

University of California Cooperative Extension *Sustainable Irrigation Project*

The Sustainable Irrigation Project demonstrates the use of recycled water on vegetable crops and educates consumers, produce buyers, farmers, and other interested groups about the use of recycled water. Some consumers have concerns regarding potential contaminants in recycled water while others see it as a valuable resource for agricultural use.



At the Sustainable Irrigation Demonstration Project there are two acres currently under cultivation with a neighboring farm of three acres growing a wide variety of crops representing many of the vegetables grown in Sonoma County. By seeing, touching, and tasting vegetables irrigated with recycled water, consumers and farmers should develop a familiarity with it and support its use. It is hoped that, by presenting scientific information

and explaining the use of recycled water, the public will embrace recycled water as a sustainable alternative to using freshwater supplies that are being consumed at non-sustainable rates and possibly create agricultural opportunities in locations where reliable sources for irrigation water do not exist.

What is Recycled Water?

Recycled water comes from the urban sewer system; it goes through several purification treatments by removing and digesting contaminants, settling out solid particles, and filtration. The number and type of treatments the water receives determines the final quality of the water. Most often water is put through two processes (secondary treatment) or three processes (tertiary treatment) and is then disinfected with chlorine, ultraviolet light, or reverse osmosis filtration. Heavy metals, if present, are removed and viruses and bacteria are eliminated. The water is then stored in ponds prior to use.



California law (Title 22) currently allows tertiary treated and disinfected water to be used on all edible food crops. *Photo: raw influent entering at the Laguna Treatment Facility in Santa Rosa, California.*

Uses for Recycled Water

There are many different uses for recycled water such as: wetlands restoration, industrial use, toilet flushing, fire fighting, swimming pools, and urban and agricultural irrigation. It can be used for almost anything except as a long-term drinking water source for humans. The presence of minerals, such as nitrogen, sodium, phosphorus, potassium, and chlorine, are some of the most important factors to consider when looking at potential uses for recycled water. One of the primary objections for river discharge is the algae bloom caused by the presence of some minerals.

Tertiary Reclaimed Water Legal Usage Status

- OK on all food crops and food parts eaten raw
- OK for swimming pools
- OK for wetlands
- OK for industrial washing
- OK for dual systems for homes
- OK for livestock drinking water

Recycled Water Use in Agriculture

Recycled water is used in agriculture in many different parts of the world. The levels of treatment vary from almost no treatment to water that meets standards for drinking water. Currently the Laguna Treatment Facility in Santa Rosa, California supplies irrigation water to about 6,000 acres of crops. There are a diversity of crops grown including animal feed, wine grapes, and vegetables, as well as watering of urban landscapes and wetlands restoration.

Agricultural use of recycled water could help alleviate the problem of river discharge, but the main obstacle to creating more agricultural irrigation opportunities is the shortage of reservoirs for winter storage of recycled water. Recycled water is also a reliable source of water, which can have advantages over other sources, which can dry up when the need for water is most critical. *Photo: Recycled water storage pond in Santa Rosa.*



Comparing Recycled Water to Conventional Agricultural Waters

In studies by the University of California Cooperative Extension, the quality of recycled water compared favorably to that of other California water sources. The following table lists several water sources in California with quality comparisons. The aqueduct (Lake Shasta water) and Colorado River water have mineral levels that pose no problems to crop production. The Napa well has a high Sodium Absorption Ration (SAR) and would have to be treated before use, the Yolo well has high electrical conductivity (EC, or total salts), high boron (B), high sodium (Na), and high chloride (Cl) levels making it unacceptable for crop production. The recycled water has a high sodium level which is not a problem because the SAR is low and the regional rainfall leaches out the salts. The high nitrogen level (Nit) may be positive for agriculture by supplying a needed nutrient.

	EC	B	Na	Cl	SAR	pH	Nit
CA - Aqueduct	0.4	0.3	1.1	1.5	1.0	8.0	0.0
Napa Well	0.7	0.6	7.4	1.2	17.0	7.8	1.0
Colorado River	1.1	0.1	4.7	2.8	2.6	8.4	1.0
Yolo Well	11.5	6.0	109	147	65.0	6.9	1.0
Santa Rosa Recycled	0.8	0.4	74	--	2.8	7.0	7.5

New opportunities for agriculture



As water supplies become tighter in California, recycled water could become a critical source for irrigation water. In some areas new agricultural opportunities might be created by growing high value specialty crops that are water intensive like berries, cut flowers, vegetables, and tree fruits. Another example is Sebastopol, California where the dry-farmed (non-irrigated) apple industry is no longer competitive with irrigated orchards elsewhere. Adequate irrigation water on Sebastopol hillsides would also significantly reduce soil erosion by allowing for permanent cover crops.

With recycled water highly productive farms could be created or expanded to help the local agricultural economy continue to thrive.

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