


Photos, clockwise from top left: View of reception area for Cutting-Edge Solutions to Wicked Water Problems conference; Conference co-chairs Dror Avisar and Sharon B. Megdal; Sorek Desalination Plant field trip participants; Panel at Sept. 12 WATEC conference; Central Arizona Project Board members Jennifer Brown and Mark Taylor with Sharon B. Megdal.

Photographers: Gefen Ronen Eliraz, Jennifer Brown, and Michelle Baruch

Comparing Experiences and Lessons Learned: The September 2017 International Conference on Cutting-Edge Solutions to Wicked Water Problems

by Sharon B. Megdal

My work focuses on water policy and management. For over a decade, I have been comparing the policies and management approaches of Israel with those of Arizona and the Colorado River Basin. This multi-faceted effort has involved several visits to Israel, where I have studied their management strategies and often speak about our region's water matters. Water recharge and banking, transboundary water and wastewater, groundwater management and governance, and conservation are among the issues compared. This calendar year started with a new opportunity, namely to co-chair a water conference co-convened by a U.S. organization, the American Water Resources Association (AWRA), and the Water Research Center at Tel Aviv University (TAU). On September 10-11, 2017, the conference "Cutting-Edge Solutions to Wicked Water Problems" was held at Tel Aviv University's beautiful Porter School of Environmental Studies building. Professor Dror Avisar, Water Research Center Director, served as conference co-chair. It was great to work with Professor Avisar, whom I did not meet in person until the day before the conference!

Wicked water problems are difficult to formulate and solve. (See *https://wrrc.arizona.edu/wicked-water-problems*.) Some examples are overuse or over-allocation of surface water and groundwater, impacts of long-term drought or changing climate, the imbalance between growing demands for water relative to supplies, and transboundary water and wastewater challenges, including pollution. Different regions face different problems, but the pathways to solutions often have common or similar elements. Israel is well known for its leadership in deployment of desalination technology, drip irrigation, and water reclamation, which has enabled it to address the scarcity of natural freshwater resources. While Israeli water management has influenced the work of others across the globe, we must acknowledge that institutional and governance factors, along with those related to geographic and physical variables, will shape the policies we see implemented. The key thrust of the conference was to discuss the pathways to solutions so to learn from each other's experiences and/or research. The active sharing and learning occurred through conference keynote addresses, technical presentations, field trips, and meals and hallway conversation. And learn we did!

In addition to speakers and attendees from the U.S. and Israel, experts from Mexico, the United Kingdom, and Hong Kong participated. The opening keynote speakers set the stage. Felicia Marcus, Chair of the California State Water Resources Control Board, emphasized the need to look at the whole of the problem(s), including difficult-to-predict game-changing influences, such as those associated with climate. Scale is important to consider: the population of California is more than four times that of Israel and the economy of this single state in the U.S. would rank about sixth among countries world-wide. Starting with a bit of humor, she invoked Godzilla in her first slide to evoke the horror of the wicked water problems situation. She emphasized that California's Water Action Plan includes a mix of approaches. Her presentation underscored a concern water managers often speak to, namely that it will take a crisis to spur actions that many have known were advisable, but difficult to implement, due to political and cost considerations. In California, the worst drought in

modern times served as the wake-up call and led to adoption of conservation mandates and groundwater management legislation. She emphasized the need to recognize the sometimes harsh realities and take bold actions.

Professor Eilon Adar of the Zuckerberg Institute for Water Resources at Ben Gurion University of the Negev provided an overview of how Israel has addressed the wicked problem of water scarcity. Often during the conference the saying "necessity is the mother of invention" came to mind. In Israel, the scarcity of naturally occurring usable water relative to demand made "bridging over the water shortage" the primary water management goal. Key strategies included: improving water utilization efficiency for irrigation and other water applications; conservation; water reuse; and management of water quantity and quality. "New" usable water was created through treating and reclaiming wastewater and desalinating seawater and brackish groundwater. Like California, responding to crisis has figured into the timing of Israel's water management actions. Drought conditions during the early part of this century resulted in changing agricultural water allocations and water pricing, which led to a renewed look at seawater desalination and the current situation where the quantity of desalinated water exceeds 70 percent of the quantity for municipal use. Key take-away messages were that water has economic value and its management needs care and attention through a holistic and coordinated approach.

