

REGIONAL WATER
DATA BANKS PROJECT

MULTILATERAL WORKING
GROUP ON WATER RESOURCES

MIDDLE EAST PEACE PROCESS

2002

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Coastal Plain

IN THE BEGINNING

The Middle East peace process began with the Madrid Conference in October 1991. The bilateral track (between the Israelis and Palestinians) was designed to concentrate on the political issues of territorial control and sovereignty, border demarcations, security arrangements, and the political rights of the Palestinians. Resolution of problems inherited from the past became the focus of the bilateral process. The message underlying the Madrid Conference was that the time had come to shed the old paradigms of the Middle East conflict and focus on the future.

The peace process partners agreed to establish a multilateral track (among multiple countries) to supplement and reinforce the bilateral track. A framework for the multilateral track was established in January 1992 in Moscow, a forum that included forty-six delegations from around the globe. The

multilateral track was intended to examine a range of technically oriented issues that extend across national boundaries and the resolution of which is essential for the promotion of long-term regional development and security. The focus of the multilateral track was on issues that could shape the future. Five multilateral working groups were established as well as a steering group to coordinate the activities of the various working groups. The Multilateral Working Group on Water Resources (MWGWR) is one of these five groups.

The model for cooperation incorporated in the multilateral peace process is based on the vision of creating synergies through awareness of common problems, such as water. Concentration on the common problem of regional water scarcity encourages the participants in the process to transcend the realm of competing interests and create a situation in which all parties may share benefits. This model



Palestinian, Israeli, and Jordanian representatives conversing at the World Water Forum held at The Hague in The Netherlands, March 2000.

of cooperation has been a process-in-the-making. It has been gradual and required procedural definition, ratification of decisions by each of the participating regional parties, and the support (financial and otherwise) of the various donor parties involved. The primary aim of the MWGWR is to create an awareness of water issues from a regional perspective. More specifically, the Group's objectives are to foster cooperation and coordinate efforts to ameliorate water problems through activities done under the Group's four agenda items:

- Enhancement of water data availability;
- Water management practices, including conservation;
- Enhancement of water supply; and
- Concepts of regional water management and cooperation.

The primary project designed to focus on the agenda item "Enhancement of water data availability" is known as the Regional Water Data Banks Project (WDBP). The project affords an opportunity for Israeli, Jordanian, and Palestinian water agencies (Core Parties) to work together, while being supported by technical and financial assistance from Australia, Canada, the European Union, France, The Netherlands, and the United States. In addition, Norway has made substantial contributions to an element of the project focusing on the capacity building needs of the Palestinian Water

Authority. Most project activities are carried out jointly among the three Core Parties, but some were designed to give special help to the newly created Palestinian Water Authority. The WDBP is an ongoing capacity-building measure to enhance current and future cooperation in water management, and is designed to establish, upgrade, and standardize regional data banks of hydrologic data.

The WDBP was approved in November 1994 and launched in January 1995 with the formation of the Executive Action Team (EXACT), a regional oversight group consisting of two members from each of the participating regional parties and representatives from active donor countries. EXACT meets twice a year to review progress on the 39



Delegates to the workshop on "Standards for Water Data Acquisition and Processing" March 1994, Atlanta, Georgia.



Palestinian, Israeli, and Jordanian representatives at the World Water Forum held at The Hague in The Netherlands, March 2000.

recommendations and Work Package A that were identified and agreed upon by the Core Parties in the original project implementation plan and to consider possible additional activities of interest to the Core Parties.

ACHIEVEMENTS

The project has achieved much! Perhaps the greatest single achievement is the effective and continuing communication channels that have been established among colleagues from the Core Party participating agencies. Since the January 1995 organizational meeting in Amman, the U.S. sponsor has convened 14 additional meetings of EXACT at various venues throughout the region

or in Europe. The meetings have been held in a positive atmosphere and were concluded successfully, even during periods when other communication channels ceased to function. In addition to the EXACT representatives, many other Core Party participants also have met and worked together through joint, donor-sponsored activities hosted at venues throughout the region. Multiple joint technical activities and training events have brought Core Party working scientists together, often for the first time, and facilitated the exchange of technical water information about the region. These joint activities have been of immense value in helping people understand each other and their programs of common interest.

