

Water Technologies and Potential Cooperation along the Jordan River Basin

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Introduction

This paper focuses on water technologies and potential cooperation along the Jordan River Basin, a trans-boundary water body shared among Israel, Jordan, Syria, Lebanon, and the West Bank. Due to space limitations, this paper will focus on Israel, Jordan, and the West Bank. Data were collected in the region March 14-25, 2014 through site visits, expert interviews, and household water data and surveys, and were supplemented with water and climate change documents from available literature. This paper examines the role the future United Nation Technology Facilitation Mechanism

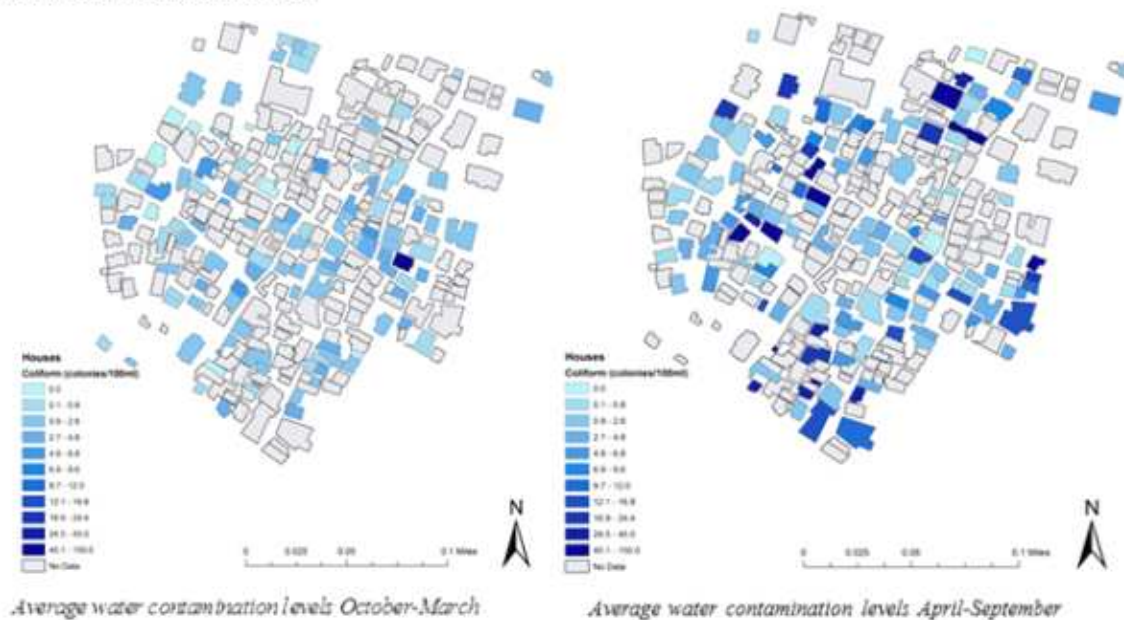
could take to assist cooperation among Israel, Jordan, and the Palestinian Authority to do the following: 1) Address and identify water technology needs and gaps, 2) promote partnerships and capacity building to encourage the development of innovation.

Water Technology Needs and Gaps

Despite acute water insecurity in the Middle East, there is minimal innovation among countries in the Jordan River Basin (with the exception of Israel). Advances in technology are

Case Study: Aida Refugee Camp, Bethlehem, West Bank

Aida Refugee Camp is one of 19 refugee camps in the West Bank, and an example of a Palestinian community at “high risk” of water scarcity and poor water quality. The water network in the region is inefficient, and there is a 40 percent water loss in the Bethlehem area, according to the Bethlehem Municipality. Residents of Aida Camp receive less than the World Health Organizations’ recommended minimum of 100 liters of water a day, and 67.5 percent of the household water tested in the camp contained coliform bacteria. The frequency and level of contamination is higher in the summer when there is less water.



one of the most powerful resources the countries can provide to address water scarcity and quality. Israel is ranked 14 out of 142 countries in the Global Innovation Index 2013, Jordan ranks 61, and the Occupied Palestinian Territories are not listed.¹ The level of knowledge used effectively for economic development also varies significantly. The World Bank's Knowledge Economy Index lists Israel as 25 out of 145 countries, Jordan 75, and the Occupied Palestinian Territories (OPT) are again not listed.² Israel has put an emphasis on water technologies - more than 30 percent of all of Israel's applications for patents are for water-saving technologies.³ Israel has filed 24 membrane water treatment patents and 13 UV water treatment patents, which is 0.5 percent of total water patents filed globally⁴. This indicates that in the Middle East, Israel is a leader in water technologies, and could share more of these technologies to neighboring countries. Improved irrigation, desalination, and wastewater management are just a few water technologies that are already being implemented in Israel.

