATE: September 1995
LANGUAGE OF PUBLICATION: English
ABSTRACT: This report provides a baseline data and projections for water supply and demand in Palestine for the Harvard Middle East Water Project. It presents the water supply, the baseline and projections estimates of water demand for household, industrial, and agricultural sectors.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: Palestine Consultancy Group (PCG), P.O. Box 19322, East Jerusalem. Fax: (02) 744660
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

85
TITLE: The Jordan Watershed: Past Attempts at Co-operation and Lessons for the Future. Water International, Volume 18 No.1
AUTHOR(S): M. Aaron Wolf
PUBLISHER: International Water Resources Association (IWRA)
PAGES: 12
PUBLICATION DATE: March 1993
LANGUAGE OF PUBLICATION: English
ABSTRACT: This paper suggests a process of conflict resolution by which the dispute over the waters of the Jordan River watershed might be approached. Focus is on the "Hydro-political" relations among Israelis, Jordanians and Palestinians. The process is designed for a hypothetical mediator and the disciplinary tools he/she might use are described.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: IWRA, 205 North Mathews Avenue, Urbana, IL 61801-2352, USA
AVAILABILITY OF REPORT: Photocopies available at the Palestinian Water Authority library, P.O. Box 891, Ramallah, West Bank. Tel: (02) 5747311/2. Fax: (02) 5747310

86
TITLE: Core Issues of the Palestinian-Israeli Water Dispute
AUTHOR(S): Jad Issac
PUBLISHER: Applied Research Institute Jerusalem (ARIJ)
PAGES:
PUBLICATION DATE: 1996
LANGUAGE OF PUBLICATION: English
ABSTRACT: Israel controls the greater part of the Jordan River and the West Bank's aquifers. Palestinian consumption is severely restricted by the military authorities, causing serious water deficiencies in most Palestinian homes. This paper outlines a set of much needed measures. Firstly, Israel should instigate a number of confidence building measures, a recognition of Palestinian water rights, and an increase in water supply to Gaza and the West Bank. Secondly, Israelis and Palestinians should adopt a water charter. This could act as a springboard for the agreement of an integrated water programme in which allocation conservation enhancement and quality are considered as a totality.
ADDRESS FROM WHICH THE REPORT CAN BE OBTAINED: ARIJ, P.O. Box 860, Bethlehem, West Bank. Tel: (02) 741889
AVAILABILITY OF REPORT: Available - ARIJ