REUSE OF TREATED WASTEWATER: AN OPPORTUNITY NOT TO BE WASTED

POLICY BRIEF

المجلس العربي للمياه
Arab Water Council

United Nations Educational, Scientific and Cultural Organization
منظمة الأمم المتحدة للتربية والعلم والثقافة

Cairo Office
مكتب القاهرة

Key Messages

- It is becoming increasingly important to treat and reuse wastewater to reduce pollution and cope with water scarcity. Proper treatment and reuse of wastewater will increase the economic benefits of the treatment plants investment at least four-folds in addition to the other health and environmental benefits.

- Future expansion in reuse of treated wastewater requires the mobilization of huge financial resources for the construction of wastewater collection and treatment plants and conveyance infrastructure. Additionally, cross-sector regional and local collaboration with governmental and other agencies will help develop effective legislation, guidelines and innovative financial tools including the private sector.

- The Arab region policy-makers need to put on top of their agenda increasing the reuse of treated wastewater via five main pillars: Improved Governance and Leadership, Integrated Planning for Improved Sustainability, Advanced Research and Development, Enhanced Financial Sustainability and Improved Public Awareness and Acceptance.

Context

Reuse of treated wastewater was highlighted under Sustainable Development Goal 6 which targets universal sanitation services coverage, improved wastewater management, improved water quality and increased reuse, among other targets to meet the 2030 Sustainable Development Challenge (AWC and CEDARE, 2014).

The reuse of treated wastewater in the Arab region targets predominantly the agriculture sector particularly in Tunisia, Syria, Egypt and Jordan. Treated wastewater irrigation for landscaping and golf courses is also on the rise in member countries of the Gulf Cooperation Council (World Bank, 2007). However there are economic, institutional, health, and environmental constraints that hamper the sustainable and safe reuse of treated wastewater. Addressing these limitations will require concerted effort and commitment by the Arab governments, as well as support from relevant regional and international organizations, to improve water services, boost the volumes of wastewater treated as well as the quality of water produced.

This policy brief outlines challenges, potentials and impacts in relation to reuse of treated wastewater in the Arab region. The brief provides recommendations to make more treated wastewater resources available and improve their quality for various reuse purposes. This effort is part of the mandate of the Arab Water Council and UNESCO to establish an Arab Regional Initiative in support of the non-conventional water resources (NCWR) development. The initiative will help mobilize the financial, legal and technical support required to adopt proper policies and build up appropriate structures and human capacities for the sustainable development of NCWR, including reuse of treated wastewater.

Trends and Potentials

Traditionally, planned wastewater management interventions in the Arab region focused on the conventional objectives of protecting public health and the environment. The untreated wastewater is usually disposed to freshwater bodies, open seas, groundwater aquifers and agriculture drains, resulting in an increased amount of environmental degradation and reduced economic development. Pervasive water scarcity, urbanization and the increasing impacts of climate change, however, led to a shift in local perceptions to the importance of properly capturing and using treated wastewater.

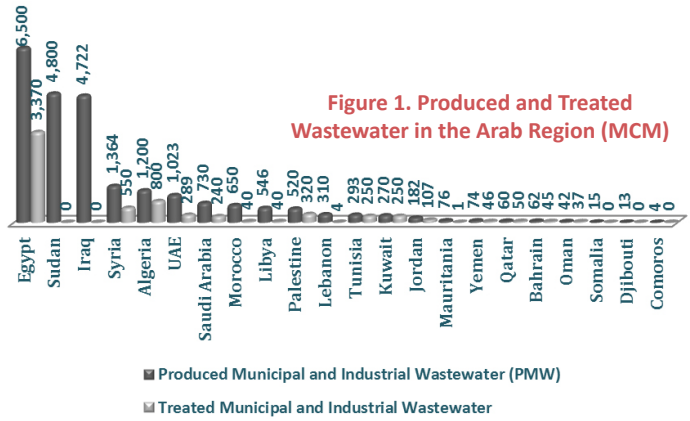

Figure 1. Produced and Treated Wastewater in the Arab Region (MCM)

In general in the Arab region, treatment and reuse of wastewater occurs on a limited scale and far from its potential sites of reuse. As of 2012, only 26% of the 24 BCM/y of produced wastewater in the Arab Region is treated and only 25% of the treated wastewater is reused. Thus, only 7% of the produced wastewater is reused (WHO, 2012). Tunisia, Jordan, Syria, Egypt, and the GCC counties are considered the leaders in the area of wastewater generation and reuse. However, the lack of political commitment and of a national policy and/or strategy to support wastewater treatment and reuse act as significant constraints in most Arab countries. Oman ranked highest in terms of percentage of reused treated wastewater among the Arab countries, reaching an 88% reuse of its produced wastewater. Egypt produces the highest treated wastewater volume and Syria reuses the largest treated wastewater volume.