Currently, there is a low level of distribution of clean water technology, particularly to the West Bank. Approximately 70-75 percent of Israel agriculture is currently using drip irrigation. In the Jordan Valley approximately 99 percent of the crops use drip irrigation and "micro"

irrigation.⁵ In the West Bank only 7 percent of the cultivated land is irrigated. The majority of their production comes from this irrigated land, which averages at about 53 percent of total production in the country.⁶ With the proliferation of such technology, there could be more effective and available water for food production and household water use.

The only way for additional clean water to come into the area is through desalination of seawater. More than 90 percent of the desalination-related patents from the Middle East have been filed in Israel.⁷ Desalination is very expensive, however, and the West Bank and Jordan are required to buy the water. The Jordanian Water Minister suggested that there could be a pipeline of desalinated water from Israel-Jordan.⁸ Gaza and Jordan developing desalination plants and technology might be more lucrative for their countries in the long term.

Less than 3 percent of the sewage is treated in the West Bank, and the majority of the rest is treated in Israel. By comparison, Israel reuses more than 80 percent of their wastewater. Experts in the West Bank expressed their desire to also reuse more of their wastewater, but it is difficult to get water projects approved. Of the 30 wastewater treatment plants suggested, only four have been approved since 1995.⁹ The Joint Water Committee (JWC) is an Israeli-Palestinian Authority water management mechanism,

¹ Cornell University, INSEAD, WIPO, Global Innovation Index Rankings, <http://www.globalinnovationindex.org/content.aspx?page=gii-full-report-2013#pdfopener>, 2013.

² World Bank, Knowledge Economy Index, http://info.worldbank.org/etools/kam2/KAM_page5.asp, 2012, page 5,

³ Antoine Dechzlepretre and Eric Lane, Fast-tracking green patent applications, http://www.wipo.int/wipo_magazine/en/2013/03/article_0002.html, 2013.

⁴ Helena van der Vegt, Ilian Ilieve, Patent Landscape Report on Membrane Filtration and UV Water Treatment A landscape report on selected water treatment technologies and their application in desalination systems, World Intellectual Property Organization (WIPO), http://www.wipo.int/export/sites/www/freepublications/en/patents/947/wipo_pub_947.pdf, 2012, page 43.

⁵ His Excellency Hazim el Naser, Jordanian Water Minister, March 2014.

⁶ Food and Agriculture Organization (FAO), Aquastat: Occupied Palestinian Territory, www.fao.org/nr/water/aquastat/countries_regions/wbgs/index.stm, 2008.

⁷ Irene Kitsara, Mapping Desalination Technologies, http://www.wipo.int/wipo_magazine/en/2012/03/article_0007.html, June 2012.

⁸ His Excellency Hazim el Naser, Jordanian Water Minister, March 2014.

⁹ Palestinian National Authority, Palestinian Water Sector: Status Summary Report, <http://www.ewash.org/files/library/Water%20summary%20for%20AHLIC%20report%20FINAL.pdf>, September 2012, page 5.

which makes decisions on all things related to water in the West Bank. According to a senior USAID official, the JWC has not agreed to any new water projects since 2010.¹⁰ Implementing and accessing innovation is very important, especially for countries where research development and demonstration (RD&D) is not as intensive.

There is a huge discrepancy of RD&D among the countries in the Jordan River Basin. Israel is very RD&D intensive, and in 2010 they designated approximately 4.8 percent of their gross domestic expenditure (GDP) to RD&D.¹¹ While Israel is a world leader in RD&D, many of the other countries are lagging behind. Israel's contribution of GDP to RD&D is very high and surpasses Japan, United States, Germany, and France, among others. Jordan contributes less than 1 percent of their GDP to RD&D.¹² In the West Bank, it is unclear how much GDP is allocated to innovation.

