



ARIZONA

WATER RESOURCE

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Arizona, Middle East Water Issues Focus of WRRC Workshop



AZIP
Arizona-Israeli-Palestinian
Water Management & Policy Workshop

Arizona, Israel, Palestinian Territories Share Common Concerns

The Arizona-Israeli-Palestinian Water Management and Policy Workshop (AzIP for short), a Water Resources Research Center project that was two and a half years in the planning, focused on critical water issues of the three arid and semi-arid

Special Workshop Edition of Newsletter

This issue of the *Arizona Water Resource* newsletter provides information about the Arizona, Israeli, and Palestinian Water Management and Policy Workshop. (See page 8 for workshop agenda.) Additional information about the workshop is available at the WRRC web site.

regions. Workshop participants, including managers, NGO representatives, students and scholars from a range of disciplines worked together to better understand water management challenges and to consider solutions as well as build the groundwork for future collaboration on projects and programs. The workshop was conducted Aug. 31 to Sept. 2 in Tucson.

In some ways, this commitment might appear to break new ground for WRRC. With the event, WRRC looked beyond Arizona and the West, its primary geographical areas of interest, to participate in a workshop featuring Middle East water affairs. This view, however, overlooks commonalities among the regions. Arizona, Israel and the Palestinian Territories are arid/semi-arid lands, and they confront similar water concerns. Rather than breaking new ground, the workshop was an opportunity for WRRC to view Arizona and regional water issues in an international or global context.

Further, what was gained at the workshop — the issues, challenges and research needs the participants identified — will benefit other arid and semi-arid regions struggling with similar concerns having to do with water shortages, poor water quality and effective governance.

The regions have another shared interest besides a dry climate. Israel and the Palestinian Territories are facing the challenge of sharing groundwater and surface water resources.

Complicating their task are the formidable political issues that trouble the waters, and much else in the Middle East. Arizona water affairs, too, are marked by the need to consider and negotiate the claims of sovereign entities, specifically neighboring Mexico and Indian nations. Arizona fortunately does not have to contend with the worrisome, highly-charged political climate prevailing in the Middle East.

It is hoped that the workshop will pay a long-term benefit by promoting peace. By working together to identify research needs and developing an international, collaborative research program, workshop participants were engaged in “science diplomacy,” a strategy to promote understanding and peace. 🏛️

The Face of Drought



The Israeli Water Authority used the above photo in a campaign to encourage drought awareness. The campaign included promoting water awareness days at elementary schools, involving the private sector and distributing water conservation devices. Israeli presenters at the AzIP workshop used the striking image to dramatize the occurrence of drought in their country. Drought was one of the issues of concern shared by all the regions participating in the workshop: Arizona, Israel and the Palestinian Territories.

Water Allocation, a Potential Source of Conflict, Can Promote Peace

Water wars are viewed as an unlikely prospect

With a limited supply of water available to serve the needs of an expanding global population, controversy and disputes over water supplies can be expected. The question often raised, however, is how the issues will be resolved, whether peacefully or through armed conflict and war.

Some observers have feared the worst. Kofi Annan, former UN Secretary-General and Nobel laureate said, "Fierce national competition over water resources has prompted fears that water issues contain the seeds of violent conflict." It has oft been said that in the near future, as water trumps oil as a scarce resource, armed conflict is likely.

It was noted several times that water, who gets it and who uses it, although a potential source of conflict, also can be an opportunity for people and nations to cooperate and work together for peace. Even warring nations can cooperate when it comes to water. For example, the 1960 Indus Basin Treaty is a water settlement reached despite hostilities between participating nations. The treaty determines India's and Pakistan's sharing of the Indus and its tributaries and has held up despite military clashes between the two nations.

With water raising such high stakes, cooperation is likely to be the most effective strategy for allocating this scarce resource to ensure a lasting accord among diverse interests. This was AzIP's guiding premise.

Workshop participant Aaron Wolf, professor in the Department of Geosciences at Oregon State University, has studied water disputes, their causes and resolution. He says that complicating the resolution of water disputes is the fact that water is defined by natural and human boundaries.

He says, "Water people tend to take the natural or watershed view, observing the workings of a river system, its capture and flow of water over a large area of land. This brings people together. Political people, on the other hand, consider boundaries, lines that separate and divide people and states. These sets of boundaries define the areas of interest for international water management."

He asks a critical question: "How do we work within a watershed context where everything is connected to everything else and still honor and do justice to the real sovereignty and political issues that boundaries represent?" He says this is the situation in Arizona,

in the Middle East and all over the world.

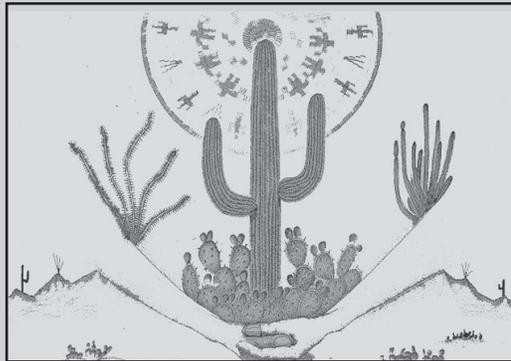
Wolf says there are 263 international basins in the world, covering about half the land surface of the earth. He says tension prevails in some of these but, "In many of the areas where you have tension you find people sharing water resources as well."

Wolf says, "When people interact over water, two-thirds of the time it is to cooperate. Among water people we know this is the rule. Among some journalists and others who want to talk about water wars the evidence is against them, at least the historic evidence."

Wolf describes a turning point in negotiations when cooperation becomes the likely strategy. "People generally walk into a negotiation setting talking about their rights. ... I deserve the water because I am upstream; And that almost never gets ratified in an agreement. ... One of the first switches is going from rights to needs. OK you may be upstream but how much water do you actually need? That is an important switch. ... The latest buzz word is an 'equitable distribution of benefits'."

