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In water-scarce Jordan, agriculture consumes nearly two-thirds of the country's fresh water supply, yet accounts for less than three percent of the nation's gross domestic product. To improve water-use efficiency, USAID and local partners are promoting hydroponic farming and the use of recycled wastewater for irrigation.

Photo credit: USAID/Jordan

Sustainable Systems Link Urban WASH and Rural Agriculture

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Jordan is among the most water-poor countries in the world. Amman, the Kingdom's capital, has more than 3 million residents who badly need water for sanitation and hygiene. At the same time, outside the city, there is not enough water to irrigate some 10,000 hectares devoted to food production. The country's water infrastructure is aging and groundwater levels are declining, which also means an increase in salinity.

USAID Jordan has been taking an integrated approach to these issues with a key success being the USAID/Millennium Challenge Corporation's (MCC) As-Samra Wastewater Treatment Plant (WWTP). As-Samra WWTP now provides 10 percent of Jordan's agricultural water in the form of reused, highly-treated wastewater. This approach addresses the water, sanitation, and hygiene (WASH) needs of the city, while still providing the water needed for crops in the surrounding area and the

Jordan River Valley. By using this wastewater for irrigation, Jordan is able to conserve its precious freshwater resources for drinking water.

Amman's residents produce 267,000 cubic meters of wastewater a day. This is transported 22 miles to the As-Samra plant in the Zarqa Governorate. There it is treated before approximately 200,000 cubic meters is released into the Zarqa River, which, before receiving this steady influx of treated water, had shriveled into a small, polluted creek. The river once again contains fish, plants and other aquatic life as a result of this water. More than 100,000 cubic meters per day from the WWTP is now used for agricultural purposes and approximately 4,000 farms (10,000 hectares) are irrigated with the highly-treated water.

Building on Success

USAID supported Phase One of the As-Samra WWTP construction in 2003. In 2009, the Government of Jordan (GOJ) decided to enlarge the plant. As part of a five-year Compact with Jordan, MCC committed \$275.1 million for development projects, including a substantial grant toward financing the As-Samra expansion. The expansion will help improve environmental conditions in Jordan by increasing the capacity to treat growing volumes of wastewater from the Amman and Zarqa Governorates. The added treatment capacity will grow from 267,000 to 365,000 cubic meters per day when the expanded plant is fully operational in 2016. It will serve some 3.5 million inhabitants of Amman through 2025.

The use of the build-operate-transfer (BOT) financing model, put in place by MCC and the GOJ in 2012, has been critical to the success of the project. Under this type of public-private partnership, the financing, design, construction, operation and maintenance of the facility falls to a private sector entity. At the end of the concession period in 2037, the facility will be transferred to the GOJ at no additional cost. This frees up the government to use much-needed public funds elsewhere in the water sector.

Renewable Operation

Remarkably, As-Samra meets 80 percent of its energy needs — about 10 megawatts — with renewable energy from onsite sources. These consist of methane from the wastewater, converted into biogas to power a turbine, and energy generated from the onsite movement of wastewater, including using water flows to power a turbine at the plant outfall.

The plant also converts waste into bio-solids, which may be used for non-food production purposes, such as soil amendments used in conjunction with the planting of trees and shrubs for the rehabilitation of mines and rangelands. Bio-solids have not yet received GOJ approval for this purpose, but USAID is working closely with the Government to enable this important policy change.

Key Partnerships

The construction and operation of the As-Samra WWTP and other U.S. Government (USG)-supported water sector projects demonstrate strong interagency coordination in Jordan. USAID and MCC are collaborating to ensure that USG investments in Jordan's water sector are mutually reinforcing, cost-effective, and

sustainable.

In addition to MCC's support for As-Samra, the corporation has two other major projects in Zarqa that provide upstream water and wastewater infrastructure and capacity building for the Zarqa water utility. One is MCC's Wastewater Network Project, which has completed more than 113 miles of urban sewage pipelines, and is on track to complete up to 136 miles soon. These pipelines will dramatically reduce sewage overflows into city streets and increase collection of wastewater for water treatment and recycling. The other is the Water Network Project, which has completed construction of more than 90 percent of its targeted 363 miles of urban drinking water pipelines. These new lines will greatly reduce water loss from leaky pipes and improve the operation and maintenance of the Zarqa water utility. The MCC Compact with Jordan ends in December 2016, and efforts are already underway to ensure a seamless handover to the Zarqa water utility with follow-up support to Zarqa by USAID.

A Sustainable Response

USAID's holistic approach to Jordan's issues, such as in the case of the As-Samra WTTTP, is notable for its emphasis on sustainability, and is dependent on four factors: non-revenue water (NRW) reduction and capacity development, wastewater treatment plants, financial incentives and structure, and effective coordination between organizations.

The Mission's projects with the Ministry of Water and Irrigation cover water supply, water conservation, wastewater treatment, and water management and governance. Many of these interventions, taken together, provide the country with options for making the best use of its limited water supply.

Non-Revenue Water and Governance

Jordan's water utilities and municipal water services face non-revenue water losses caused by theft, leaks, and poor metering and billing. The five-year, \$60 million USAID Non-Revenue Water (NRW) Reduction Project focuses on supporting water utilities to reduce water losses through advanced leak detection, mobile leak repair workshops, and improved metering and equipment. The Jordanian Government estimates that achieving a reduction in NRW from its current 50 percent to 25 percent will save enough water to meet the daily urban water needs of 2 million people.

Strengthening Institutions

To make the most of this increased revenue, water sector institutions need to deliver higher-quality services and serve more customers. Some water utilities in Jordan still struggle with financing, governance, structure, and technical and planning capacity. USAID has supported several of Jordan's utilities over the last five years through the Institutional Support and Strengthening Program, which ran from 2010 to 2015 with a budget of \$16 million. Its successor project, the Improving Water Sector Management and Governance Project, is slated to run from 2016–2021, with a budget of approximately \$35 million, and will tackle institutional reform, capacity building and policy issues.

The increased focus on strengthening the capacity and governance of utilities and

municipalities to provide water dovetails with the Non-Revenue Water Reduction Project. This project helps ensure the greatest amount of water is provided at the best price structures, so that the country makes the most of its water supply.

A Sustainability Model for Water-Scarce Countries

USAID Jordan's approach to water scarcity is multi-faceted and long-sighted. Lessons learned here can be replicated in other regions and countries with similar challenges. These approaches align with the Agency's Water and Development Strategy's commitment to addressing global water-related development needs with a focus that is sustainable and works through host country systems. The USAID Jordan approach to critical water sector issues is a good example of the Strategy in use.

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Additional Resources:

- [USAID/Jordan](#)
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