



# Constructed Engineered Wetlands: An Innovative Solution for Wastewater Treatment

The MED-WET project focuses on enhancing irrigation efficiency in agriculture, with a particular emphasis on supporting smallholder farmers in the Mediterranean region. One technology under exploration is Constructed Engineered Wetlands (CEWs), which are eco-friendly and cost-effective systems designed to treat wastewater using natural processes such as sedimentation and filtration. Heliopolis University for Sustainable Development has constructed CEW at Sekem Farm in El-Wahat El-Bahariya, Egypt, where domestic wastewater is being treated to irrigate nonfood crops. Initial records indicate a treatment efficiency of up to 85%, demonstrating satisfactory pollutant removal capabilities.

## Key Features of Constructed Engineered Wetlands

**Nature-Based Treatment:** utilize native plants, soils, and microorganisms to naturally filter and purify wastewater.

**Zero Waste Approach:** facilitate safe sludge management and on-site reuse.

**Efficient Contaminant Removal:** remove a wide range of pathogens and toxic compounds.

**Versatility:** effective for treating various wastewater types and suitable for rural and remote regions.

**Low-Cost Technology:** affordable to build and maintain with minimal energy requirements.

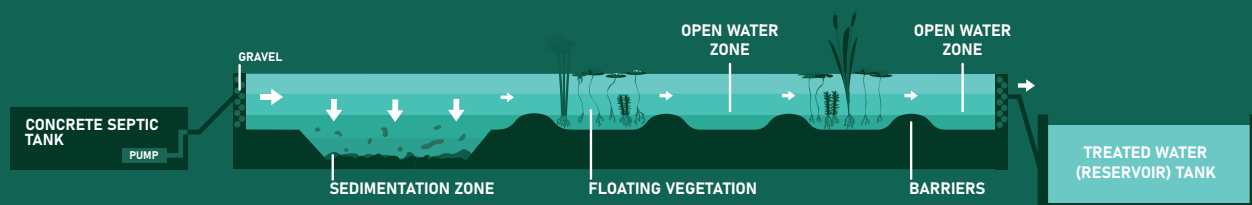
## Applications and benefits of Constructed Engineered Wetlands

**Rural Communities:** Provide low-cost, efficient wastewater treatment in remote areas with limited resources and enhance water availability for irrigation.

**Desert Communities:** Address the unique challenges of water scarcity in arid environments, and safeguard groundwater and surface water bodies from pollution.

**Industrial and Agricultural Settings:** Offer sustainable and economical solutions for treating industrial and agricultural effluents and promote responsible water management practices.

## Constructed Engineered Wetlands Design



The CWT includes upstream wastewater tanks (above the ground surface), downstream treated water tanks (below the ground surface), and two lined treatment cells. The treatment cells contain gravel and sand filters, sharp crested weirs, and substrate medium to support rooted aquatic plants. Each cell consists of plants, biofilms, soil, and floating green algae to naturally treat and remove the majority of the physical, chemical and biological water pollutants.