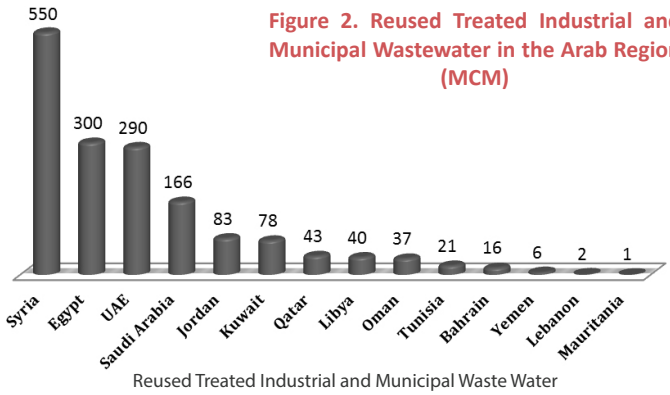

Figure 2. Reused Treated Industrial and Municipal Wastewater in the Arab Region (MCM)

Benefits and Risks of Treated Wastewater Reuse

Managing wastewater is obviously linked to the management of the entire water cycle. Inadequate wastewater management pollutes water bodies that are also important sources for drinking water, fisheries and other services. Therefore, the discharge of wastewater, without or with inadequate treatment, involves significant costs, including environmental and social ones. The reuse of treated wastewater entails a number of benefits and risks as well (Table 1):

Table 1. Benefits and Associated Risks of Treated Wastewater Reuse

Benefits (UNEP, 2005):	Risks (World Bank, 2011):
It is a low-cost method for sanitary disposal of municipal wastewater; It converts wastewater that potentially damages the environment into a resource that can improve the water quality and environment, thus improving GDP; Reduces pollution of rivers and other surface water; Conserves nutrients, thereby reducing the need for artificial fertilizer; increases crop yields; Provides a reliable water supply to farmers and; Improves livelihood of the community, and reduces diseases and other health issues.	Health risks to agricultural workers resulting from fields irrigated with untreated or inadequately treated wastewater; Health risks to consumers of agricultural goods produced from untreated or inadequately treated wastewater; Contamination of soils and plants through introduction of chemicals found in inadequately treated wastewater; and Ground and surface water pollution from infiltration of contaminated irrigation water.

An important element in the sustainable treatment and reuse of wastewater is the formulation of standards and regulations that are achievable and enforceable. Unrealistic standards and non-enforceable regulations may do more harm than having no standards and regulations at all, because they create an attitude of indifference towards rules and regulations in general, both among polluters and administrators. The regulations should be coupled with regular monitoring and evaluation of wastewater reuse systems to meet specified quality standards. Additionally, the lack of organization in-charge of the reuse sector should be addressed as a matter of urgency to identify the proper institutional structure needed to develop the sector and act as its regulatory regime.

Treatment and Conveyance Infrastructure for Treated Wastewater Reuse

High cost of wastewater treatment and conveyance infrastructure is an upstream investment challenge for treated wastewater reuse. Mixing industrial wastes with municipal sewage system is also a major cause for underperformance. Instead, industrial pollutants should be removed at the source which is more financially and technically feasible. The cost of transferring treated wastewater from urban centers to agricultural areas which is typically located in more distant rural setting is a further investment cost that can make water reuse plans difficult or even prohibitive in some cases.

Wastewater reuse in peri-urban agriculture can contribute to improved health of poor communities through income generation and increased access to food. While minimal transportation cost is usually associated with peri-urban agriculture, it also has its drawbacks and health hazards since most wastewater is untreated or contaminated with industrial and other wastes.

Policy Recommendations

The Arab Region should put on top of its political agenda to "Increase Reuse of Treated Wastewater in the Arab Region with Lower Cost Technologies in Wastewater Treatment and Reuse" via 5 main pillars:

1. Policy Change through Improved Governance and Leadership

a. Provide political support and strong leadership to overcome the challenges associated with effective wastewater reuse.
b. Ensure that water and wastewater are managed under the same governmental water resources planning and management body. This will ensure that wastewater is not considered as waste but as a resource.
c. Set clear time targets for wastewater treatment volumes, quality and reuse. This would be coupled with robust monitoring and evaluation systems to follow up on produced wastewater volumes, quality of treatment and reuse efficiency.

2. Integrated Planning for Improved Sustainability

a. Develop strategic and integrated plans at national and governorate levels incorporating treated wastewater among available water resources.
b. Consider treated wastewater for agricultural development, peri-agriculture, landscaping, and possible domestic use.
c. Consider the proximity to wastewater treatment plants in the selection of agricultural development lands for potential reuse.

3. Advanced Research and Development (R&D)

a. Provide incentive schemes for research and development (R&D) in cost-effective technologies and lower costs for treatment and reuse of treated wastewater in rural areas.
b. Develop and adopt new approaches in wastewater treatment and reuse to reduce energy consumption and increase dependency on renewable energy supplies.
c. Develop new crop varieties and irrigation techniques that would cope with the reuse of treated wastewater qualities and possible health hazards.

4. Enhanced Financial Sustainability

a. Adoption of feasible and fair tariff which would balance between the treated wastewater economic costs and incentives for reuse. Balanced cost recovery tariff will enable the governments to provide sustainable water services.
b. Create special incentive programs and enabling environment to attract the participation of private sector through public-private partnership (PPP) approaches.
c. Prepare wastewater treatment and reuse project proposals that can be financially supported through local, regional, and international funding institutions.

5. Improved Public Awareness and Acceptance

a. Launch public awareness campaigns to change the perception of wastewater from being a health risk and waste to being a valuable water resource. Regular information-sharing on water quality data will be helpful in confidence-building.
b. Establish stakeholders platforms with farmers, local community and local NGOs to promote treated wastewater reuse in agriculture.
c. Provide farmer assistance on selecting crop varieties and irrigation technologies.

For Further Reading

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