The AzIP workshop brought Arizona, Israeli and Palestinian scholars and water managers together to map out pathways to bypass conflict and lead to the equitable and collaborative distribution of water. ■■■

Early Desert People Adopted Cross-cultural Water Sharing Strategies



Artist: Adrain Hendricks, member of the Gila River Indian Community.

Gary Nabhan, research social scientist at the University of Arizona's Southwest Center, says a look at the past, before the emergence of nation states, could provide some guidance for dealing with current bi-national and cross-cultural water disputes.

He mentioned that desert cultures had long ago adopted cross-cultural strategies to manage or protect springs, wells and rivers from overuse. At the confluence of the Colorado and Gila rivers, near what is today Yuma, he says indigenous cultures of several language families successfully negotiated the shared use of river water and wetlands access.

Sharing the water of the desert watershed were the Hia c ed O'odham or Sand Papago, the Western Yavapai, the Mohave, the Maricopa, the Quechan or Yuma, the Cucupa, the Maricopa and for some decades, the Paipai and Hispanic cultures as well as Anglo cultures. The presence of multi-cultural camps along the Gila and Colorado rivers was first recorded in the 16th century, with some persisting into the late 19th century. These seasonal inhabitants relied on the water ethics of diverse cultures to negotiate use of scarce and seasonally variable water resources.

Oral histories and archival documents enable researchers to better understand some of the principles and practices that figured into agreements about shared water use. These influences include the indigenous traditions of the Sonoran Desert along with some others that were transplanted into the Americas by the Spanish, as well as Crypto Jews and Crypto Moslems (including Arabs and Berbers) in the two centuries following the Spanish Inquisition.

AzIP Workshop, a Forum to Discuss Issues in Water-scarce Regions

Arizona, Israel and the Palestinian Territories seek and find common cause

The AzIP workshop was a collaborative effort bringing together representatives from Arizona, Israel and the Palestinian Territories, regions with arid and semi-arid environments, to address a topic of critical and mutual concern to all: water. Following is a brief summary of issues raised and discussed at the workshop.

It was apparent from workshop presentations that the strategies applied to meet current and future water supply-and-quality challenges vary. Some communities within the three regions seek ways to fund and build basic infrastructure to provide potable water and treat it after initial use, while others focus on water pollution, desalination, and conservation concerns.

Israel already reuses and desalinates large quantities of water to meet its water budget, and it plans to do more of both in the future. In Arizona and the Palestinian Territories, increased reuse and desalination are also often discussed as potential answers to the challenges of growing population and diminishing supply.

Arizonans also confront the challenge of governing water supplies that they share with other states and nations. Arizona depends on rivers and groundwater aquifers shared with Mexico and the Colorado River Compact states,

while Israelis and Palestinians both depend on shared groundwater supplies. The AzIP workshop convened a group of scholars, high level water managers, and students to tackle the challenges and complications of shared governance, desalination, reuse, treatment, climate change, and other pressing issues.

Arizona, Israel and the Palestinian Territories share certain basic conditions: growing and urbanizing populations, arid and semi-arid climates, substantial transboundary water resources, and concerns about the long term sustainability of current water supplies and how to encourage conservation. Yet there are also substantial differences, several workshop participants said, including population density, culture, economic and political status, and basic infrastructure. These differences

demand as much attention as the similarities in identifying research directions.

Palestinian, Israeli, and Arizona water managers share the desire to encourage water conservation in their areas. While each may draw on historical and religious traditions that encourage careful resource use, these traditions do not always carry through into binding law, policy, or practice.

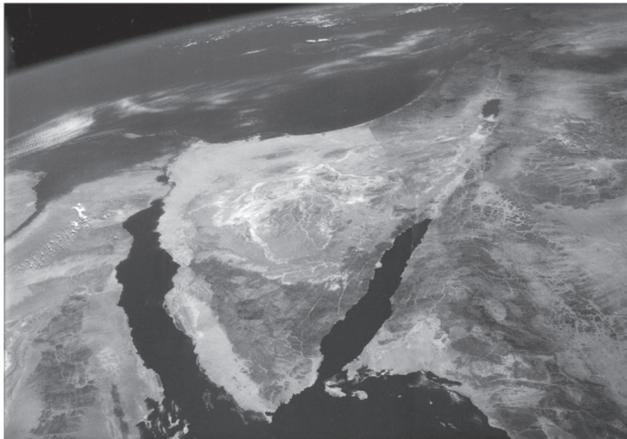
While property rights regimes and legal statutes governing water may differ within the three regions, each seems capable of encouraging or discouraging efficient and sustainable water management. Innovative water pricing structures could provide incentives for more efficient water use in the agricultural, commercial, and residential sectors.

Israel has established itself as a leader in desalination technology and looks to expand desalination of both sea and brackish water in the future. In Arizona and the United States, as in the Palestinian Territories, the high cost of building and operating desalination facilities have been seen as limiting factors. Disposal of wastestream from desalination facilities and the high cost of desalinated water for end users are also concerns that need to be further addressed in future research.

While Palestinian water managers view desalination as one of the ways to meet their future water needs, development of more basic water infrastructure, such as groundwater wells and water transport lines, is seen as a more immediate need. Many Palestinian communities lack basic water treatment facilities, and this lack brings with it health concerns that do not exist at the same level in Arizona and Israel. Much potential exists for collaborative projects that explore ways to meet these needs in Palestinian communities.

Reusing wastewater is another often cited answer to the dilemma

Issues.....continued on page 12



A satellite view of the region called the Fertile Crescent. It is here that humans first made the transition from a hunter-gatherer way of life to settlers on the land. The Fertile Crescent broadly corresponds to present day Iraq, Syria, Lebanon, Israel, Kuwait, Jordan, southeastern Turkey and west and southwestern Iran. Graphic from Daniel Hillel's AzIP PowerPoint presentation.



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Common Concerns of Arizona, Israel and Palestinian Territories Prompt Cooperative Efforts

Regions have shared interests

What conditions, interests and concerns, related specifically to water resources, do Arizona, Israel and the Palestinian Territories have in common? What issues defined and directed discussions during the recent Arizona, Israeli, and Palestinian Water Management and Policy Workshop (AzIP)? In other words, what factors made it likely that a cooperative effort among the regions would bear fruit?

