



Decentralized Wastewater Treatment and Reuse

At the Public Security Directorate (PSD) in Muqablaine, Amman, Jordan

Sustainable Water Integrated Management Programme (SWIM)

Network of demonstration activities for sustainable integrated wastewater treatment and reuse in the Mediterranean region.

Background

SWIM-Sustain Water MED aims at demonstrating the benefits and impacts of decentralised wastewater treatment and its reuse in the Mediterranean region. The project is financed by the European Union (EU) and the German Ministry for Economic Cooperation and Development (BMZ). Activities are implemented in Jordan, Tunisia, Morocco, and Egypt.

In Jordan, the pilot project is installing a decentralized wastewater treatment unit and reuse system at the Public Security Directorate (PSD). The treated effluent will be reused to irrigate the compound's green area. The pilot project is implemented by Al-Balqa' Applied University (BAU) and the International Union for the Conservation of Nature (IUCN) and the Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

The project is the first of its kind in that it is the first on-site treatment plant in an urban area. Lessons learned from this project will feed into the National Wastewater Masterplan and support national efforts in upscaling decentralized wastewater management. Almost 40% of households in Jordan are not yet connected to the sewage network - most of them located in rural and peri-urban areas. Effective wastewater treatment contributes to both: the prevention of groundwater pollution and the exploitation of additional water resources for reuse.

Baseline Situation

Prior to the start of the project, the PSD compound was connected to the central water supply network but lacked access to the sewage system. The wastewater generated at this compound used to be collected in cesspits and subsequently disposed by wastewater trucks at the Ain-Ghazal pre-treatment facility. On top of this, PSD used freshwater resources to irrigate its green area.

The pilot aims to demonstrate how on-site treatment units and reuse systems can reduce freshwater as well as financial costs.

Pilot Site

The treatment plant will use the Sequencing Batch Reactor technology (SBR) and has a capacity of 150 CM/Day to serve around 2,500 employees at PSD. The treated wastewater is going to be used to irrigate the compound's green area, covering approx. 24,000 square meters. In doing so, freshwater demand is expected to drop to half its current value.





Dr. Ismail Al Baz
SWIM - Sustain Water MED
Senior Project Manager
ismail.albaz@giz.de

The Treatment Technology

The Sequencing Batch Reactor (SBR) is a fill-and-draw activated sludge system. The treatment plant is expected to deliver 'Class A' wastewater with low Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD). The quality of influent and effluent in comparison to the Reclaimed Domestic Wastewater Jordanian Standards 893(2006) is illustrated in the table below.

SBR technology is being used in Jordan, therefore operation and maintenance knowledge is available. Its selection is also attributed to the following advantages:

- Suitable where the influent quantity fluctuates
- Small foot print
- High removal performance for most critical parameters

Reuse and Irrigation

In order to demonstrate the safe and efficient reuse of treated wastewater, the project will:

- Recommend technical specifications for an irrigation system that accommodates the treated wastewater;
- Propose landscape plant species that are compatible with the produced treated wastewater;
- Provide training and guidelines for the operation of the adapted irrigation system;
- Monitor socio-economic and environmental impacts (i.e. on overall costs, soil quality, etc.).

Water and cost saving through reuse:

- Water saving 52,536 CM/Y.
- Cost saving through replacing fresh water 152,340 JD/Y.
- Cost saving through reduced fertilizers 2,496 JD/Y.
- Cost saving through treatment and avoiding dumping of sewage 165,013 JD/Y.

		BOD (mg/l)	COD (mg/l)	TSS (mg/l)	E-Coli (CFU/100ml)	
Jordanian Standards no. 893 (2006) for Reclaimed Domestic Wastewater.	Treated wastewater (TWW) allowed to drain to side wadis, water ways, and water bodies	60	150	60	1,000	
	TWW allowed to artificially recharge ground-water	15	50	50	<2.2	
	TWW for Irrigating:	Cooked vegetables, recreational areas, sidewalks inside cities (A)	30	100	50	100
		Fruit trees, sidewalks outside cities, green areas (B)	200	500	200	1,000
Field crops, industrial crops, forestry (C)		300	500	300	-	
Actual	Influent	573	2020	166	5.7x10 ⁷ MPN/100ml	
	Effluent	29	98	14	100	

Overview of the quality of PSD plant influent and effluent and Jordanian Standards no. 893(2006) for Reclaimed Domestic Wastewater.

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Sustainable Water Integrated Management Programme (SWIM) - Sustain Water MED
GIZ Office Jordan
Mohamed Baseem Al-Khammash St.13, Sweifieh
Amman 11190 Jordan
www.giz.de/jordan

Author(s) Irene Sander, Ismael Nouns

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Addresses of the
BMZ offices

BMZ Bonn
Dahlmannstraße 4
53113 Bonn, Germany
T +49 (0)22899535-0
F +49 (0)22899535-3500

BMZ Berlin
Stresemannstraße 94
10963 Berlin, Germany
T +49 (0)3018535-0
F +49 (0)3018535-2501

poststelle@bmz.bund.de
www.bmz.de