Remarks on "Immigration and the Water Crisis" by TAU Vice Rector Professor Eyal Zisser helped provide a regional geopolitical backdrop to the discussions. Conference attendees received the most up-to-date information on the Red Sea-Dead Sea Project (Project) by Oded Fixler, Senior Deputy Director General, Israel Ministry of Regional Cooperation. He serves as the Israeli lead for the Joint Advisory Board with Jordan for the Project. His address covered the details of this cutting-edge and complex program to address partially the water scarcity challenges faced by (1) Jordan, whose significant water demands occur in the northern part of the country, (2) a key agricultural area in the south of Israel, and (3) the West Bank. A 2013 Memorandum of Understanding signed by Israel, Jordan, and the Palestinian Authority enabled the parties to move forward with what may be the first phase of a much larger effort to desalinate Red Sea water. The Project involves building a plant in Jordan. Some of the desalinated water will be sold to Israel. Israel in turn will provide water from the Sea of Galilee in the North to Jordan. The Project includes delivery of water to the Palestinian Authority for the West Bank, further demonstrating its regional importance. Also incorporated are energy features and the pumping the seawater desalination plant's brine discharge to the Dead Sea to offset some of the decline in Dead Sea water levels – another truly wicked water problem of the region.

Field trips were offered to the IDE's Sorek Desalination Plant, the largest reverse osmosis desalination facility in the world, and to Netafim's drip irrigation manufacturing facility at Kibbutz Hatzerim in the Negev Desert, where participants learned about the technology in drip emitters and life on a kibbutz. In addition, those who did not participate in the field trip to Sorek were able to take a virtual tour of the Sea of Galilee (Lake Kinneret), conducted by Dr. Doron Markel, Unit Head for Monitoring and Management of Lake Kinneret and Its Watershed. This was followed by a screening I hosted of the award-winning documentary *Beyond the Mirage*, which connects some of the wicked water problems of the lower Colorado River Basin and Arizona to Israeli water management. (See *http://beyondthemirage.org/*.)

Two tracks of technical presentations on wicked problems as well as strategies to address them featured experts representing academic institutions, government water agencies, the private sector, and non-governmental organizations. Low Jordan River and Colorado River flows, low inflows into the Sea of Galilee and Lake Mead, transboundary wastewater and associated pollution problems, water banking programs, water quality monitoring, water use efficiency, and water treatment were just some of the topics covered. For a more complete overview of the topics, along with contact information for the lead presenters, please consult the final program. (*http://awra.org/meetings/Israel2017/* and *http://watec-israel.com/preview-program/*.)

It is hard to convey the excitement associated with the conference in words. This was the first visit to Israel for many participants, some of whom were joined by family members. Several combined the conference experience with other exploration of this small country. For me and others, this conference was followed by participation in the biennial international WATEC conference and expo (*http://watec-israel.com/*), where discussion of wicked water problems carried over into the panel on water scarcity and abundance. See *https://wrrc.arizona.edu/panel-remarks-watec* for a summary of my panel comments.

I am grateful for the many positive comments I received before, during, and after the conference. Organizing a conference always takes a lot of work, and co-chairing an international conference was something new for me. It involved dealing with many issues that either do not arise or arise less frequently when chairing a domestic conference, whether local or national. While it did not involve too many sleepless nights for me, it did involve many early mornings of calls and emails working across the 10-hour time difference. I wish to offer my most sincere thanks to all those who helped make this conference successful. In addition to the speakers, I wish to shout out special thanks to Ken Reid and staff at AWRA, Dror Avisar and his colleagues at Tel Aviv University, and conference collaborators Netafim, IDE Technologies, Tel Aviv University, International Arid Lands Consortium, WATEC, and, last but not least, the University of Arizona Water Resources Research Center!