Web Site

The WDBP has a project web site, located at <http://www.exact-me.org>. The site provides an overview of the project and contains selected reports that have been prepared as a result of project activities.

Reports

Progress has been made in many of the recommendations and this progress is covered in technical reports, some of which are designed for internal use by the Core Parties and others that are in the public domain. The internal reports (more than



EXACT VIII meeting in Ramallah, May 1998.

50) were written primarily by the European Union-sponsored project team, ANTEA-Euroconsult, and provide the water managers with detailed information and recommendations on a wide variety of subjects. The reports have been invaluable in helping the participating parties design and manage their respective programs.

Reports in the public domain include:

“Overview of Middle East Water Resources”

The “Overview” report was published in 1998. Areal and site-specific hydrologic, meteorologic, and geologic information provided by water-resources agencies of the region are presented to provide a broad depiction of the overall water conditions in the region. The work was coordinated by U.S. Geological Survey scientists and completed as a cooperative effort among the Palestinian Water Authority, Jordanian Ministry of Water and Irrigation, and the Israeli Hydrological Service. The report looks at water resources from a regional perspective.

“Summary of Palestinian Hydrologic Data 2000, Volume I: West Bank and Volume II: Gaza”

Although not a direct activity of the WDBP, this two-volume report was developed as a result of the project and is mentioned here because of its significance and relevance to the region and to the Core

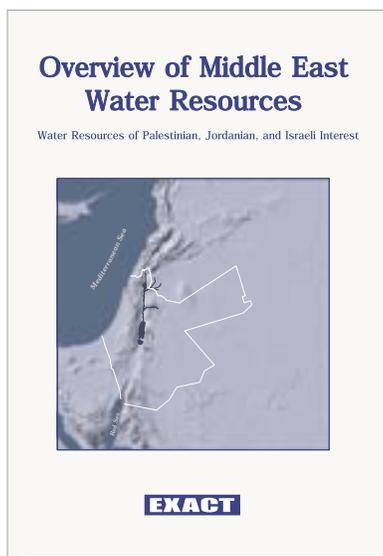
Parties. The report contains summaries of data for about 2,600 groundwater wells, 300 springs, and 70 precipitation stations in the West Bank and the Gaza Strip. The PWA Water Data Bank Section offices in Gaza and the West Bank maintain the data. It is the first public data report prepared by the Palestinian Water Authority and serves as a benchmark for their database. The U.S. Geological Survey coordinated work on the publication.

“Temporal Trends for Water-Resources Data in Areas of Israeli, Jordanian, and Palestinian Interest”

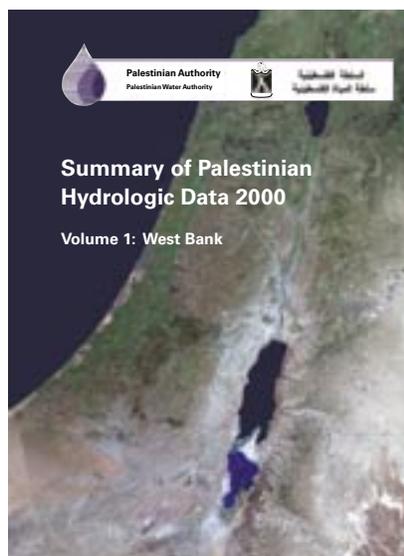
This publication presents analyses and interpretation of water-resources data compiled by the Core Parties in cooperation with the U.S. Geological Survey. Data analysis focused on looking for time-related trends relative to groundwater levels, discharge from springs, stream flow, and chloride and nitrate concentrations in groundwater samples. The time period varies for each measurement, but in general was 1974-98 (www.exact-me.org).

