

California Rice Rebounds After a Brutal 2022

Aaron Smith

In 2022, California rice farmers planted half the number of acres they had planted in 2020. Rice acreage had not been that low since 1958. Acreage has rebounded this year, returning to its 2020 level. Rice acreage dropped in 2022 because of a lack of water stemming from a multi-year drought. Surface water deliveries from the Sacramento River were severely curtailed. Multiple storms this past winter restored the flow of the Sacramento River. Rice growers were thus able to return to normal activities in 2023.

California has experienced two severe droughts in the past decade: 2014–2016 and 2021–2022. These droughts have strained water resources, leading to reduced surface water deliveries, increased groundwater pumping, and reduced production. Droughts are heterogeneous, affecting different parts of the state differently.

Rice has long been a staple crop in the northern Central Valley. Growers rely on surface water deliveries from the Sacramento and Feather Rivers. Growers had experienced some curtailment in the 2014–2016 drought. However, in 2022, low water levels in Lake Shasta dramatically reduced the amount of available water available to them.

Background

During the gold rush, California imported large quantities of rice, primarily to feed immigrants from China who had come to work in the mines. It took several decades for California producers to figure out how to grow rice in the state. Commercial rice production started in the state around 1911. It increased steadily for almost 100 years, before plateauing early this century, as shown in Figures 1a and

1b. In dollar terms, the value of rice production peaked in 1980, before a price decline that persisted for more than two decades. California growers produced an average of \$1.1 billion worth of rice in the last 15 years.

California is the second largest rice-producing state behind Arkansas, producing about a billion dollars in production value per year. Most California rice is medium-grain Japonica for use in Asian and Mediterranean dishes such as sushi, paella, and risotto. Other U.S. states produce mostly long-grain rice. In a typical year, about half of California's rice production is exported. In the 2022/23 crop year, U.S. exports of medium- and short-grain rice were down by about 400,000 metric tons (about 60%) from their average over the prior decade. California rice exports were also low in 2021/22.

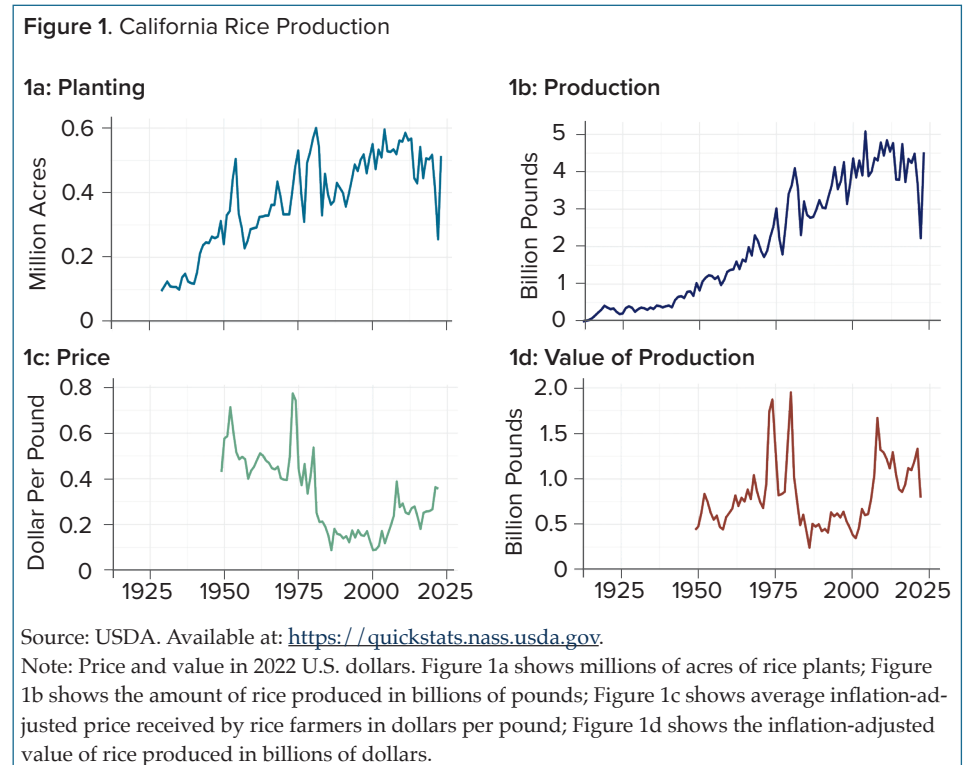
Rice cultivation has environmental costs and benefits. Flooding rice fields starves the soil of oxygen, so soil

