

Potential Health Hazards posed to Humans by the Use of Wastewater for Irrigation

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ABSTRACT

This research paper focuses on the health hazards posed by using wastewater for irrigation purposes. The paper is intended to present material from various experiments and research conducted at different locations across the globe. The information is being compiled to give the reader a better understanding of the potential health hazards posed to humans by the use of wastewater for field irrigation. The paper concentrates on the viral and bacterial pathogens, as well as other pathogenic organisms, that may affect the applicator and the consumer. A generalized view taken by evaluating worldwide effects of such irrigation is important to understand because of the expansive import/export trading that is currently a major part of the global food market. This trading of goods puts people in certain countries at risk for health hazards that their own government has instituted policies to prevent. Globally there is also an increase in the spread of pathogens throughout the human population, which means that a currently non-invasive pathogen in one geographical location may become an infestation or concern in future years.

KEYWORDS

Wastewater, irrigation, human health hazards, bacterial and viral pathogens

INTRODUCTION

According to Colorado River Conservation District, freshwater composes only 3% of the water on earth. (CRCD) Only 12% of the freshwater can be reached and used. (CRCD) Freshwater is needed for the irrigation of crops. Because of the need for freshwater for the purposes of drinking, bathing, laundering, etc. farmers in some geographical regions have been required to find alternative sources for irrigating their crops. Likewise, some municipalities have been required to find alternative sources for irrigating municipal properties such as parks and school playgrounds. According to the United Nations Environment Programme (UNEP), agriculture uses more than 70% of the freshwater overall. This use is mainly for irrigation purposes. Irrigated agriculture provides around 40% of the world's food. Agricultural irrigation water needs have increased around 60% since 1960. (UNEP) Most of the regions where there is a problem of finding water for irrigation face shortages of usable water. These regions are by seas and oceans where the water has high salinity or are in desert-like areas where there is either no groundwater attainable or very little river or stream water.

One of the solutions that has been implemented to solve the problem of the short supply of water is the use of wastewater for irrigation. San Joaquin Valley in California uses wastewater effluent to irrigate cotton and alfalfa crops. (Clow 1992) Currently wastewater irrigation is the only means for some developing countries to sustain crops. It is estimated that developing countries reuse 80% of their wastewater. (Scott 2000) The attraction of using wastewater for irrigation in regions where there is limited amounts of water comes from the ability to recycle the water, rather than compete for it. Another benefit in the use of wastewater for irrigation is the addition of nutrients to the soil. These nutrients are not in "unused" water and help increase crop yield. The application of the nutrients via the wastewater often lowers or negates the need for additional fertilizer application. (Al-Lahham 2003)

The use of wastewater for irrigation, however, does have drawbacks. One of these drawbacks is the potential health hazards. If wastewater is not properly treated, the applicator may be exposed to pathogens that pose risks to his/her health. (Scott 2000) In the 1970's there was a study done by the Central Public Health Engineering Research Institute in Nagpur, India to determine the actual health affects on the workers who handled the wastewater. (Sullivan 1973) The study