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Commentary

Use of Ground Water and Reclaimed Water for Crop Irrigation

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DESCRIPTION

Since the Early Bronze Age (about 3200-1100 BC), domestic wastewater (wastewater) has been used for irrigation and aquaculture by a number of civilizations including those grows in China and the East, in Egypt, in the valley of the Indus, in Mesopotamia, and Crete. During historical times (circa 1000 BC-330 AD), wastewater was either treated or used by the later Greek and Roman civilizations for irrigation and fertilizer purposes, especially in areas around important cities (for example, Athens and Rome). More recently, the practice of spreading wastewater for treatment and agricultural use has been adopted first in European cities and then in the United States.

Water reuse is not a new technique or concept; Knowledge of wastewater treatment and reuse has been accumulated over the course of human history. The scattering of human waste is an ancient practice, going through many stages of development from ancient times to modern times. Today, recycled water is used for almost any purpose, including potable reuse. In this article, historical and current developments in water reuse are examined over three time periods: (a) prehistoric to medieval, early and modern times, and (c) to the modern era. Building on the information presented in the first three sections, the last two discuss the future, including: (a) emerging trends and (b) water reuse issues and challenges.

Agricultural reuse of treated wastewater (TWW) for irrigation is widely practiced. Its use with fresh water is becoming increasingly popular to ensure food safety, while its justification and sustainability are questionable. The objective of this study was to better understand the dynamics of joint use of TWW and groundwater (GW) in the Nabeul region, Tunisia, and the potential impacts on the environment and health taking into account Farmers' practices and attitudes towards reuse. TWW is used for irrigation with relatively high salinity and high microbial load.

Important technological developments that have led to renewed interest in wastewater remediation include: the availability of reliable microfiltration, ultrafiltration and reverse osmosis membranes; the use of ozone in combination with biological filtration, low, medium and high energy ultraviolet sterilization; High energy ultraviolet oxidation enhanced. These treatment procedures can now be used to remove acute toxicity (e.g. microbiological) and chronic toxicity (e.g. chemical components). Much has changed in the field of water harvesting and reuse in contemporary times (1900 AD), but especially in the last three decades. One of the most relevant changes is the recognition of the importance of reclaimed water in integrated water resources management planning. The reclaimed water has become a new reliable, alternative and complementary water supply at the gateways of the municipality for multiple uses in a diverse environment.

For Florida crops that are 'peeled, cooked or heat treated', the recovered water can be applied directly to the edible portion of the plant. Therefore, the recovered water can be used for spray irrigation of citrus and other crops that have been peeled or cooked. For plants that are eaten raw (so-called "salad plants"), current FDEP regulations require that no direct contact of reclaimed water with the edible portion of the crop is allowed. This means that lettuce growers when watering with improved water must use drip, bubbling or trench irrigation, not spray water directly on the plants. The regulation also means that reclaimed water cannot be used in Florida to spray aerial frost protection on crops such as blueberries or strawberries.

Population growth and economic development in emerging America have encouraged the establishment of a number of agricultural reuse projects, some of which are summarized below. In Mendoza, Argentina, an area known as Campo Espejo was formerly irrigated with raw sewage (2,000 ha) but now 129,600 m^3 /day from stable ponds is supplied for irrigation of 1,900 ha.

Wastewater has a high nutrient content and is therefore highly usable in agricultural irrigation as it provides organic carbon, nutrients (NPK) and inorganic micronutrients to cultures. Many studies highlight the usefulness of wastewater and especially treated water for crop irrigation, in terms of benefits represented by increased crop yields due to Nutrient content in these waters and rice yields increased by 15%, tomatoes irrigated with wastewater increased by 114.9 %. A recent study showed that due to its nutrient content, the reuse of treated municipal wastewater in countries such as Brazil, Poland and Saudi Arabia would meet 100% of phosphorus and potassium requirements for maize crops.

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