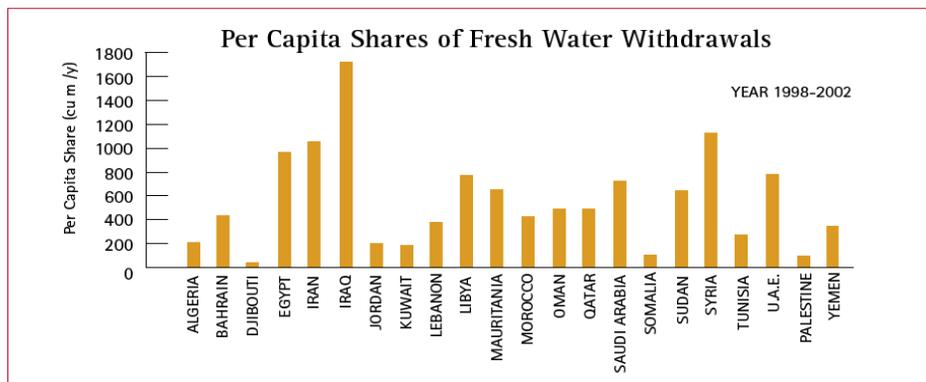


## Wastewater Reuse for Water Demand Management in the Middle East and North Africa

Water Demand Management (WDM) is a water management approach that aims to promote water-use efficient, equitable and sustainable practices and policies. WDM is simply defined as ‘getting the most of the water that we have’, while taking into account the social, political, economic and ecological contexts in which this process takes place. For the Middle East and North Africa (MENA) region, WDM requires a change in behaviours and practices in the way in which water is used, particularly in the agricultural sector where approximately 85% of the region’s water is consumed.

Among the substantial WDM tools in MENA is the use of wastewater to reduce the pressure on scarce freshwater resources. The utilization of wastewater, drainage water, greywater or saline water saves conventional resources and is a viable WDM strategy that promotes the use of lesser quality water for specific purposes. WDM implies that wastewater be viewed as a resource, and advocates its reuse following appropriate treatment for application in myriad activities such as crop production, irrigating green spaces and golf courses, groundwater recharge, influent for industrial cooling systems and domestic cleaning, to name a few.



Per capita shares for freshwater withdrawals for different Arab countries

Source: AWC (Arab Water Council). MENA Regional Document, 4<sup>th</sup> World Water Forum Local Actions for a Global Change, Mexico.

Irrigation with raw wastewater and drainage water is a widespread practice in MENA where it is usually used when no alternative water source is available. This practice can bring considerable benefits, yet, it is associated with serious health and environmental risks. When compared to freshwater, wastewater supply is cheap, reliable, and available to farmers on demand allowing them to grow crops they would not otherwise be able to grow. It can ensure crops all year round, and is rich with nutrients. Conversely, the use of raw or partially treated wastewater can cause pollution of soil, surface water and groundwater due to increase in nitrate concentrations. Inappropriate wastewater use poses direct and indirect risks to human health caused by the consumption of polluted crops and fish. Farmers in direct contact to wastewater and contaminated soil are also at risk. Moreover, most of the wastewater treatment plants in the MENA region are not efficient in removing pathogens of the discharged reclaimed waters.

Most of the wastewater reuse standards in MENA are based either on United States Environmental Protection Agency (USEPA) or World Health Organization (WHO) guidelines. In 2006, the WHO published the third edition of the Guidelines for the safe use of wastewater, excreta and greywater in agriculture and aquaculture. However, most of the time, these standards are not reinforced in the countries of the region.

Planned strategic reuse programmes require that countries in MENA adopt an integrated approach that seeks to maintain the benefits and minimise the risks. Current constraints on wastewater reuse need to be reviewed. It should be planned to treat all generated wastewater and to use the whole amount in appropriate contexts. This approach considers multiple institutional arrangements, sound application of economic incentives for wastewater reuse, adoption of appropriate farming practices, public awareness to establish social acceptability for reuse, and consistent government and civil society commitment over the long-term.

As such, many MENA countries practice wastewater treatment and reuse, whether planned or un-planned, however, Tunisia and Jordan present unique examples. The Tunisian experience places Tunisia among the leading countries in treated wastewater reuse. In Tunisia, there exists 98 water treatment plants, around 190 million m<sup>3</sup> treated wastewater effluent, 24% of which is used for irrigated agriculture. The Decree 89-1047 regulates the use of treated wastewater for agricultural purposes. With consideration to associated constraints, Tunisia has mitigated environmental and health risks associated with untreated wastewater use more than elsewhere in the world.



Jordan, the most water scarce country in MENA is set to achieve 100% reuse of reclaimed water. In Jordan, all of the treated wastewater collected from the As-Samra wastewater treatment plant is mixed with freshwater and used for unrestricted irrigation in the Jordan Valley. Wastewater represents 10% of the current total water supply in Jordan. Groundwater recharge is one of the explicit uses of treated wastewater in Jordan.

In Egypt, drainage water reuse is practiced on a very large scale. The official reuse of agricultural drainage water in irrigation amounted to 4.84 km<sup>3</sup>/year in 2001. The present aim of the Government of Egypt is to reuse up to 8 km<sup>3</sup>/year in new reclamation areas in the near future. In addition, there exists significant unofficial wastewater reuse estimated between 2.8 and 4 km<sup>3</sup>. This unofficial water reuse is not controlled by the government and poses threats to human health and environment. Unless adequate regulations are enforced, the quality of drainage water is threatened.

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A series of projects on greywater treatment and reuse have been supported by IDRC in Jordan, Lebanon and Palestine. The projects explored water management techniques, simple technological innovations and creative agricultural practices for greywater reuse at the household level. Households used the recycled water to irrigate crops with associated economic and social benefits. Officials monitored the quality of the greywater used for irrigation over time and concluded that the system met WHO's standard for restricted irrigation.

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