organic matter ferments anaerobically, producing methane, a greenhouse gas. Globally, flooded rice fields contribute an estimated 10% of agricultural greenhouse gas emissions and about 2% of total anthropogenic (human-caused) emissions. Agriculture is not covered under California's cap and trade programs, so methane emissions from rice are not regulated. However, rice growers can sell offsets for demonstrated reductions in methane emissions through, for example, dry seeding or early drainage. However, state data suggest that no growers have availed themselves of this opportunity yet.

Rice fields also provide habitat to migratory birds. Such habitats have become scarcer over time as wetland area has declined.

Prevented Planting

The U.S. Department of Agriculture (USDA) Farm Service Agency (FSA) is the part of USDA that administers farm programs. The FSA requires



all farmers who participate in crop insurance, farm credit, or disaster programs to report all cropland use on their farm. It publishes these data each season starting in August and updates them each month until the numbers are finalized in January.

The FSA crop acreage data contain two pieces of information that indicate how the drought affected land use. First, farmers report prevented-planting acres, which is land that they had intended to plant a crop but were prevented from doing so by a natural disaster, such as inadequate irrigation water. Second, farmers report fallowed or idle acres, which is cropland not planted to a crop.

Figure 2 shows that, in 2022, farmers reported 544,000 unplanted crop acres in California, an increase of 124,000 acres from 2021. Total unplanted acreage was about 7% of the state's cropland, but it remained lower in 2022 than it was in 2014 and 2015 during the previous drought. In 2023, the reported number of unplanted crop acres in California is 280,000, less than half the number from 2022 and back down to 2020 levels.

Prevented planting reduced rice acres by 55% in 2022, a much larger decline than observed in any other crop in recent years. There were almost no 2022 prevented-planting acres in California crops other than cotton or rice.

The FSA's prevented-planting data are a good estimate of how many rice acres the state lost in 2022 because almost all rice farmers participate in FSA programs. Nonetheless, it is possible there were acres outside of the FSA umbrella that were also taken out of production. The FSA acreage numbers are less comprehensive for many other crops, especially perennials such as almonds, grapes, and pistachios, because fewer of those growers participate in FSA programs.

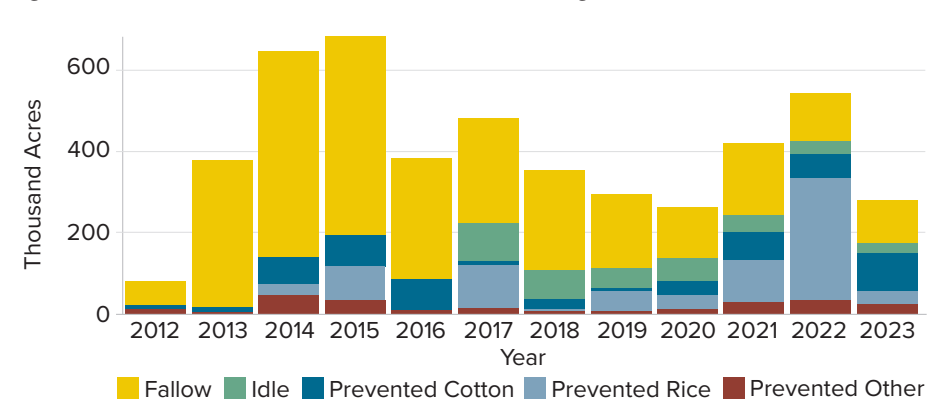
In addition to prevented planting, FSA records both fallow and idle land. Fallow land is an intentional part of a rotation. For example, a farmer may plant tomatoes, cotton, and fallow in a three-year cycle, with the fallow year intended to conserve moisture and increase fertility for crop production in the next growing season. Idle cropland, on the other hand, is just land not planted.

