

## **POSTER PRESENTATION**

### **Best Practice Examples for Reuse of Wastewaters in Agricultural Irrigation in the World**

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#### **Abstract**

Due to scarcity of freshwater resources and increasing demand in the world, wastewater reclamation and reuse will be crucial in future. Today, many countries are allocating resources to improve wastewater reuse studies and applications, and establishing guidelines for that purpose. Although wastewater reuse applications have initially tailored for activities such as small scale irrigation of gardens, toilet flushing, etc., current applications are trending for large scale agricultural irrigation. Together with saving the freshwater sources for domestic usage, wastewater reuse in agriculture, after proper treatment to minimize health risks, has the potential to provide nutrients that should be supplied through fertilization otherwise.

In this paper various successful applications of wastewater reuse in agricultural irrigation in developed and developing countries are investigated and compared. Cases examined were from Australia, Cyprus, Jordan, France, Israel, Spain, Tunisia, and USA. Facilities operated in these countries were examined and compared based on several parameters such as the volume of wastewater processed, area of land irrigated, treatment technologies utilized, crops irrigated. Within the considered cases, applications in Israel are the most notable ones in terms of capacity, effluent quality, application diversity, and suitability to Mediterranean region. Dan Region project in Israel seems to be the largest and most remarkable one with 120 million m<sup>3</sup>/yr capacity, post-treatment water handling and reuse applications (e.g. groundwater recharge, reservoir storage, soil aquifer treatment, etc). In addition, specific treatment schemes are adopted depending on the end-use goals in Israel. Reclaimed effluents, after tertiary treatment followed by soil aquifer treatment, are used for the irrigation of all crops without any restriction. Tertiary effluents (activated sludge and seasonal detention, or activated sludge with sand filtration) are used on a restricted basis for the irrigation of canned fruits, vegetables for cooking and for fruits with non-edible peels. Secondary effluents (activated sludge, trickling filters and oxidation ponds with seasonal detention), stored in surface reservoirs, are used, with restrictions, for the irrigation of industrial field crops (mainly cotton), fodder crops, forests and pastures. Applications in United States of America and Australia are almost ultimate with respect to the technologies employed and the quality of the reclaimed wastewater almost reaching to drinking water standards in some cases. However, although noteworthy, these applications may not be suitable for the Mediterranean countries due to the economics of scale. In conclusion, different treatment schemes can be applied depending on the types of plants irrigated. For restricted irrigation, secondary treatment followed by detention can be adequate in most cases. However, unrestricted irrigation, for edible crops, requires more advanced treatment to ensure the microbial quality of the irrigation water.