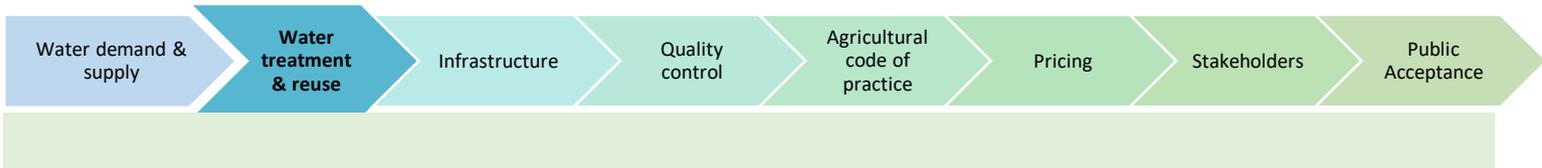




The Success Story of Cyprus

Fact Sheet 2 - Wastewater treatment and reuse



KEYS FOR SUCCESS – Lessons learned from the success stories of Cyprus and Israel

SUWANU EUROPE is a H2020 project aiming to promote the effective exchange of knowledge, experience and skills among practitioners and relevant actors on the use of reclaimed water in agriculture. This factsheet is part of a total of 17 factsheets that describe the successful reclamation practices of Israel and Cyprus in order to learn and boost implementation of solutions adapted to the European context. Our ultimate goal is to enhance acceptance and awareness to an alternative source of an increasingly scarce resource, water.

The increasing water stress and the semi-arid climate of Cyprus make reclaimed water a growing water resource to meet the water demands of the island. Today, Cyprus water demands by sector are 59% for irrigation, 29% for domestic use, 5% for tourism needs, 3.3% for livestock farming and 3% for industrial purposes.

More than 30 million cubic meters (MCM) of reclaimed water are being produced today, while by 2027 up to 74 MCM are expected to be produced. Reclaimed water is mainly used to satisfy part of the existing irrigation needs. In detail, today, 15% of the total irrigation needs are covered by reclaimed water, a percentage which is expected to reach 25% by 2025.

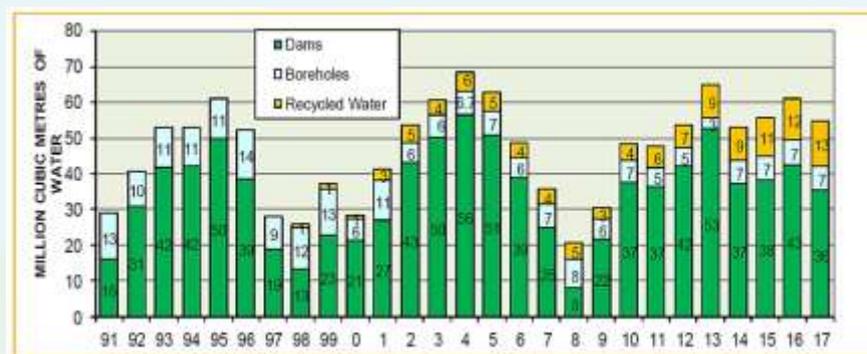


Figure 1 - Irrigation water supply, 1991-2017.
(Source: Cyprus Water Development Department, 2019)

In more detail, reclaimed water in Cyprus is utilised for the following purposes:

- **Irrigation of crops, grass and green areas** - the irrigation is done under the Code of Good Agricultural Practice: K.D.P. 263/2007.
- **Enrichment of aquifers** - Aquifers of reclaimed water are used as storage reservoirs mainly in winter. The water from the aquifers is then extracted and used for irrigation. Main examples of aquifers' recharge:
 - Limassol: the water is used for the recharge of Akrotiri aquifer in winter when there is surplus of reclaimed water.
 - Paphos: all the reclaimed water in Paphos is used for the recharge of Ezousa aquifer
- **Infiltration in dry river beds** - the reclaimed water enters about 22 shallow ponds constructed by the Cyprus Water Development Department, through which it reaches the aquifer.
- **Discharge into the sea** - due to the seasonal demand of water for irrigation and limited surface/ground storage capacity, unused reclaimed water is discharged into the sea and Polemidia dam, where it may be used for irrigation during the winter months.

