Researchers successfully test solar desalination system for arid land agriculture

May 25 2012

Ben-Gurion University of the Negev (BGU) researchers have created a man-made oasis in the desert with the successful application of a solar-powered desalination system that provides water for irrigation in arid regions. The project was made possible with support from American Associates, Ben-Gurion University of the Negev (AABGU).

The solar-powered system uses nanofiltration membranes to treat the local brackish (saline) water, resulting in high-quality desalinated irrigation water. The results of the Josefowitz Oasis Project indicate that irrigation with desalinated water yields higher productivity from water and inorganic fertilizers compared with current practices. Crops grown with desalinated water required 25 percent less irrigation and fertilizer than brackish water irrigation. In some cases, the yield of crops increased.

The findings were presented in a paper at the Conference on Desalination for the Environment in Barcelona late last month by Dr. Andrea Ghermandi of BGU's Zuckerberg Institute for Water Research (ZIWR) on behalf of his colleagues Drs. Rami Messalem (ZIWR), Rivka Offenbach, and Shabtai Cohen of the Central Arava Research and Development Station. The Josefowitz Oasis Project was funded by Samuel Josefowitz, of Lausanne, Switzerland with additional support from The Alliance for Global Good, Greensboro, North Carolina through AABGU.

"The growing global demand for food and competition for resources

between economic sectors compel future agricultural systems to be more efficient in the use of natural resources, such as land and water," says Dr. Ghermandi. "In the Middle East, the lack of fresh water promotes the exploitation of marginal quality sources such as brackish aquifers, but the sustainability of the current management practices is questionable."

The research was conducted in the Arava Valley of Israel, south of the Dead Sea at a facility that produces environmentally sustainable crops in arid environments. The Arava basin is extremely dry and its agricultural activities rely extensively on brackish groundwater from local aquifers.

Agricultural experiments with variable irrigation water quality, application rate and four different staple crops were conducted over two growing seasons between September 2010 and June 2011. Nanofiltration membranes allowed for less pumping of energy. The desalination plant operated at low pressure, low energy consumption and with little maintenance required during the period.

The researchers also used red beet, a salt-tolerant crop, to successfully consume the liquid wastes of the pilot facility over two growing seasons. This demonstrates that the moderately saline concentrate waste from brackish water desalination can be a useable byproduct.

"The Alliance for Global Good, generously supported by Leonard Kaplan, has been a partner of ours for a year now and is focused on innovation and research to solve global problems," explains American Associates, Ben-Gurion University of the Negev Executive Vice President Doron Krakow. "The Josefowitz Oasis Project has the potential to help quench the thirst of a very parched world."

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