

REUSE OF TREATED EFFLUENT IN CYPRUS

6th ANNUAL WORLD WATER-TECH INNOVATION SUMMIT

London, February 20-22, 2017

Water scarcity has always been a serious problem for Cyprus, with low water availability per capita. Cyprus has a semi-arid climate and limited water resources which depends mainly on rainfall.

Over the years, we have come to realise that water, as a limited resource, must be carefully managed and that simply attempting to satisfy the increasing demand by increasing the supply does not provide a sustainable solution.

Several measures were used **to increase availability of water** and **decrease water demand**.

On the supply side **the dams' capacity was increased** from 6 million cubic metres in 1960 to 328 million cubic metres today. Boreholes were drilled for domestic and irrigation purposes and water treatment plants and major water projects were constructed.

On the demand side, several water saving **measures** are implemented in an attempt to optimise the use of water such as:

- Legislative and Institutional Measures
- Improved Irrigation Efficiency
- Education and Awareness Campaigns
- Water pricing and metering
- Leakage reduction in Distribution Networks

Climate change is already affecting Cyprus in a number of ways. Statistical analysis reveals a **drop of precipitation in Cyprus**, while climate models for this region also predict a rise in temperature and an **increase in the intensity and frequency of**

extreme drought events. These conditions, coupled with increased water demands, are worsening the water scarcity problem on the island.

Domestic use and irrigation are the two main water-consuming sectors in Cyprus. Agriculture, including animal husbandry, accounts for about 64% of the total water consumption, household for 28% and tourism for 5%. The remaining 3% is used for industrial purposes.

The groundwater resources of the island have been the most obvious and easily accessible sources of water for many years and as a result in the attempt to meet the increasing water demand or to mitigate drought effects, they have been **heavily over pumped**. This has led to seawater intrusion into many coastal aquifers and deterioration of both quality and quantity of groundwater.

Nevertheless, despite the significant efforts and measures taken, the available water was not enough to satisfy the water demand. In addition more frequent occurrence of extreme drought events was experienced. Furthermore there was also a rapid increase in the population and number of tourist arrivals in Cyprus, which placed additional demands for water.

After the development of almost all the conventional surface and underground water sources, Cyprus continued to face an acute water shortage problem. Therefore, twenty years ago, the Government decided to proceed with the construction of sea water desalination plants and to replace fresh water used in agriculture by treated effluent.

SUPPLY and REUSE OF TREATED EFFLUENT

The policy of the Government is that the tertiary treated effluent produced by the Urban Sewerage Boards will be handled and disposed by the Government.

The cost for the construction and the operation and maintenance of the tertiary treatment plant is undertaken by the Government.

The tertiary treated effluent from the urban wastewater treatment plants is used:

- **for irrigation and**

- **recharge of aquifers to manage sea water intrusion or for later abstraction for irrigation use.**

Irrigation is done under the code of good agricultural practice.

Almost all the crops can be irrigated with the reuse water except vegetables with leaves, bulbs and condyles eaten row.

The following plantations are irrigated with treated effluent:

Citrus, olive trees, corn, lolium and sutax, potatoes, vegetables, barley, fodder crops, cow grass, public green areas, football fields and golf yards.

The treated effluent from the urban wastewater treatment plants is used for irrigation (78%) and for the recharged of aquifers (17%).

The total quantity of water reuse today is about 30 MCM/YEAR and it is expected to reach 75 MCM/YEAR by 2027.

According to the Water Pollution Control Law, the Minister of Environment is issuing a Wastewater Discharge Permit, in which the following are defined:

- quality characteristics
- number and the type of analysis
- disposal of the treated effluent

It should be noted that the European Commission is developing common quality requirements for water reuse across Europe.

GENERAL COMMENTS FOR THE REUSE OF TREATED EFFLUENT

- The treated effluent is another constant source of water.
- The Government's policy is to introduce the treated effluent in the Cyprus Water Balance.
- The Quality is under control and remains constant.
- The treated effluent is suitable for the majority of the crops.
- Almost all the Wastewater Treatment Plants are equipped with Tertiary Treatment , consisting of Sand Filtration and Chlorination or Membrane Bioreactor and Chlorination in order to achieve higher quality characteristics.
- The farmers use less quantities of fertilisers because the treated effluent contains already nutrients such as Phosphorous and Nitrogen.

- The experience of Cyprus has also shown that awareness raising and dissemination of information on the various benefits of water reuse, among all key stakeholders is also critically important.

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