Training

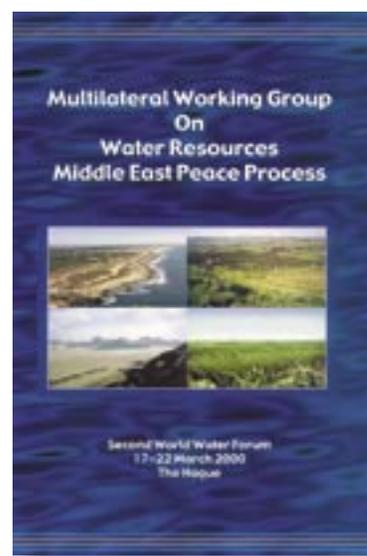
Training has been a major focus of the WDBP, and has resulted in hundreds of hours of training for dozens of Core Party participants on a wide array of topics. The largest single training program is the Regional Operational Hydrology Training Project



“Overview of Middle East Water Resources.”



Palestinian data book.



Brochure prepared for the Second World Water Forum, March 2000.

(ROHTP) sponsored by the Canadian Government, and implemented by Hydrosult, Inc. It is an extensive program on water resources topics for both water managers and field technicians focused on building staff capabilities of the Core Parties in hydrometeorological data collection and information management. Every effort is made to conduct multilateral training events. After a briefing session in Jerusalem for local trainers, training sessions have been held in Amman (2 weeks on groundwater), Ramallah (2 weeks on surface water), and Zichron Yaacov (1 week on water quality). About 75 people attended these sessions. The course materials included specially designed training manuals and trainee exercise and handbooks in the respective subjects. All of the materials have been prepared in English, and some have been translated into Hebrew and Arabic. A complete course tutorial module for surface-water hydrometry for field and office techniques also has been prepared and submitted to the Core Parties.

In addition to the large-scale Canadian-sponsored training program, there have been multiple *ad hoc* training events offered to meet the needs of specific activities being carried out by other Donor Parties. The format of these events ranged from standard classroom presentations to on-the-job-training (OJT).

Technical experts sponsored by the European Union have worked with the Core Parties on several OJT events, including database development, interpretation of water-quality network data, and interpretation of surface-water network data. Technical experts sponsored by France have provided OJT on the installation and operation of hydro-meteorological and stream-gauging stations, several workshops on data interpretation, and a study tour in France.

Technical experts sponsored by the United States have provided training on statistical analysis for water-resources analyses, laboratory review procedures, writing laboratory quality-assurance plans, water-quality field measurements and use of a mobile laboratory, how to improve laboratory analytical results, fundamentals of relational database design, rainfall intensity data analysis, use of digitizing rainfall intensity strip chart software, and use of RAINPLOT software.



Preparing for a groundwater seminar in Amman.



A training class.

Data Collection Networks

Technical experts sponsored by the European Union reviewed the existing groundwater, surface-water, water-quality, and meteorological monitoring networks of the Core Parties. The review included describing and documenting station locations, types of stations, equipment installed, types of data collected, and length of data record. Emphasis was given to the infrastructure, and rehabilitation was recommended for selected sites.

Technical experts sponsored by France are implementing a project to develop a pilot real-time monitoring system for hydrometeorological data measurements, transmission, processing, storage, and interpretation. The pilot system is composed of a variety of instruments for data acquisition and measurement. The data-collection system is designed to improve capabilities for preventing and managing critical and sudden changes in hydrome-



A pH measurement in the Palestinian mobile laboratory.



Multi-Party scientists being shown how to measure dissolved oxygen.

teological conditions in drainage areas and river basins, including groundwater conditions. Plans call for 21 hydrometeorological stations to be constructed, 6 gauging stations to be rehabilitated, a data transmission system installed, a variety of ancillary and complementary equipment provided, and database development in the form of software routines for transferring automatically gathered data into the databases. There also will be on-the-

job training on the installation and operation of the equipment, workshops on data interpretation, and a study tour in France. Most of this work has been completed (2002).

Data Collection Standards and Procedures

Technical experts sponsored by the European Union reviewed the field data-collection techniques used by the Core Parties for groundwater levels and abstraction, surface-water gauging, and meteorology. The review confirmed that international standards as defined by the World Meteorological Organization were in use by the Parties and, because of this, it is believed that the data are comparable. Agreements were reached among the Parties to improve selected procedures and practices jointly in order to support data consistency and comparability. The agreements included (1) definition of a base, minimum level of information to be collected for all well inventory and water-quality field measurement forms, (2) use of field note forms as a method to record and process field water-quality information, (3) standardization and definition of water-quality-related terminology, (4) adherence to similar characteristics in construction and operation of surface-water gauging stations, and (5) use of common units for reporting water-quality field measurements and clear definition between field and laboratory data.