The obvious commonality is that all are arid and semi-arid regions. Water scarcity threatens the well-being of regions and nations and provides a powerful incentive for officials to consult with others from water scarce areas to share political, technological and scientific information.

Robert Varady, research professor at the University of Arizona's Udall Center for Studies in Public Policy, provides more specific information about Arizona, Israel and the Palestinian Territories. He said, "The areas are somewhat similar topographically, hydrographically, climate wise and so on. They have similar size populations and most important they face a lot of the same challenges because there is not enough water for a growing population."

Christopher Scott, assistant research professor at the UA Udall Center and professor in the School of Geography and Development, elaborated on the regions' population issues and the need for

water. He mentioned the degree to which Israel, the Palestinian Territories and Arizona are rapidly urbanizing. He said, "It is not just aggregate demand but it is new demand for water coming from the urban sector real estate, urban growth, new subdivisions, population growth and expansion," Scott said.

Scott said each region faces the issue of reallocating water resources from an agricultural sector that had previously gotten the lion's share in order to meet increasing urban and environmental needs. He asked, "Are we going to do a good job leaving water in river systems and wetlands and riparian areas?"

Also, Scott provides an example with hydrographic and political significance. He finds similarities in the way the three regions are concerned with transjurisdictional boundaries when sharing a river: Arizona shares the Colorado River with other U.S. states and Mexico, while Israel and the Palestinian Territories share the Jordan River with other countries. Arizona's water supply is highly dependent upon flows from other Colorado River Basin states, and it has downstream obligations to California and Mexico, as well as to instream ecosystem water needs. Similarly, Israel and the Palestinian Territories rely on the Jordan River that is shared with Jordan with important contributions from Syria and parts of Lebanon. Downstream concerns include the environmental condition of the Dead Sea and instream uses of the Jordan River.

Scott said, "There is a clear analogy between the Colorado River and the Jordan River. ... These are both extremely water scarce basins in which there is a rush to develop water resources."

He added, "The way the Colorado River Basin has been managed with all kinds of challenges and some success and some failures has provided us with a degree of accumulated experiences in managing transjurisdictional river basins."

In coping with water resource challenges, the three regions have relied on different strategies depending upon circumstances and priorities. Information and expertise from one or two of the regions can be shared to benefit all. Using reclaimed water is an example. Scott said, "In using reclaimed water, I think that the Israelis and the Palestinians are doing a lot better and using more creativity [than Arizona]. They are one step ahead of us."

Along this line, at the AzIP workshop Alon Tal, associate professor in the Department of Desert Ecology at Ben Gurion University, discussed Israel's efforts to treat and reuse wastewater. He said Israel recycles over 80 percent of its sewage, providing local agriculture with over half of its water supply.

Meanwhile in Arizona, use of reclaimed water is an up-and-coming topic. Ben Grumbles, director of the Arizona Department of Environmental Quality, said in a recent interview, "Reclaiming wastewater is absolutely the future." Arizona currently uses wastewater for only about 4 percent of its water demand.

Desalination is another example. Varady said, "The Israelis have gone whole hog for desalination, whereas here it is a hot topic right now. The case is not as compelling to us as it was to Israel. They



Daniel Hillel, senior research scientist at Columbia University's Center for Climate Systems Research, discussed water in Israeli history and culture. He described the pastoral way of life that developed in the Fertile Crescent. Sheep, goats and cattle were domesticated, and water was mostly obtained from wells. The above scene is reminiscent of the stories in the Bible in which meetings occur by a well.

Public Participated in Session on Israeli-Palestinian Water Challenges

The public forum concluded on a hopeful note

A community program that included keynote addresses rounded out the day's events on Sept. 1. University of Arizona's President Robert Shelton greeted about 225 people attending the community event. Ben Grumbles, director of the Arizona Department of Environmental Quality, further extended the welcome. The keynote speakers were Uri Shani, director general of the Israeli Water Authority, and Shaddad Attili, chairman of the Palestinian Water Authority.

Attili, who was unable to attend the event in person, provided his message via DVD. Ayman Jarrar, director general for the regulatory and water control directorates of the Palestinian Water Authority, joined Shani at the podium to answer questions.

Shani described Israel's predicament confronting the dire consequences of ongoing drought affecting the Middle East. "The trend is very clear, and we need to understand it. If we don't work on the future development of water, we don't solve anything. Demand is increasing, and the supply is decreasing, and we are left with no solution," he said.

With brackish water threatening groundwater reserves, Shani said the importance of desalination as a water source has increased. Conservation measures, a national priority, have decreased Israeli water



About 225 people attended the community event.



Shaddad Attili, chairman of the Palestinian Water Authority, participated electronically in the AzIP workshop.

consumption. Agricultural allocations are half what they were nine years ago. Contributing to the conservation savings is the relatively minimal water lost to evaporation and leakage, about 10 percent in

Israel compared to much higher rates in other areas of the developed world. The use of reclaimed water has also increased dramatically.

Attili discussed the precarious state of Palestinian water supplies. He said that water is a daily problem in the Palestinian Territories, with many communities lacking basic infrastructure for delivery of clean water and for water treatment. "We are trying to create a vibrant Palestinian state; our state will not be vibrant if there is not enough water."

He stressed the need for Israel to increase water allocations. Going beyond an acknowledgment of the political work to be done, Attili spoke of water supplies as a humanitarian cause. He said, "In the end of the day, it is a basic human need."

Jarrar sounded a pessimistic note with regard to an immediate solution to Palestinian water problems. He said what is needed is "political will from both sides, which is unfortunately not available at this time." He said, "We are suffering, and the time should come to end our suffering with regard to the water supply." He expressed confidence in Uri Shani's willingness to work with the Palestinian Water Authority, but also made clear that final decisions on critical water issues were often politicized and made at a higher level of government than the water authorities.

