



Participants discuss their research at the Arab-American Frontiers poster session.

Photo credit: National Academy of Sciences

Bringing Scientists Together on the Cutting Edge of Innovation in the Middle East

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Accessing safe water and sanitation is an ongoing challenge in the Middle East and North Africa (MENA) region. This historically arid area is home to about 5 percent of the world's population, but only about 1.4 percent of the world's fresh-water resources. The demand for both water resources and a solution to sanitation challenges continues to grow. Through a partnership with the National Academy of Sciences (NAS), USAID is connecting researchers and encouraging them to work together across disciplines to devise comprehensive and practical solutions to the region's water resource challenges.

About 100 researchers from the United States and the MENA region will gather in November at the Arab-American Frontiers of Science, Engineering, and Medicine Symposium in Rabat, Morocco, to learn about each other's research in one of five subject areas: water, sanitation, and hygiene; renewable energy; precision medicine and cancer; smart agriculture; and smart cities.

“We wanted to bring together people from multiple disciplines so they can meet counterparts who they don’t usually interact with in the traditional meetings of their field,” explains Dalal Najib, senior program officer with NAS. “We’re not talking about things that have been discussed before, but trying to look at the cutting edge in those specific fields.”

USAID was an early supporter of this symposium format, which has also been held in China, Japan, and the European Union, among other places. “This is a forum where participants can collaborate and publish together, which researchers in the Middle East have fewer opportunities to do,” says Kamal Ouda, the USAID MENA water and infrastructure advisor. He explains that one of the Agency’s ultimate goals is to improve the water, sanitation, and hygiene (WASH) sector and service delivery in the region.

This will be the fifth Arab-American symposium and the third that USAID has helped fund. Water issues have been featured in some form at all five symposiums. “Water keeps coming back, because it is always a theme that is current, there is always a certain urgency to it in the region,” says Najib.

Improved water services is a subject that Antoine Ghauch of the American University of Beirut and Kartik Chandran of Columbia University have devoted their careers to. The two co-chairs of the WASH panel at the Frontiers Symposium will not meet face-to-face until they arrive in Morocco, but they already see an overlap in their research. “I learned a lot from his research topic,” says Ghauch. “He is investigating a topic that is complementary to what we are doing here.”

Ghauch and his colleagues in Lebanon are developing treatment systems that will be cost-effective for smaller-scale industries such as pesticide, pharmaceutical, or dye manufacturers to use when disposing of wastewater. “All the wastewater that is produced now is discharged without any prior treatment into the environment — either into rivers, lakes, or mostly into the Mediterranean Sea,” he explains.

Since 2012, Ghauch and his team have been working with USAID-funded Partnerships for Enhanced Engagement in Research (PEER) grants on a strategy using advanced oxidation processes to remove organic contaminants from wastewater before it is released. “A very powerful oxidant is activated and it produces chemical radicals,” he says. “These chemical radicals are able to oxidize and mineralize the organic compounds including dyes, pesticides, or pharmaceuticals that are hardly removed through regular wastewater treatment plants.”

Chandran’s research, on the other hand, is looking at ways to transform wastewater into a resource. “In 2011, we launched a program in Ghana to convert fecal sludge into chemicals and also very high-end products like biodiesel,” he explains. Additionally, using ammonia-oxidizing bacteria, which are typically used to remove nitrogen from wastewater, Chandran has been able to develop a technology that transforms bio-generated methane gas into methanol, a widely used industrial chemical. The 2015 MacArthur Foundation grant winner says that this use of microbes to recover energy, nutrients, and chemicals also has applications in the United States, where 20 percent of households are connected to septic systems instead of municipal sewers.

Chandran says that events like the Arab-American Frontiers Symposium encourage innovation. “That really catalyzes new thinking, and perhaps even allows us to ask questions that we might not have even thought before to ask,” he says. “It’s really the connections that I’m looking forward to. In general, we focus on clean water and sanitation, but we can’t talk about that in a vacuum. We need to bring in the energy and other industrial sectors into the conversation on water as well.”

Ouda agrees with the usefulness of collaboration. “We can be so focused in one direction, but attendance at these meetings can show us new perspectives. That’s where the value is.” Seeing problems from new perspectives can be the catalyst that ultimately brings improved water services to the MENA region.

By Christine Chumbler



Additional Resources:

- [Partnerships for Enhanced Engagement in Research](#)
- [USAID Bureau for the Middle East](#)

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