Drought and Groundwater Regulation: Impacts for Irrigated Agriculture in California

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Drought reduces water supply and increases crop water needs. The most recent drought, spanning 2020-2022, led to drastic cuts in irrigation deliveries in many places, leading to changes in irrigated acreage and crop revenues. For example, a study by Josué Medellín-Azuara and others states that relative to 2019 (a wet year), statewide irrigated acreage dropped by 7.4% in 2021 and by nearly 10% in 2022. Crop revenue losses were estimated at $1.3 billion in 2021 and $1.7 billion in 2022. Growers with orchards or vineyards often have less flexibility about their water usage. Corn silage and alfalfa hay, on the other hand, often see the greatest cutbacks during drought.

These drought-induced acreage and crop revenue impacts experienced in California would have been worse if it were not for groundwater, which serves as a buffer to surface water variability. When surface water supplies are low, growers often turn to groundwater to make up the difference. Farmers get about a third of their water from groundwater in a typical year, but in a drought year, it is much more.

Groundwater extraction is not without its own costs. For over a century, Californians have been withdrawing water from the ground faster than it can be replenished; as a result, the ground is subsiding in spots, domestic wells are being impacted, and the groundwater reserves needed for the future are being lost.

Groundwater management is evolving in California under the Sustainable Groundwater Management Act (SGMA), and as a result, access to groundwater in the future may not be the same as it has been in the past. Substantial variation exists among groundwater agencies implementing their plans to achieve sustainability over the next 15 to 20 years. A comparison between regions facing greater overdraft (and thus likely greater regulation under SGMA) to those facing less overdraft, suggests that similar rates of new perennial plantings and well drilling have occurred in 2020 and 2021, relative to 2014, the year in which SGMA passed. So while investments in perennial crops increased 50% since SGMA passed in 2014, we see no differential increase among regions facing different degrees of regulation under SGMA. This suggests that early effects of SGMA on agriculture, if any, are small.

While drought is not new to California, droughts may become more intense in the future. The way agriculture adapts and experiences the costs of surface water scarcity will be different under a future with groundwater regulation.

References

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