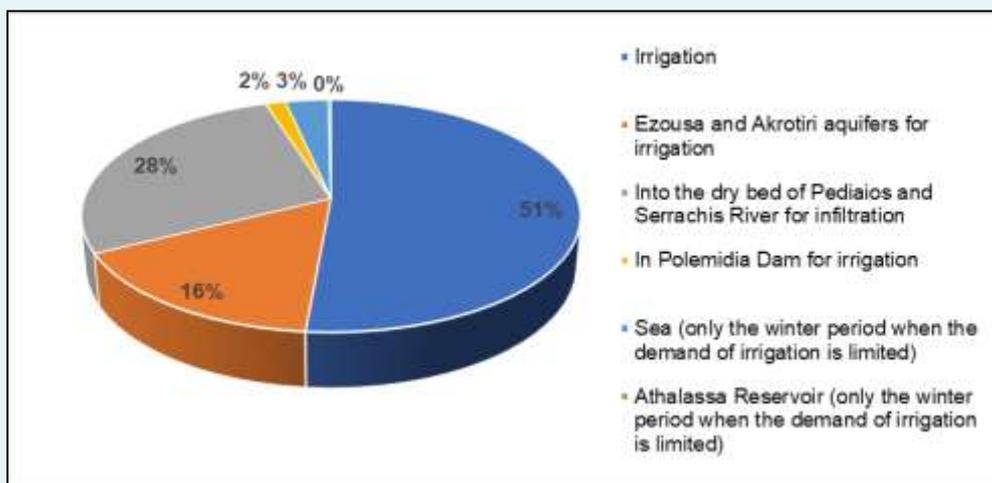


Figure 2 - Treated wastewater reuse for 2016 (for agglomerations with ≥ 2.000 P.E.)
(Source: Cyprus Water Development Department, 2019)

To date, reclaimed water satisfies the needs of 5000 ha in total, through existing and new irrigation networks. Since 2004, reclaimed water has also been used for artificial recharge of aquifers with water of low quality (natural high sulphate and boron concentrations). This water is pumped again from the aquifers, and through the irrigation pipes, for distribution for irrigation in water-stressed agricultural areas.

Artificial recharge with reclaimed water can be considered as a good case study, which can be applied in areas with similar geological conditions to Cyprus, suffering from droughts, since (i) seawater intrusion is controlled, (ii) it provides storage of effluent water for subsequent retrieval and reuse, (iii) the aquifer serves as an eventual natural distribution system, (iv) further purification of effluent water is made (reducing biological load) and (v) saving of equal quantities of freshwater for domestic use.

There are six (6) main urban wastewater treatment facilities (UWTPs) (> 2000 P.E.) in the government-controlled areas of Cyprus, serving the big urban centers of the island (Table 1). Due to the Cyprus political situation, the Mia Milia WWTP serving part of the Nicosia area, is not included in this fact sheet, since it is not managed by the Cyprus Government.

Moreover, eight (8) rural UWTPs serve communities with P.E. higher than 2000, five (5) rural UWTPs serve communities with PE below 2000, three (3) plants serve refugee housings, three (3) plants serve hospitals, nine (9) plants serve military camps and one (1) plant serves the Immigration Detention Centre at Menoyia (Water Development Department, 2019).

Table 1 - Capacity of the main UWTPs in Cyprus and technologies applied
(Source: Water Development Department, 2019)

WWTP	Capacity (m ³ /day)	Capacity (Person Equivalent (PE))	Biological treatment process applied	Tertiary treatment process applied
Anthoupoli	13000	130000	Membrane Bioreactor (UF)	-
Vathia Gonia (NSB)	22000	202000	Membrane Bioreactor (MF)	UV disinfection
Larnaca	18000	100000	Membrane Bioreactor	Sand filtration - Chlorination
Moni Limassol	40000	272000	Conventional Activated Sludge	Sand filtration - Chlorination
Paphos	19500	160000	Conventional Activated Sludge	Sand filtration - Chlorination
Paralimni – Ayia Napa	21000	125000	Conventional Activated Sludge	Chlorination
Total	133500		UF: Ultrafiltration; MF: Microfiltration	

In conclusion, Cyprus is a good example of water reclamation and reuse, as there are reclamation facilities in all major cities, thus treating the majority of the island urban wastewater. Moreover, water reuse schemes have been long implemented and have been briefly described in this fact sheet, showcasing the ways in which water reuse can be successful and effective in serving the needs of water stressed areas following of course the Code of Good Agricultural Practice.

REFERENCES:

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