

Cactus may give farmers a cure for poisoned crop land

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The prickly pear cactus may not sound like a trendy cash crop, but it could become a phenomenon among farmers on the arid west side of California's San Joaquin Valley.

The cactus can grow in the west-side's salty soils, drink briny water and live just fine in very dry times. But the real attraction: As it grows, the cactus slowly absorbs and cleans up a chemical villain in the soil - selenium.

Selenium in irrigation drainage widely killed and maimed wildlife during the 1980s at Kesterson Reservoir on the Valley's west side. Before that, selenium was known only as an essential natural element in animals and people - in small doses.

Then The Bee broke the story about mega-doses of selenium causing the disaster and suddenly, the [New York Times](#) and "60 Minutes" were on the case. West-side agriculture has been scrambling for a cleanup ever since.

No silver bullet has been found yet, partly because the problem is more than just selenium. West side land also is slowly being poisoned by salts from irrigation water that can't be drained away.

But the stakes are too high to give up, farmers say. It's about saving a billion-dollar farm belt nearly half the size of [Yosemite National Park](#).

The prickly pear cactus might help with the selenium part of the problem, scientists say.

The biggest challenge probably would be marketing this crop, which is not in high demand in California but might become a hot item in other countries.

Working with federal researchers, farmer John Diener is growing the cactus on 15 acres at his west-side Red Rock Ranch near Five Points. He has been experimenting for years on ways to remove soil contaminants and dispose of salty irrigation drainage.

"Some people would rather retire this land rather than working on the problem," Diener said. "I think that's ignoring the reality of the world's need for crops we grow."

The west side grows 250 different crops, including almonds, garlic, tomatoes, cotton, alfalfa and grain.

Cactus fruit is billed as a health food, sometimes used in fruit drinks. It's also used in jam and marmalade. Cactus has been shown to help protect the nervous system and treat gastritis, arteriosclerosis and diabetes.

Cactus fortified with selenium from west-side soil might become a more attractive product in Europe, Australia, India and China, where selenium is sometimes lacking in people's diets, scientists say.

Cactus would be a gentle way to clean up the soil, says Gary Banuelos, a federal plant and soil scientist at the Agriculture Research Service in Parlier, although it would take many years to make a difference.

Because it takes in selenium very slowly, the plant would not be toxic to birds and other animals.

Banuelos has experimented extensively with cactus in Parlier, Calif., using soil from the Valley's west side. He is growing a spineless variety that is easier to handle.

"The spineless cactus has only tiny spines that float through the air, land on your skin and make you itch," he said. "It grows with a minimal amount of water. That's what you really need on the west side of the Valley."

West-siders are desert farmers, working on land high in natural salts, boron, selenium and other mineral debris - leftovers in the soil from an ancient sea.

In addition, ocean salt rides in with irrigation water sent to the west side in canals from the Sacramento-San Joaquin River Delta.

Perhaps the toughest part of the west-side's problem: Layers of west-side clay beneath the ground's surface stop used [irrigation water](#) from seeping into the deep underground. The trapped water builds up toward crop roots, carrying a tide of concentrated salt. Sooner or later, the land is poisoned.

Thousands of [west-side](#) acres have this problem. Desert agriculture around the globe has encountered it, too.

In the mid-1990s, Diener set up his own 640-acre experimental plot of land to discover ways of coping with the problem. He grows high-value crops, such as spinach. After irrigating with fresh water, he captures the salty drainage and reuses it on salt-tolerant plants, such as alfalfa and Jose tall wheatgrass.

Now, he hopes to use the saltier drainage from the alfalfa and grass on cactus. After the cactus irrigation, he would capture the remaining

drainage and harvest the salt for disposal or perhaps as a product to sell. The remaining drainage water would be sent through sprinklers over a gravel bed to evaporate.

"If we added [cactus](#) into our program, it would reduce the volume of brine at the end," he said. "It's just easier to deal with a lower volume of brine."

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