Technical experts sponsored by the European Union worked with the Core Parties to review their geographic reference systems. Although each Party uses a different system, the location references are comparable.

A conversion program was prepared that correlates the different systems to facilitate sharing data as appropriate. The European Union also provided to each Party GPS Magellan Trimble GeoExplorer systems and a wide variety of software including software for: MapInfo, water chemistry, hydrologic data analysis and interpretation, database development, statistical analyses, and GIS.

Technical experts sponsored by the United States reviewed various water-quality programs and worked with the Core Parties to effect some procedural modifications. Mobile laboratories were designed by the Parties, constructed in the United States, stocked with water-quality-oriented field equipment, and donated to each of the Core Parties.

The Parties agreed to adopt “Standard Methods for the Examination of Water and Wastewater” as a regional standard analytical methods manual. Representatives from the major Core Party laboratories were trained in laboratory review procedures and implemented a program of joint technical reviews of the major laboratories in the region. About 25 regional laboratories participate in the U.S. Geological Survey’s semi-annual Standard Reference Sample program in which they are part of a group of about 250 laboratories all analyzing the same water sample. A regional water-quality committee consisting of water-quality experts from each of the Core Parties was formed. The committee made recommendations on ways to improve water-quality-related work in the region. One activity of the committee was to design and implement a program to jointly collect field data and water-quality samples of various types for comparison by local analysis. The United States also worked directly with the Palestinian Water Authority to help them set up their laboratory and make it operational.

The Canadian Project, ROHTP, has for a main objective the harmonization of data collection and management procedures within the three Core Parties. The Project’s training courses and modules, and the regional joint training sessions are designed and intended to attain this objective.

Data Storage and Communication

Experts sponsored by the European Union provided substantial technical assistance to the Core Parties on data storage and organization, including on-the-job training in database development and contributions of hardware and software. The equipment provided included several computers, laser and color printers, scanner, digitizing table, and UPS (uninterruptible power source) units. The European Union experts worked directly with the Palestinian Water Authority to help them develop and populate their data base. Each of the Core Parties has a functioning database that is being used effectively on a daily basis. The database management programs used by the Core Parties are compatible, and there are few technical problems associated with data transfer among the databases.

Experts sponsored by the United States assisted the Parties in the development of Local Area and



Digitizing rainfall data from strip charts in Amman.



Laying a water pipe.

Wide Area Networks, so the Core Parties can communicate internally among themselves and their remote offices and externally to other agencies and the Internet. Assistance included contributions of computer hardware and software, telecommunications lines, wiring, and installation.

Experts sponsored by the United States have assisted the Parties to develop a joint, regional database to store and process rainfall intensity data. They have provided hardware (computers and digitizers), developed software to digitize



Gauging station on the Upper Jordan River.

rainfall strip charts for direct entry into the database, and provided a modified version of RAINPLOT software that can be used to analyze the data.

Data Analysis, Interpretation, and Publication

On-the-job training in the analysis of ground-water quality and surface-water gauging data sponsored by the European Union provided the Parties with improved insight into the water resources situation. European Union experts also worked with Jordanian and Palestinian scientists in developing a potential format and procedures for publishing a periodic hydrological bulletin.

Wastewater

Experts sponsored by the European Union conducted an inventory of wastewater-related concerns. It produced overviews, by Party, on quantities of wastewater produced, collected, treated and reused, existing major treatment plants, existing water-

quality standards, and institutions responsible for wastewater management. They also have prepared two Decision Support Systems (DSS) as Excel spreadsheets. The first DSS focused on water reuse for agriculture. The system can select from 60 possible crops according to water quality standards and guidelines for reuse, and soil characteristics. The second DSS focused on wastewater treatment technologies for small communities, defined as a community with a population range from 1,000 to 20,000 inhabitants. The system can select desirable actions from many possible options and rank them according to pre-determined criteria.

