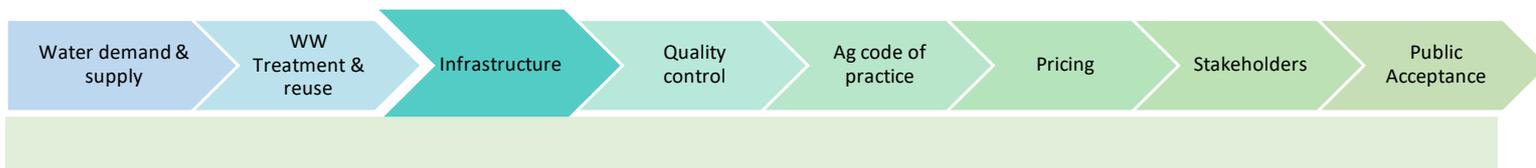




The Success Story of Cyprus

Fact Sheet 3 - Projects and infrastructure to tackle water shortage



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 demand for both irrigation and human consumption, during the past century, has led to the development of large infrastructure projects in Cyprus, such as: 1) dams (e.g. construction of over 100 dams with total storage capacity of 332 MCM of water), 2) urban wastewater treatment plants/water reclamation plants (UWTs), 3) water reallocation projects (e.g. large conveyors/reservoirs and drilled boreholes for domestic and irrigation purposes) to store, process and transfer water throughout the island and specifically to supply adequate irrigation water to agricultural areas and 4) desalination plants (Water Development Department, 2019).

The annual inflow of water to the Cypriot dams (Figure 1) for the years 1987-2017 are presented in Figure 2, with an average value of 79 MCM/year, while the annual water to the dams for the year 2016-2017 was 48.9 MCM. Concerning surface water, the water corresponding to the total surface of the government-controlled area of the island is 2792 MCM (average from 2000 to 2017), while the inflow of surface and groundwater is 279 MCM (Water Development Department, 2019).



Figure 1 - A map of the dams of Cyprus.
(Source: Water Development Department, 2019)

In 2017, 55 MCM were used for irrigation purposes, from which 36 MCM were from dams, 7 MCM from boreholes and 13 MCM from tertiary-treated effluents.

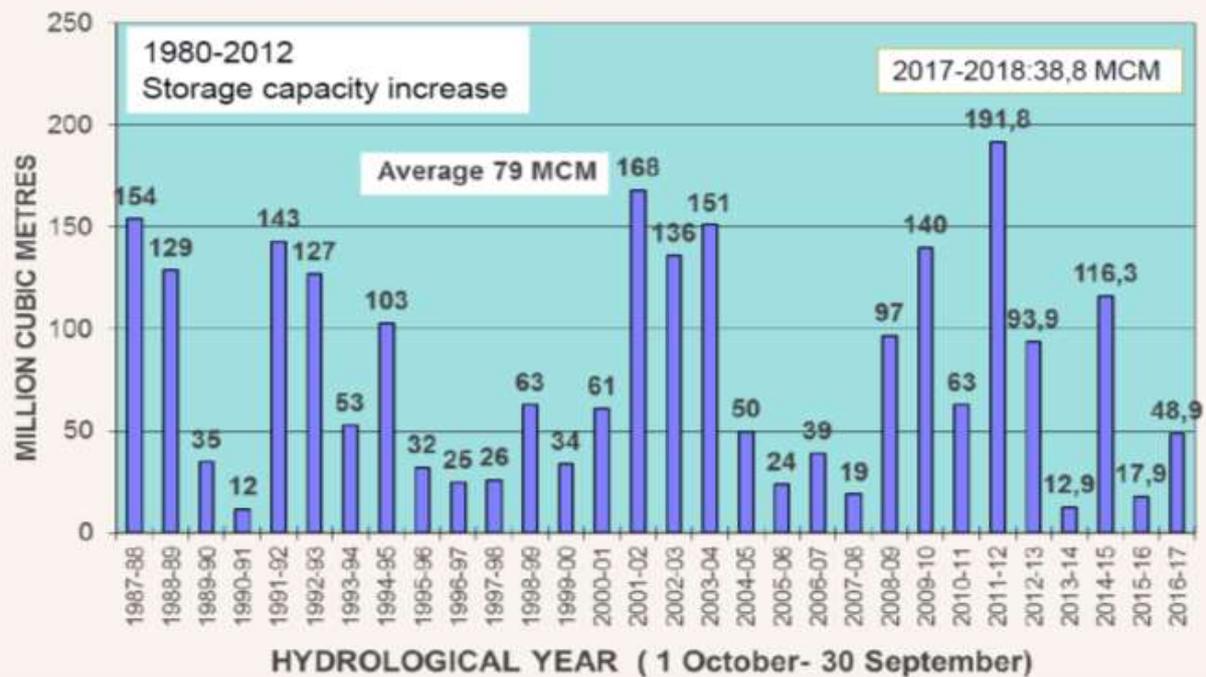


Figure 2 - Inflow of water to the Cypriot dams (1987-2017).
(Source: Water Development Department, 2019)

Despite the development of the conventional surface and underground water sources, Cyprus continued to face an acute water shortage problem. Therefore, in order to eliminate the dependency of the domestic water supply on annual rainfall, the Cyprus Government decided:

- To proceed with the construction of desalination plants (in total 4 desalination plants in Larnaca, Dhekelia, Vasilikos and Limassol, with total yield of 220.000 m³/day or 80 MCM/year);
- To replace freshwater used in agriculture by reclaimed water (1995). To date, reclaimed water satisfies the needs of 5000 ha in total, through existing and new irrigation networks (Figure 3).

