

Water Conservation through Reuse of Graywater

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BACKGROUND

The use of graywater for landscape applications is an accepted practice for many communities, industries, and institutions and can significantly increase the amount of water available. Graywater, generally considered to be domestic and industry wastewater (with the exception of toilet water), and may contain grease, food particles, hair, detergents, pharmaceuticals, and personal care pollutants. Most of these constituents are biodegradable, but some may be sodium-based, which can result in graywater degrading the soil structure, potentially harming landscape in an arid environment. Recommendations for application rates of graywater have been developed in other states (e.g. Massachusetts), but these may not be appropriate for arid regions such as West Texas. This demonstration will test and provide recommendations for appropriate application rates for graywater in arid regions to improve water conservation in a manner that will not harm plants or degrade soils susceptible to salt accumulation.

OBJECTIVES

This project evaluates potential graywater sources in the region, estimate quantities of water that may be recovered, and develops application rates and baseline quality parameters of graywater in West Texas. The results of this project will provide tested recommendations of safe and appropriate levels of graywater application in arid regions. The goal is water conservation by reusing wastewater for crop irrigation and landscape uses in arid regions.



APPROACH AND RESULTS

A demonstration program was conducted at Rogelio Sanchez Texas State Prison, El Paso, Texas, using graywater to irrigate vegetables. Research activities included: construction of a graywater conveyance system, chemical characterization of graywater sources, maintenance of the demonstration site with vegetable crops, measurement of soil salinity, sodicity and soil moisture (using sensors) at the surface and subsurface layers, identification and quantification of potential graywater sources in the region, and development and distribution of educational materials on graywater landscape use. The 3 year experiment results with tomato, chili and bell pepper demonstrated that graywater use for production of vegetables is feasible and even outperformed over brackish groundwater. No significant impacts of salinity were observed for both brackish water and gray water irrigation. However long-term impacts should be further evaluated.

BENEFITS

- This project demonstrated and evaluated the use and feasibility of graywater on crop production in arid environments.
- This project provided new information on appropriate graywater use and sustainable crop production application rates.
- Testing and demonstrating the use of graywater and distribution of research findings will encourage and enhance water conservation and extend water supplies by preserving native water resources.