The keynote session ended on a hopeful and conciliatory note. Despite the obstacles, Jarrar expressed optimism that trust can be

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Common Concerns.....continued from page 4

felt they had no alternative. ... On the pure technical side I think it is pretty clear that Israel is ahead of us in terms of desalination simply because they have done it and are using it."

Varady said the United States is ahead in a different area. "The kinds of things we might be able to impart may be softer than technical fixes ...more of those societal kinds of things that have to do with how do you get people to participate in decision making. How do you try to get equity in the decision making process, and

how do you do that in a transboundary way? How do you do it in a way that does not upset the other side? While we are by no means perfect at that, we are making some progress along those lines," he said.

Varady noted that the United States Mexico Transboundary Aquifer Assessment Program, a project involving three U.S. states and Mexico, might be viewed as a model. He said, "It is a good model because it starts off with the premise that both sides need to talk about common problems, and that when you are trying to

access groundwater you cannot just access what is on one side. The basins extend across the border. And so it is a good example of bi-national collaboration."

The AzIP workshop was only the first step in setting an agenda for broad collaboration in search of solutions to each region's most pressing water issues. As a neutral, third party research institution, the University of Arizona is well positioned to seek funding and serve as a hub for ongoing research that benefits Israelis, Palestinians, and Arizonans. ■

Israel's Public Ownership of Water Said to Offer Advantages Over Prior Appropriation

Ideals of public ownership, however, thwarted by "agency capture"

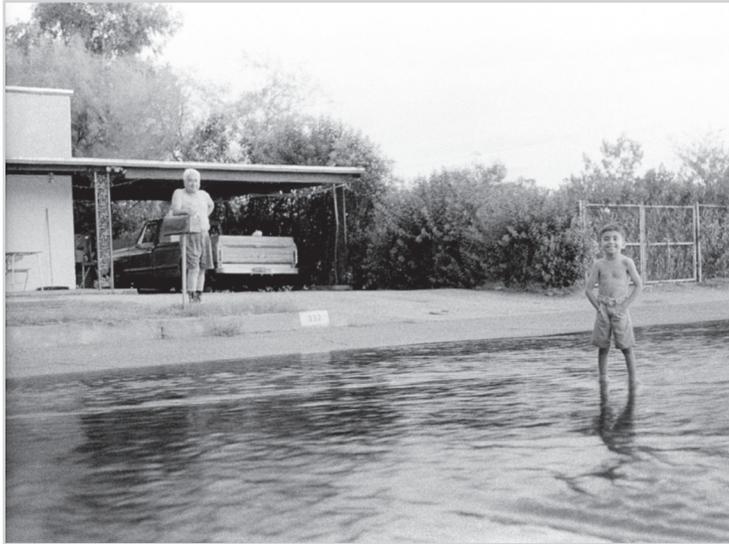
Does Israel's public ownership of water better protect instream uses than the prior appropriation doctrine in effect in the western United States? David Schorr, faculty of law member at Tel-Aviv University, raised this question by discussing water rights in Israel and Arizona. According to Schorr the two systems of water governance might be at opposite ends of the private-public spectrum.

In Arizona, the prior appropriations doctrine allows a water user private rights to a specific amount of water by diverting water from a source to serve a beneficial use. This system has been faulted for exploiting water resources and resulting in seriously reduced river flows and the destruction of riparian habitat.

The legal situation is much different in Israel. Section 1 of the Israeli Water Act, 1959, states that "the water sources of the State are public property," with "water sources" defined very broadly as "The springs, streams, rivers, lakes and other flowing and gathered waters, whether surface or subsurface, whether natural or controlled or built, whether flowing or standing permanently or intermittently, including drainage and sewage waters." The state owns water in Israel and sets conditions that must be met for private sector use.

Schorr believes that the Israeli system, at least in theory, is ideally suited to protect the natural environment. Environmental woes, however, beset the country. Due to falling water tables or surface

diversions nearly all the streams, including the Jordan below the Sea of Galilee, have been dried up. Some serve as sewage canals causing extensive damage to flora and fauna. The levels of the



Winning photos were displayed at the A&IP workshop and included these two entries. The above picture, titled "Desert Flooding," was one of the winning photos in the WRRC contest; Esther Snow is the photographer. On the right is a photo submitted to the Center for Middle Eastern Studies contest. It is titled "Playing in Nablus," photographer Michael Bonine, Nablus, Palestinian Authority, 1979. The latter photo is included with other submitted work as part of an exhibition called "Footsteps on Water" that will be on display through May at the Marshall Building, CMES, Room 470, 845 N. Park Ave., Tucson, Arizona.



Theme of 1st WRRC Annual Photo Contest was "Water"

Water Resources Research Center and the Center for Middle Eastern Studies conducted photo contests with water as a theme.

Dead Sea and the Sea of Galilee are dropping precipitously. Falling water tables in the Coastal Aquifer have caused saltwater incursions. Clearly there is a theory-practice disconnect in Israeli water law.

Schorr describes a drift from the principles of public ownership that he believes is at the root of the problem. Judicial decisions, new legislation and legislative amendments are leading the way to a nascent recognition of private rights or a quasi private property view of water. He would still characterize water in Israel as a public

Public Ownership.....continued on page 9

Identifying Topics for Collaborative Research is Task on Final Day

The plenary background presentations and discussions that took place on day one of the AzIP workshop served as an orientation for the work of Sept. 2. Participants were now ready to tackle a major workshop assignment: the identification of opportunities for collaborative projects to be conducted by teams of Palestinian, Israeli and Arizona researchers. Results of an online participant survey administered in advance of the workshop, along with extensive workshop discussions, identified possible research themes.

Five break out groups were organized based on complementary expertise to further define research questions. The groups were



Participants broke out into five discussion groups.

tasked with laying the foundation for joint proposals and identifying sources of funding. Much discussion was devoted to strategies for maintaining ongoing contacts and collaboration.