Fallow and idle acres have declined in recent years, perhaps partly due to acres that were formerly in row crops being planted to tree nuts. You cannot temporarily fallow or idle an orchard.

The FSA data report 35,000 prevented rice acres in 2023, which is only 6% of the planned acreage and is down from 300,000 acres in 2022 and 104,000 acres in 2021. Other years with substantial prevented planting in rice were 2015 and 2017 (see Figure 3).

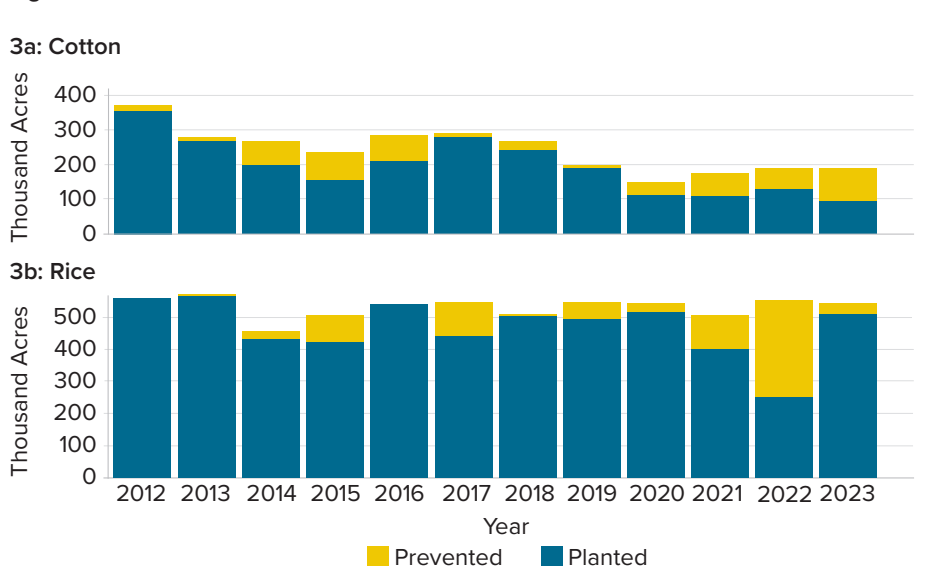
The number of prevented cotton acres has increased to 96,000 this year, many of which are buried under Tulare Lake. Tulare Lake used to be the largest lake west of the Mississippi River. Beginning in the late 19th century, farmers drained it to grow crops. The lakebed flooded in 1969, 1983, and 1997, but otherwise has served as productive cropland. This year, it has flooded again, and farmers may not be able to plant crops in the lakebed until 2025.

Figure 2. California Fallow, Idle, and Prevented-Planting Acres



Source: USDA National Agricultural Statistics Service. Available at: <https://quickstats.nass.usda.gov>.

Figure 3. California Prevented and Planted Acres



Source: USDA. Available at: <https://www.fsa.usda.gov/online-services/fsa-online-data-resources/index>.

Effects of the Drought on Rice

Most California rice is grown in the northern Central Valley, but small quantities are grown as far south as Fresno County. On average in the state, rice growers apply about 5 acre-feet of water per acre (about 1.6 million gallons per acre.) Up to half of this water drains away from the field, much of it re-entering waterways. A small amount seeps into the soil. There is a lot of variation across fields in the water lost to drainage.