ON-GOING AND PLANNED ACTIVITIES

Canada

The Regional Operational Hydrology Training Project, on-going since 1999, takes a regional approach to building staff capabilities of the three Core Parties in hydrometeorological data collection and information management. The Canadian implementing agency (Hydrosult, Inc.) is scheduling more training events (office and field technicians, middle level managers) and is working with the Parties to get the training materials accredited so that the participants can receive official credit for completion of the training. To that effect, Hydrosult has prepared guidelines that were distributed to the Core Parties, on the establishment and mandate of a Regional Accreditation Board, to be established by the Core Parties. In addition to these activities, the ROHTP



Drilling deep water-supply well in the South Jordan desert.

includes an advisory services component that is directed at the respective needs of the Core Parties in key areas of water resources management.

European Union

The European Union already has completed an extensive and complex list of activities consisting of three Phases, and is finalizing a program of Phase 4 activities. The main objectives of Phase 4 are to implement some of the recommendations of the earlier phases by: (1) improving the management and understanding of waste-water issues, (2) broadening the scope of the decision-support systems, and (3) enhancing the practical capacity of the Core Parties to measure and store data on meteorology, surface flow, groundwater levels, and water quality.

Equipment to be obtained includes: hydro-metric equipment, surface-water (flow measuring) equipment, groundwater monitoring equipment, and laboratory equipment. Plans also include training in the operation and maintenance of the equipment and activities specifically related to the Palestinian Water Authority focused on rehabilitation of spring measurement and data base enhancement.

Specific objectives of Phase 4 include:

- Extension of decision support systems for wastewater.
- Extension of base-line survey of wastewater.
- Rehabilitation or construction of flow measure-



King Abdullah canal at the outflow of pipeline bringing water from Lake Tiberias.



Data collection platform at Wadi Hasa near Safa.

- ment and climate stations.
- Purchase and installation of measuring and transmission equipment, ancillary equipment, and laboratory equipment.
- Training in the operation and maintenance of the above.
- Data base enhancement.

France

The French-sponsored project, as implemented by the French Global Environmental Facility agency, began in February 2000 and is funded for 3 years. The long-term goal is to establish a data collection system as a tool suitable for improving the capabilities for preventing and managing critical and sudden changes in hydrometeorological conditions in drainage areas and river basins, including groundwater conditions. The specific objectives are:

- Improvement of measurement networks in pilot areas.



Small flowing spring in the region.

- Implementation of a suitable data transmission system.
- Development of a real-time monitoring system.
- Processing and use of data in real-time and transfer to data banks.

The three main activities in executing the project are: (1) technical assistance, (2) facilities for training sessions, workshops, and monitoring meetings, and (3) equipment. Much of the work has been completed, but the project is not yet fully operational.

The Netherlands

The Government of The Netherlands recently has started implementation of a project on small-scale water treatment and artificial recharge. As part of the inception phase of the project, the executing agency, IHE/Delft, currently is discussing the selection of pilot sites with the Core Parties. The project

will include carrying out small-scale pilot activities concerning raw water treatment, artificial recharge, and groundwater modeling and will focus on capacity development on relevant methodologies.

United States

The United States continues to sponsor the semi-annual meetings of the EXACT group, with meetings typically held in the spring and fall of each year.

In addition, the United States is beginning to implement a new project focused on helping the Core Parties to store, analyze, and exchange hydrogeologic information related to groundwater resources of the region. The project will assist the Core Parties to: agree on common lithological and stratigraphical nomenclature, develop databases to store a wide variety of hydrogeologic data, initiate a digitization program for these data, provide the analytical tools needed to analyze the data, and make digital maps of selected hydrogeological strata.

THE FUTURE

The project has been very successful, bringing many benefits to the Core Party participants and their constituents. The progress attained at the programmatic level would not have been possible without the development of mutual trust and credibility among the participating regional parties. Two key factors demonstrate the strength and resiliency of the working relationships among the Parties. First, the WDBP has been able to continue functioning during the ups and downs of the political negotiations of the bilateral track. Second, in addition to implementing ongoing activities with the Donor Parties, the participating regional Parties have come together on their own to discuss and agree on additional activities for the project.