The break out groups took up the following topics as they relate to water: economics and socio-economics; decision making and conflict resolution processes; science and science diplomacy; institutions, governance and geopolitics; and master planning and infrastructure. The

groups' labors resulted in several potential research projects with an emphasis on their connections to on-the-ground, real world water challenges in each region. Among the identified projects were the following:

- Economics/Socio-economics: Compare financing methods used by water utilities and examine how they address water conservation, socio-economic differences between and within communities, water source reliability, and political and natural uncertainties.
- Process: Identify tools for building trust and making cooperative agreements on water resource management under conditions of conflict and power disparity through a review of case studies in similar contexts.
- Science/Science Diplomacy: Improve data sharing by developing the technological and institutional foundation for making hydrological and anthropogenic data more accessible for research, verification, and policy formulation.
- Institutional/Geopolitical: Evaluate how existing bilateral water governance institutions, such as the Israeli-Palestinian Joint Water Committee, have performed and identify improvements that could be made.
- Master Planning/Infrastructure: Conduct a feasibility

study for developing water delivery and wastewater infrastructure to a needy community in Palestine.

Despite political differences, the groups succeeded in developing research topics that could benefit communities in Arizona, Israel, and the Palestinian Territories. Disagreements arose, but all of the participants handled them with civility and respect, remaining committed to the constructive exchange of ideas and information that was a fundamental goal of the AzIP workshop. Substantial agreements were reached on key research questions and the approaches that can be used to move forward in addressing them.

The AzIP workshop brought together both established water scholars and managers and students involved in water related fields of study. Students and post-doctoral researchers from Arizona, other U.S. states, Israel, and the Palestinian Territories not only recorded small group discussions, but also participated actively in the formulation of research questions and approaches. As research proposals that build on the AzIP workshop are further developed, the contributions of students, researchers, water managers, and local community members will be needed to find real solutions to the pressing water challenges we face together. ■■

Optional Field Trip on AzIP Agenda



AzIP participants choosing to take an optional field trip had a choice of visiting the wastewater treatment plant, Sweetwater Wetlands or Tucson Water's Central Avra Valley Storage and Recovery Project for Central Arizona Project water.

Tucson Water staff provided briefings and led two field trips. Listening to a tour guide at Sweetwater Wetlands are (left to

right) Yoav Kislev, professor emeritus, Hebrew University, Daniel Hillel, senior research scientist at Columbia University, and Akrum Tamimi, associate research scientist at the University of Arizona, International Arid Lands Consortium.

Water Dispute.....continued from page 5

built between the two sides, leading to adequate water supplies for both Israelis and Palestinians and contributing to peace in the region. Shaddad Attili also expressed confidence that he and the Palestinian Water Authority can work with Uri Shani and the Israeli Water Authority to resolve conflict in the area of water. Shani found significance in the fact that part of the conflict is about water. He said, "The general method to extinguish fire is to use water. I believe water can lead to peace, and this is my hope. Nobody promised us to have easy solutions, but it can be done."

The AzIP workshop was organized to help both Israelis and Palestinians achieve the goal of resolving conflict over water and working together to find shared solutions. ■■

Arizona, Israeli, and Palestinian Water Management and Policy Workshop

Opening Dinner Session – August 31

Convenors: *Sharon Megdal*, Director, Water Resources Research Center, and Director, Water Sustainability Program, The University of Arizona; *Itay Fischhendler*, Senior Lecturer and Program Head, Environmental Planning and Policy Program, Department of Geography, The Hebrew University.

Presenter: *Christopher Scott*, Assistant Research Professor, Udall Center for Studies in Public Policy, and Assistant Professor, School of Geography and Development, UA, “Physical Environments in Arizona, Israel, and the Palestinian Territories: Landscape, Physiography, Climate, and Current Water Availability”.



Samer Alatout, University of Wisconsin

Plenary Background Presentations and Discussion – September 1

Session I: Historical and Social Environment: Understanding the Interaction of History, Culture, and Water

Moderator: *Dan Bitan*, Co-Director, Israeli-Palestinian Science Organization (IPSO)

Presenters: *Samer Alatout*, Assistant Professor University of Wisconsin, Department of Rural Sociology, Water Resources Management Center, “Comparative Analysis of Water in Arab and Israeli History and Culture”; *Daniel Hillel*, Senior Research Scientist, Columbia University Center for Climate Systems Research, “Water in Israeli History and Culture”; *Gary Nabhan*, Research Social Scientist, The Southwest Center, UA, “Historic Precedents for Cross-Cultural Water Conservation in the Desert Southwest”.

Session II: Contemporary Water Management: Reuse and Desalination as Expanding Water Sources, Including Consideration of Costs, Water Quality, and Community Acceptability

Moderator: *Hassan Dweik*, Co-Director, Israeli-Palestinian Science Organization

Presenters: *Abdel Rahman Tamimi*, Director General, Palestinian Hydrology Group Water Provision, “Water Treatment and Infrastructure Development in Palestinian Communities”; *Miki Zaide*, Head of Long Term Planning Division, Israeli Water Authority, “Water Management Challenges and Potential Solutions in Israel”; *Karen Smith*, Deputy Director, Arizona Department of Water Resources; *Tom McCann*, Assistant General Manager for Operations, Planning and Engineering, Central Arizona Project; *Bruce Hallin*, Manager, Water Business Development, Salt River Project; *Marc Campbell*, Planning Analyst/Engineer, Salt River Project, “Role of Desalination and Reuse in Arizona: Expanding Water Resources in Arizona”.

Session III: Water Law, Policy and Pricing

Moderator: *Marc L. Miller*, Esq., Ralph W. Bilby Professor, James E. Rogers College of Law, UA

Presenters: *David Schorr*, Esq., Lecturer and Director of the Law and Environment Program, Tel-Aviv University, “Property Regimes and Nature Conservation: Water Law in Israel and Arizona”; *Yoav Kislev*, Professor Emeritus, Hebrew University; *Sharon B. Megdal*, “Water Pricing in Theory and Practice”.