Both Israel and Jordan are part of the FP7, which means they are part of the EU's Program for Research and Technological Development. More cooperation among countries is needed to close knowledge gaps caused by lack of funding for RD&D, and an education system that does not focus on innovation. Overall research funding in the Jordan River Basin is low, and so there is a low level of incentives to encourage innovation and data collection.

There are gaps in the publically available data regarding water and technology in the Jordan

¹⁰ Senior USAID Official, Interview, March 23, 2014, Tel Aviv.

¹¹ United Nations Educational, Scientific and Cultural Organization (UNESCO), Global Investments in R&D, http://www.uis.unesco.org/FactSheets/Documents/fs15_2011-investments-en.pdf, 2011, page 2.

¹² The Higher Council for Science and Technology, The National Innovation Strategy 2013-2017, Policy Document, Jordan, <http://erawatch.jrc.ec.europa.eu/erawatch/opencms/system/modules/com.everis.erawatch.template/pages/exportTypesToHtml.jsp?contentid=ce681843-705b-11e3-ab31-3b1a37daf5b5&country=Jordan&option=PDF>.

River Basin. Jordan has an outdated technology needs assessment (TNA), which dates back to 1999. Neither Israel nor the Palestinian Authority has a TNA listed online. These documents would be useful for countries to further self-diagnose water technology gaps.

The Jordan River Basin requires more efficient water technology transfer. In the West Bank in particular, environmentally sound water technology development, transfer, and dissemination is needed. Over 13,000 Palestinians living in 99 communities in Area C of the West Bank are considered at "high risk" of water scarcity.¹³ Water scarcity and poor water quality are major threats to Middle East stability, and with cumulative climate variability, resilient water management strategies are increasingly important.

Important Potential Partner Organizations & Capacity Building

Israeli and the Palestinian Authority innovation systems are at different stages of development. The Palestinian innovation system is mostly in its creation phase, while the Israeli innovation system is much further along. A successful resilient water strategy in the Jordan River Basin area would combine both hard (technical transfer solutions) and soft (training, soft skills, etc.) technologies. Based on the gaps highlighted in Section I. above, it is important to establish a system to collaborate on research, development, and diffusion of water technology. Some examples of regional and national institutions that could act as a delivery mechanism for technology deployment and transfer in the region are listed below:

¹³ Emergency Water, Sanitation and Hygiene group (EWASH) and Al-Haq, *To the Committee on Economic, Social and Cultural Rights, Israel's violation of the International Covenant on Economic, Social and Cultural Rights with regard to the human rights to water and sanitation in the Occupied Palestinian Territory*, http://www2.ohchr.org/english/bodies/cescr/docs/ngos/EWASH-Al-Haq_Israel_CESCR47.pdf, September 2011, page 8.

1) International: United Nations Environment Program (UNEP), United Nations Development Program (UNDP), United Nations Industrial Development Organization (UNIDO), International Labour Organization (ILO), World Intellectual Property (WIPO), World Bank (WB), International Finance Corporation (IFC), Global Environment Facility (GEF), and the Climate Technology Initiative (CTI)

Financial Mechanisms: Global Environment Facility (GEF), Green Climate Fund (GCF), World Bank (WB), International Monetary Fund (IMF), smaller grants from foundations, etc.

2) National: The United Nations Technology Facilitation Mechanism should encourage an enabling environment among the countries in the Jordan River Basin. If there are financial incentives for all countries involved, it would encourage innovation. With enough regional expertise and financial support, Jordan and the Palestinian Authority could implement desalination and wastewater technology, instead of buying water from Mekorot (national water company) in Israel. The Israeli Ministry of Science and Technology maintains 10 small research centers dedicated for research for the benefit of their regions.¹⁴ The United Nations Technology Facilitation Mechanism could leverage these centers, particularly the RD&D Science Center Dead Sea and Arava, as they are already cooperating regionally.

Conclusion

The United Nations Technology Facilitation Mechanism should support RD&D, technology transfer, data gathering (specifically in the West Bank), and cooperation among countries in the Jordan River Basin. Water management, RD&D, and patenting in Israel can be a model for neighboring countries. Drip irrigation and

improved wastewater management could increase water availability and quality in the Jordan River Basin. Partnerships among countries and sectors are key to resilient strategies disseminating these pre-existing water technologies

¹⁴ Ministry of Science, Technology, and Space, R&D Centers, Israel, <http://most.gov.il/Pages/HomePage.aspx>.