The participating regional Parties have gained credibility not only in their dealings with one another, but with the donor nations as well. As their working relationships have grown and solidified, the regional Parties have become more proactive and have become the initiators of additional WDBP activities. As a sub-group, the Core Parties today are able to better articulate local and regional needs and function jointly as active partners in the

design and direction of activities. This approach is a key element in attracting donors to support expansion of the original project portfolio. The unbiased and dedicated leadership of the donor Parties, coupled with a continuing commitment of funds and personnel, also has been crucial in sustaining the WDBP throughout the more than 7 years of the project's existence. Working relations between the donor representatives and the regional participants have emerged as a real partnership and transcend the traditional donor-recipient relationship. Today, the WDBP represents a focal point to which additional projects can be directed and from which they can be effectively carried out.

The MWGWR has proven to be an effective mechanism for positive change. The working relations that have been established among the participating regional Parties offer an unprecedented opportunity to move forward into new ventures that will support regional growth, prosperity and peace. Nothing in life is static. Either we grow, or we stagnate and wither away. Like life, the WDBP must be an evolving process. We must continue to grow, and we can capitalize on the momentum and resources that have been established over the past years. In support of growth and expansion, the project is ready to include, and would welcome, other parties from the MENA region into the process. The systems developed in the project can be expanded to include other regional parties.

A Vision

In terms of vision, our people depend on and share a finite number of tangible items. One of those tangible items, without which life will cease to exist, is water. Both rain and drought are shared by all, not by choice, but by act of a power greater than mankind. Is it possible that these shared events can provide a common focus during times of crisis? Can our need for water lead the way?

Can we take control of our future? Current events seem to dictate that we cannot. But perhaps there are portions of our life that we CAN control. And perhaps our job is not to control the present, but to prepare for the future. The question is "How?" Our water is a finite resource, limited in quantity, and essential to life. We must work together to collect and analyze data that will enable us to better

understand the quantity and the quality of our water resources. We must plan together to manage and protect our limited precious resource, and we must enlighten our political leaders and educate our citizens so they can make wise and informed choices. We must offer alternatives to shortages, pollution, and mismanagement. It's a difficult and thankless, but essential, job.

Where do we begin? With information, data, and knowledge. By sharing the responsibility for water resources management. We must reinvent the way we do business and, if necessary, rewrite the laws. Let's work together to share our existing water data, to collect data in those areas where there is none, to share analyses, and to develop plans for informed, intelligent management of our water resources. Let's reach out to the people of the region, and share with them the knowledge that our water resources are finite and that we have options, and teach them the options so they can make wise choices. We, too, have choices. Let's work together to change the future.

Potential Activities

There are a wide variety of technical activities that can be undertaken in the region to materially improve the life of the people who live there, and the WDBP offers a mechanism to support some of these activities. The scope of the potential activities ranges from relatively inexpensive to large-scale



Local flooding after a hard rain.



Sunset on Lake Tiberias.

infrastructure projects. Some ideas (not in priority order) include:

- Exploration of alternative water sources, such as wastewater reuse or desalination
- Regional water-quality assessment
- Well-head protection project
- Digitization of large amounts of raw data
- Monitoring of resources
- Conservation projects
- Pollution prevention
- Sewage management
- Public Health issues
- Regional estimation of groundwater recharge
- Development of brackish groundwater
- Development of decision support systems
- Water use
- Water demand analysis
- Water treatment and artificial recharge

Regardless of the outcome, the WDBP is a tried and proven model and a process for effective

regional cooperation in water issues that can be applied both within the Middle East and in other-areas of the world. The combination of commitment towards the common objective of fostering regional awareness, directed project definition and planning, the inclusion of confidence building measures as an integral part of the group's *raison d'être*, effective teamwork, and proactive facilitation and support from the international donor community has proven to be a positive dynamic that facilitates capacity building on a regional scale. The success of the WDBP, as reflected in the period of the project's existence, should serve as a beacon to the rest of the world as to what CAN be accomplished by working cooperatively on a regional level. For many years the consensus among political commentators was that water would be a cause of conflict in the Middle East region. The participants in the WDBP have shown that when water professionals co-operate in a supportive environment it can, on the contrary, be a motivator for peace.