Session IV: Climate Change and Long Term Water Planning, Including the Water Needs of the Environment

Moderator: *Akram Tamimi*, Associate Research Scientist, International Arid Lands Consortium, UA

Presenters: *Gregg M. Garfin*, Deputy Director of Science Translation and Outreach, Institute of the Environment, UA, “Climate Change Challenges and Solutions for Water Managers in Arid North America”; *Amjad Alieni*, Director-General, House of Water and Environment, “Implications of Climate Change for the Palestinian Territories”; *Alon Tal*, Associate Professor, Department of Desert Ecology, Ben Gurion University, “Water Related Environmental Issues in Israel”.

Session V: Transborder Water Supply Issues

Moderator: *Sharon B. Megdal*

Presenters: *Ayman Jarrar*, Director General for Regulatory and Water Control Directorates, Palestinian Water Authority presented the paper by *Rashed Al-Sa'ed*, Technical Advisor to the Palestinian Water Authority; *Ahmad Al-Hindi*, Director General of the Unit National Water Council; *Fuad Bateh*, Legal Advisor to the Palestinian Water Authority, “Current Challenges of Transboundary Wastewater Management at the Israeli-Palestinian Borders”; *Mousa Diabat*, Ph.D. Candidate, Oregon State University; *Aaron T. Wolf*, Professor of Geography, Department of Geosciences, Oregon State University, “Transboundary Water Quality and Quantity: Lessons



Uri Shani, Israeli Water Authority

from Around the World”; *Rodney B. Lewis*, Esq., Former General Counsel of the Gila River Indian Community, “U.S.-Gila River Pima Trans-Boundary Water Issues and the Gila River Settlement”; *Robert G. Varady*, Deputy Director and Research Professor of Environmental Policy, Udall Center for Studies in Public Policy, UA; *Roberto Salmon-Castelo*, Commissioner of the Mexican Section, International Boundary Waters Commission; *Susanna Eden*, Applied Research Coordinator, Water Resources Research Center, UA, “Key Issues, Institutions, and Strategies for Managing Transboundary Water Resources in the Arizona-Mexico Border Region”; *Itay Fischbender*, Senior Lecturer and Program Head, Environmental Planning and Policy Program, Department of Geography, The Hebrew University; *David Katz*, Teaching Fellow, Tel-Aviv University, “The Dynamics of Linkage Politics: Israeli-Palestinian Water Negotiations”.

Evening Community Program: Israeli and Palestinian Water Management and Policy: Challenges Facing Water Managers and Potential Solutions

Welcome: *Sharon B. Megdal*, Director, Water Resources Research Center

Governor’s Greetings: *Ben Grumbles*, Director, Arizona Department of Environmental Quality

Opening Remarks: *Robert Shelton*, President, The University of Arizona

Speakers: *Shaddad Attili*, Chairman of the Palestinian Water Authority, via DVD with questions addressed by *Ayman Jarrar*, Director General for the Regulatory and Water Control Directorates of the Palestinian Water Authority.

Uri Shani, Director General of the Israeli Water Authority.

Collaborative Research Workshop – September 2

The first part of this full day session involved workshop speakers, invited participants and students. Based on the themes and questions identified, breakout groups formed to work more intensively on collaborative research proposal development. The full group reconvened to outline next steps.

For a full list of presenters, see the complete agenda, on the WRRC website. 🏠



*President Robert Shelton,
University of Arizona*

UA Center for Middle Eastern Studies, a Workshop Partner

By Anne H. Betteridge, Director of Middle Eastern Studies



Anne H. Betteridge

The University of Arizona’s Center for Middle Eastern Studies was honored to be a partner in planning the AzIP workshop. In spring 2007 Sharon Megdal, Bob Varady, Ed Wright and I began a hopeful conversation about possibly holding the workshop in spring 2008.

We were enthusiastic, optimistic about the project’s funding prospects, and secure in the knowledge that the project was uniquely suited to the UA’s strengths in water resources research, arid lands studies, and scholarship on the Middle East. We were particularly excited about the possibility of holding talks about complex concerns shared by Arizonans, Israelis, and Palestinians, and placing those within a comparative framework. We could not at that point appreciate the extent to which the economic environment would complicate the search for funding locally, nationally, and internationally. I continue to be grateful for the heroic efforts of Sharon Megdal, Chet Phillips, and their colleagues, which resulted in a

prestigious international workshop grant from the National Science Foundation.

The workshop’s value extends beyond an exceptional gathering and the resulting publication. A student participant told me that two aspects of the workshop struck her as most worthwhile. First, she admired the degree to which participants who didn’t necessarily agree engaged in discussions respectfully and productively. Too, she appreciated the fact that student researchers were invited to participate in workshop sessions. In her case, as I suspect in the case of other students, experience in the workshop has helped shape plans for her academic future. Further, ties established on account of the workshop provide the foundation for future collaborative activities at and beyond the UA. The workshop has already prompted communications from international colleagues who hope to extend the relationships it created. Plans for a UA study abroad program focused on Middle East environmental issues are in the works. I look forward to sharing news of those plans, and to future collaborations. 🏠

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resource, but it is increasingly moving toward the private sphere.

He finds that the public good is generally motivating Israeli water policy less than the interest of a particular sector: agriculture. The state might officially own water, but officials are allocating the water in response to agricultural interests.

He offers a theoretical explanation for

the environmental failure of public ownership. Scholars of public administration have long warned of “agency capture,” a hazard that threatens administrative and regulatory bodies. Schorr says the effects of agency capture are evident in Israeli water management.

He argues that the current situation of public ownership camouflaging private

appropriation is leading to undesirable results. Although he believes that true public control would improve these conditions, he argues, seemingly paradoxically, that a commitment to a true private property regime, with the law explicitly recognizing private rights in water, would better protect public rights than the current hybrid situation. 🏠



Guest View

Overdrafted Aquifers, Limited Wastewater Reuse Are Critical Issues

Mousa Diabat adapted his presentation at the AzIP conference to serve as a guest view. An Arab-Israeli, Diabat is Ph.D. candidate at Oregon State University, majoring in water resources sciences with an intent to study the integration of water quality in shared water treaties. He plans to work with parties involved in water disputes.

