

Recap: Exploring alternatives to fallowing land in the San Joaquin Valley

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California's San Joaquin Valley is among the most productive agricultural centers in the world. But to grow its crops—everything from tree nuts, citrus, and grapes to corn and cotton—the region relies on irrigation. Today, dry, hot conditions across the state have exacerbated the impacts of new restrictions implemented by the Sustainable Groundwater Management Act (SGMA), driving some growers to remove significant amounts of land from intensively irrigated production.

To meet SGMA requirements and reduce groundwater use, the Public Policy Institute of California (PPIC) estimates that 500,000 to 1 million acres of agricultural land in the valley will need to be repurposed. In the long term, the institute finds, achieving groundwater sustainability will benefit the region. However, bringing large tracts of agricultural land out of intensive production in the near term could negatively impact the region's soils, economy, and air quality if not carefully managed.

PPIC's latest research examines whether water-limited agriculture—as an alternative to outright fallowing—might ease the transition to groundwater sustainability. The research explores what management practices could be utilized to mitigate air quality and dust concerns.

PPIC hosted the presentation of their research in the webinar, "Farmland In Transition: the San Joaquin Valley." Caitlin Peterson, associate PPIC director and research fellow, shared results from her exploration and modeling of water-limited agriculture in the valley. Andrew Ayers, PPIC research fellow, presented information on management practices to combat air quality concerns.

The expert panel discussing the research findings included Reyn Akiona, ecologist and watershed coordinator in the Tule Subbasin; Mark Hutson, walnut and almond farmer; Jonathan Klassen, director of air quality science of the San Joaquin Valley Air Pollution Control District; and Cork McIsaac, president of Agriculture Industries, Inc. weighed in with their experiences.

Dryland farming vs. fallowing

Peterson's research suggests a switch from summer irrigated crops to winter dryland crops such as wheat and barley could answer groundwater concerns while keeping land in some form of production. Winter crops could also mitigate some of the risks associated with land idling, such as dust, weeds, pests, and soil degradation.

While strictly dryland crops have limited scope in the valley today, Peterson points out they were once commonplace. "Dryland grain production is risky due to rainfall variability," she said. "However, utilizing crops for forage and grazing better uses limited rainfall."

Pederson suggested that using small amounts of irrigation (4 to 8 inches) to supplement rainfall at critical periods of establishment would improve chances of success. But, she noted, "continued research is needed to transition land successfully to dryland crops." Next steps could include development of dryland varieties, experimentation with growing and harvesting techniques, and trials to explore different crop options and market opportunities.

Low input, low output crops such as wheat are very different from the high-value specialty crops grown in the San Joaquin Valley today. Still, grain crops could present an alternative to fallowing, generating some income, increasing water infiltration, offering habitat for wildlife, and protecting public health by limiting dust.

Mitigating the threat to air quality

The low-lying valley has long contended with poor air quality. Researchers find some possibility that fallowing land—thereby exposing more soil to wind—could set back recent progress. "Overall air quality has improved over the last several decades, but the removal of irrigation and idling of land to meet SGMA regulations is a growing concern," said Ayers.

Sources of airborne particles include vehicle emissions, agricultural burning, and wildfire smoke. Landscape emissions include tillage, crop harvest, and exposed soil picked up by wind. Exposure to fine and coarse particulate matter can cause chronic respiratory issues and complicate heart problems, as

well as contribute to developmental issues for infants and children. Windblown dust can also expose people to pesticides and Valley fever, which is transmitted through fungal spores.

"One estimate puts the valley-wide costs of air quality-related health impacts at \$3 billion per year," Ayers said. "Risks can be minimized by certain on-farm practices and the up-front identification of priority mitigation areas. Maintaining vegetative cover is one of the simplest and most cost-effective ways to decrease airborne dust."

Ayers said that water-limited farming and managed grazing could help reduce the threat to air quality; however, robust funding for proactive dust management programs at the local, state, and federal level are needed.

Klassen noted that increased use of cover crops and conservation tillage has improved air quality and reduced dust in the past. Akiona suggested the most efficient way to enlist growers' support for conserving groundwater and preventing dust is for local groundwater sustainability agencies (GSAs) to incentivize the process and partner with conservation organizations such as the Land Trust and Nature Conservancy.

With more options in growers' toolboxes, groundwater levels and quality will improve, said Mclsaac. He believes growers are looking for ways to recharge the water table and repurpose the land, but funding can be a significant barrier. "It costs \$1,200 an acre to remove walnut trees, more if you are mulching and leaving the organic matter on the soil," Mclsaac said. So the economic aspect for growers needs to pencil out in the end.

While Mclsaac himself has participated in programs that help growers invest in low-dust harvest equipment and whole orchard recycling, he noted that there are barriers to accessing resources like these. Increasing funding for these programs is not enough, Mclsaac and Hutson agreed: a simpler application process and more flexibility in how funds are used would enable more growers to participate.

It's clear that land transitions in the region will result in some complicated and sometimes surprising interactions between groundwater supply and air quality. However, the entire panel agreed that the resiliency and creativity of California growers gives them hope for innovative solutions and the long-term sustainability of the region as an agricultural powerhouse.