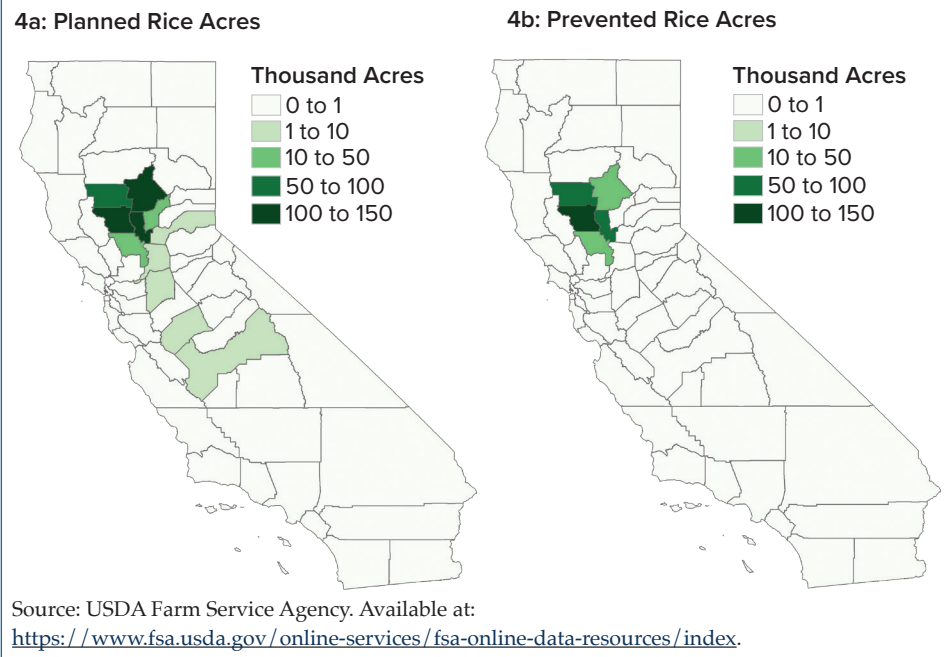
Rice is the dominant crop by land area in northern counties such as Butte, Colusa, and Sutter. Aside from rice, almonds and walnuts also have significant acreage in these counties. Similar to rice, almonds and walnuts use 3 to 5 acre-feet of water per year, so there would not be large water savings from growing them in place of rice. Moreover, because almond and walnut trees are perennial, keeping them alive during a drought year would take priority over rice, which is an annual crop planted in the spring and harvested in the late summer.

Figure 4a shows that farmers had planned to plant more than 100,000 acres in each of Butte, Sutter, and Colusa counties in 2022. The drought reduced rice acres more in the western counties than those further east. Colusa County lost 84% of its acreage and Glenn County lost 75%, whereas Butte County lost just 17%, as shown in Figure 4b. Butte County has greater groundwater resources, so it was less affected by reduced allocations from the Central Valley Water Project. Butte County rice growers also received Feather River water, which was curtailed much less than the Central Valley Project water from the Sacramento River.

Price Changes and Crop Insurance Payments

High prices offset some of the 2022 decline in rice acreage. So, although

Figure 4. Planned and Prevented Rice Acres



acreage was down by more than half, the value of production was down only 25% from 2020. Some of the losses were covered by crop insurance under the prevented-planting provision.

Crop insurance is administered by the Risk Management Agency (RMA) of the USDA but delivered by private insurance companies. These companies sell the policies and share in underwriting gains and losses. The RMA reimburses insurance companies for their administrative and operating expenses, which add another \$1.4 billion per year.

The RMA sets premiums based on a farmer's production history, with the goal of making the policies actuarially fair. The government now pays about 60% of the premium, up from about 25% in 1990.

Prevented-planting insurance is designed to provide protection based on pre-planting costs generally incurred up to the point of planting the crop. A farmer with revenue insurance who had planned to grow rice in Colusa County but was prevented from doing so by lack of water would get a payout equal to 55% of the guaranteed revenue. California rice farmers

received crop insurance payouts (indemnities) of \$350 million in 2022 for losses due to failure of irrigation supply.

Conclusion

With the drop in prevented planting, California rice acres in 2023 are back up to the level seen during most of the last decade. The drought did not cause a permanent shift out of rice (this time). Cotton acreage, on the other hand, continues to decline. The growth of almonds and pistachios, along with the increasing scarcity of water, has been pushing crops like alfalfa, cotton, and wheat out of the state. Rice continues to be more resilient.

Suggested Citation:

Smith, Aaron. 2023. "California Rice Rebounds After a Brutal 2022." *ARE Update* 27(1): 5–7. University of California Giannini Foundation of Agricultural Economics.

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