Natural resources are at the heart of the long and ongoing dispute between the Israelis and the Palestinians. Complexity intensifies as disagreement over water rights intensifies. Both sides demand senior water rights over the Mountain Aquifer. The Israelis base their claim on historical use of the water, while the Palestinian claim is geographical: 85 percent of the recharge originates within the West Bank area. Both sides also express concern over the sustainability of the aquifer. The Israelis fear the Palestinians will over exploit the Mountain Aquifer, and the latter claim the Israelis are already doing so. While the Palestinians have wells only inside the West Bank, Israeli wells are located inside the West Bank as well as in Israel near the West Bank borders.

The Mountain Aquifer is the only groundwater source for drinking water in the West Bank, while it is, along with other sources, important for Israel's water supply. The Mountain Aquifer, which is separated into three regions: eastern, northeastern, and western, intersects the 1967 (Green Line) border between Israel and the West Bank at several locations. More than 80 percent of the aquifer's basin lies beneath the West Bank.

In order to meet its demand for water, the Israelis suggest that Palestine look to other countries within the Jordan basin for necessary resources along with desalination technology. The Palestinians, on their side, reject both ideas, insisting on tying water rights to land sovereignty. The Israelis base their requests for water shares on 80-year use of the Mountain Aquifer.

There are twenty basins, shared between Israel and the West Bank, all originating in the West Bank. In most of them, Israel is located downstream, while Gaza is downstream of Israel in three basins. Eight basins flow toward the west, into Israel then to the Mediterranean Sea, and the rest flow towards the Jordan valley. The overall area of the West Bank is considered shared basins with Israel. Technically, Israeli settlements located in the West Bank are upstream of Israel and several Palestinian communities.

About 800,000 of the 2.5 million Palestinians living in the West Bank live in major cities and the rest live a rural lifestyle and in villages. In addition, close to 300,000 Israeli Jewish settlers live in the West Bank. Due to differences in water use habits and water availability, the Israelis consume, per capita, two to three times as much as the Palestinians. All residents as they consume water are, in turn, generating wastewater that demands treatment.

Extremely high percentage of wastewater generated in Palestinian towns is not treated compared to the amount in Jewish towns in the West Bank (3.2 of 56 million cubic meters in the Palestinian towns, and 12 of the 17.5 MCM in the Jewish settlements).

This is the result of various factors. The Palestinians have to make do with poor infrastructure and the Israelis have access to better maintenance of treatment plants. Palestinian authorities complain that the Israeli army limits access of trained Palestinian employees to the treatment facilities and limits their maintenance activities. As a result, wastewater effluents are released to unsupervised septic systems and wadis (open sewer canal) in nearby areas.

Consequently, wastewater runoff saturated with nitrates, phosphates, domestic and industrial chemicals, and medical matters flow freely in many wadis. Such wadis flow eastward to the Jordan valley (Dead Sea) and westward to the Mediterranean Sea over the Israeli territory. Additionally, those conditions put the Mountain Aquifer under risk of heavy pollution. Accordingly, this major source of drinking water for Israelis and Palestinians is in danger.

Since the early years of the twentieth century, principles of water quality have been incorporated in international water laws to better manage water quality in transboundary basins. To maintain healthy and functional communities, three important principles, among others, are relevant to the Israeli-Palestinian dispute: (a) guaranteeing territorial sovereignty, in order to prevent harm and to develop functional committees; (b) establishing basin level authorities that aim to prevent or control water pollution and to set mutual objectives of cleaner basins; and c) sharing real-time monitoring information.

To conclude, currently, the Palestinian population in the West Bank suffers from water scarcity and has limited access to water, and this is reflected by low-water consumption. With limited wastewater treatment and little rain water harvesting, consumption demand on the Mountain Aquifer increases. This could subject the aquifer to over exploitation or water contamination due to discharging raw sewage in the wadis. By this free discharge of untreated wastewater to the wadis, the areas downstream have high pollution potential too.

In order to integrate the principle of water quality, the discharge of untreated wastewater should be regulated. Israeli authorities have a larger role and responsibility in enforcing this action to prevent the continued contamination of the aquifer and affiliated basins. Mutual work is needed to prevent harm to both sides by establishing and maintaining a working wastewater treatment network and facilities. However, developing equal membership of joint, Israeli-Palestinian committees and functional teams of professionals is necessary to accomplish this step.

For any long term agreement, both sides would likely find it important to increase sovereign control on sovereign water and allocate to meet basic needs for all by establishing an equal "block" system. To ease the demand for pumped groundwater, both sides should increase the recycling of water. Furthermore, building healthy cooperative communities relies on establishing trust between citizens and their governments and by translating governmental cooperation into tangible trust. ■■■



Public Policy Review

By Sharon Megdal

Organizing International Workshop Provides Much Behind-the-Scenes Learning



In keeping with the featured theme of the current newsletter, which is the Arizona, Israeli, and Palestinian Water Management and Policy Workshop, my column, usually devoted to water policy matters, will instead discuss some of the lessons learned organizing the event. The broad significance of the workshop along with the challenges and details associated with its planning provided fertile grounds for learning.

The value of interdisciplinary teamwork was evident from the outset. A core group of four individuals of varied backgrounds conceptualized the workshop. Only two of us, Robert Varady, Deputy Director of the Udall Center for Studies in Public Policy, and I, have water policy/management expertise. Anne Betteridge, Director of the Center of Middle Eastern Studies, and Ed Wright, Director of the Arizona Center for Judaic Studies, are experts in other fields. We worked consistently over a lengthy period to develop a broad but balanced program, our varied perspectives and backgrounds ensuring a program of diverse perspectives.

Not to be overlooked are others who contributed significantly to our planning process, including Chet Phillips, graduate research assistant at the Water Resources Research Center. Multiple perspectives and backgrounds at the early planning stages were essential to program development, including consideration of cultural differences.