There are six (6) main UWTs (> 2000 P.E.) in the government controlled areas of Cyprus, serving the big urban centers of the island (i.e. Limassol, Anthoupolis, Vathia Gonia, Larnaca, Paphos, Ayia Napa - Paralimni Sewage Boards) and another one (i.e. Mia Milia) in the non-government controlled areas (with a capacity of 30000 m³/day, which applies a membrane bioreactor treatment method). The latter WWTP also serves a large part of Nicosia that is controlled by the government of the Republic of Cyprus.

The capacity of the main UWTs and the technologies applied in each UWT are presented next. The six UWTs serving the big urban centers of the country, today have a total capacity of 133500 m³/day and consist of a primary, a secondary and a tertiary stage.

According to the Cyprus Law, sewage treatment is of Tertiary Degree, which is higher than the requirements of the EU Directive 91/271/EEC, which states that “treated wastewater shall be reused whenever appropriate”, leaving too much room for interpretation as to what can be considered as an “appropriate” situation to reuse reclaimed water.

Tertiary Treatment in Cyprus consists of:

- Activated Sludge with Sand Filtration and Chlorination (3 facilities – Limassol, Paphos and Paralimni - Ayia Napa)
- Membrane Bioreactor with Chlorination (1 facility – Larnaca)
- Membrane Bioreactor with UV disinfection (1 facility – Vathia Gonia (Nicosia))
- Membrane Bioreactor (Ultrafiltration) (1 facility – Anthoupoli (Nicosia))

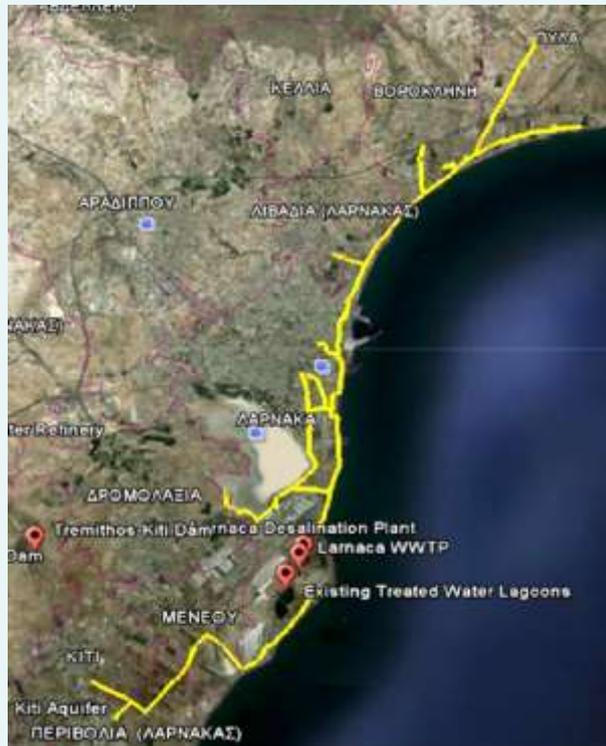


Figure 3 - Larnaca area treated effluent irrigation schemes.
(Source: Water Development Department, 2019)

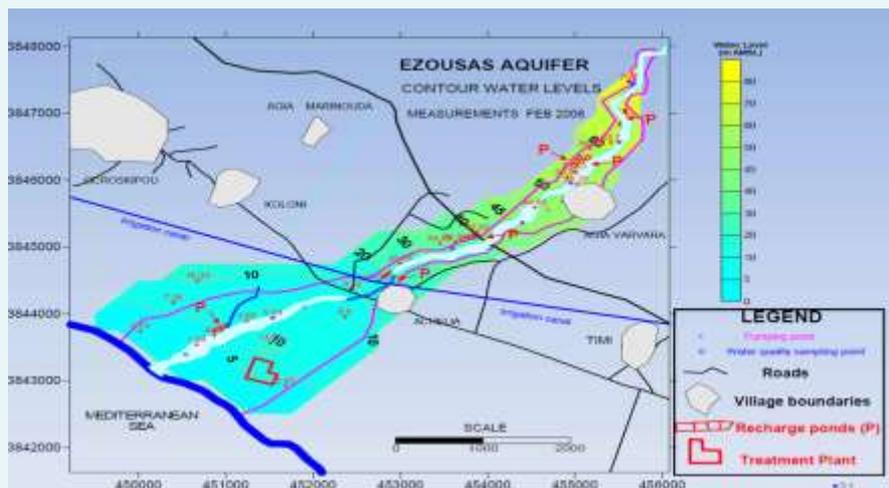


Figure 4 - Artificial recharge of Ezousa river alluvial aquifer (Paphos) with reclaimed water.
(Source: Water Development Department, 2019)

CLOSING REMARKS

In conclusion, Cyprus is a very good example of water treatment and reuse, as there are reclamation facilities in all cities covering the majority of the urban areas, thus treating the majority of the island coverage. 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.

REFERENCES:

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