Another lesson learned was the value of seed funding and the necessity for taking some risk. When our initial request for outside funding was unsuccessful, we confronted the dilemma of lacking financial backing but receiving enthusiastic response to the initial invitations to participate. Significant thought went into the selection of workshop dates and the location. We were concerned if we abandoned our plans or moved the workshop to a different date, we would lose momentum. In the absence of other funding, WRRC committed Technology Research Initiative Funds to secure the hotel site. (The WRRC is a participant in the TRIF-funded University of Arizona Water Sustainability Program, administrated by the Arizona Board of Regents. Arizona voters approved TRIF funding in 2000, with funds derived from an increase in the state sales tax to support education.)

Our persistence in seeking financial backing resulted in obtaining grants from the UA Foundation, the National Science Foundation, the U.S. Israeli-Binational Science Foundation and others. We were heartened by these successes that validated our view that the workshop would be timely and with significant value. Our decision to move forward despite lack of firm outside funding also was validated, although it involved some risk.

Another risk had to do with planning to hold the workshop in Tucson, rather than in the Middle East. We were asking approximately two thirds of the attendees to travel to Tucson rather than one third traveling to the Middle East. Logistics, however, required

we hold a UA-sponsored workshop in Tucson. We could not have overseen the detailed development and delivery of the workshop otherwise. More importantly, the UA serving as a neutral host was a benefit recognized by the participants.

Two main purposes guided the workshop: (1) to identify pressing water issues related to long-term water sustainability through educational presentations and facilitated dialogue among participants; and (2) to develop a targeted, international collaborative research program that addresses research gaps and opportunities. We limited the workshop to invited participants to better achieve the goal of identifying research projects. This approach, however, did not preclude inviting the public to a special evening event. Attracting over 200 people, this no-cost event enabled interested members of the public to hear Israeli and Palestinian officials discuss pertinent water issues and to ask questions.

The workshop succeeded in furthering cross cultural understanding of local and regional water needs.

Unable to attend the public event due to obligations at home, Dr. Shaddad Attili, Chairman of the Palestinian Water Authority, one of our two keynote speakers, offered to send video-recorded comments and a staff person to participate in the discussion. The public therefore was able to benefit from the perspectives of Professor Uri Shani, director general of the Israeli Water Authority, as well as those from the PWA, via DVD, thus fulfilling our plans and expectations for the public event. Lesson learned: Commitment to finding solutions coupled with flexibility enabled us to deliver an informative public event.

An important feature of our workshop was the participation of young scholars, including undergraduate and graduate students. Students participating in the second full day of the workshop contributed significantly to the discussions and no doubt benefitted from them. The workshop is the first step in the development of a research and science diplomacy program to undertake collaborative research projects addressing critical water management needs of communities in each region. These young scholars demonstrated their interest in participating in future projects.

The workshop succeeded in furthering cross-cultural understanding of local and regional water needs. Further, it began to establish the trust essential to collaborative research projects and proposals and encouraged the recognition of shared goals. In addition to the development of several joint project proposals, an edited volume with papers from the workshop is planned.

My final lesson to share: Although considerable work over a long period of time went into developing and delivering the workshop, the real work truly has just begun. 🏗️

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of future water supply in arid and semi-arid regions, but in each region there are unanswered questions and infrastructure issues related to this technique as well. Environmental pollution and health concerns were raised, including how to screen for very small particle contaminants and hormone disrupting chemicals in wastewater. Whether recycled water is suitable for potable use was also considered. Though water treatment and filtration facilities are not as expensive as desalination facilities, funding is still a difficult issue for the Palestinian Water Authority. The question of where to locate reuse facilities was also discussed at length, with political considerations playing a significant role.

Climate change is likely to bring increased drought and seasonal fluctuations in reservoir and stream levels to each region. These changes threaten existing water sources and necessitate careful water planning. Research into new sources of water and conservation of existing supplies is all the more urgent in light of the impacts of climate change. Ecosystems and species depending on surface water will be threatened as existing water resources dwindle. Low income communities without sufficient water infrastructure are likely to be particularly vulnerable to the effects of climate change, and projects that lead to equitable water allocation and infrastructure development are critically important.

Sharing rivers, streams, lakes, and groundwater supplies means sharing decision-making power over these resources. Arizona shares the Colorado River with several other states and shares rivers and underground aquifers with Mexico. Israel shares the Jordan River with Jordan and

Syria. The Palestinian Territories share aquifer water with Israel.

The further development of transboundary institutions at the watershed, regional, and national levels requires careful consideration of structure, voice in decision making, and improved sharing of information. Evaluation of existing governance structures will require attention to the same variables. Hopeful examples exist and contentious water issues can be resolved, but peaceful resolution will require the continued investment of time, resources, and expertise by all parties involved, an investment the AzIP workshop sought to encourage. 🏛️

Planning Committee, Workshop Co-Sponsors and Funding Partners



AZIP
Arizona-Israeli-Palestinian
Water Management & Policy Workshop

University of Arizona's Arizona-Israeli-Palestinian Water Management and Policy Workshop planning committee consisted of Sharon Megdal, Water Resources Research Center and Water Sustainability Program, Robert Varady, Udall Center for Studies in Public Policy, Anne Betteridge, Center for Middle Eastern Studies and Ed Wright, Arizona Center for Judaic Studies.

AzIP co-sponsors and funding partners are the U.S. National Science Foundation; U.S.-Israel Binational Science Foundation; University of Arizona Foundation; University of Arizona Water Sustainability Program; International Arid Lands Consortium; International Water History Association; Israeli-Palestinian Science Organization; Sol Resnick Water Resources Research Endowment; UNESCO International Hydrological Programme; United Nations Association of Southern Arizona; Tucson Water; Elaine Minow Resnick; Arizona Center for Judaic Studies; Center for Middle Eastern Studies; Udall Center for Studies in Public Policy; and Water Resources Research Center.

