

Rice Production in California

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Historic Background

During the gold rush, most of the food for the mining camps had to be imported. This included large quantities of rice, which was the staple food for tens of thousands of Chinese immigrants [5]. In the years following the gold rush, rice imports remained high. In 1876, more than 50 million pounds of rice were imported into California, predominantly from China [5].

Rice production was first promoted in California in the 1850s to substitute the large quantities imported at a comparatively high price. However, not even prizes offered by the California State Agricultural Society and the California State Legislature for the successful production of rice could motivate growers to cultivate rice [5].

Several reasons contributed to the low success of early trials, including varieties that were not adapted to the soils, climatic conditions and photoperiod of the region. Most of the trials were carried out in the Delta, where the night temperatures were too low for the varieties used. In addition, the Delta soils were very fertile, while the varieties tested were bred to produce an adequate yield on poor soils. Furthermore, careful water management was difficult with the irrigation and drainage systems available at that time [2].

One of the first successful trials was conducted by the USDA soil specialist W.W. Mackie near Biggs (Butte County) in 1908. Short medium grain varieties from Japan proved to be well adapted to the climatic conditions. The success of these trials motivated the USDA to carry out a number of variety trials. Seeds of promising varieties were offered at no charge to

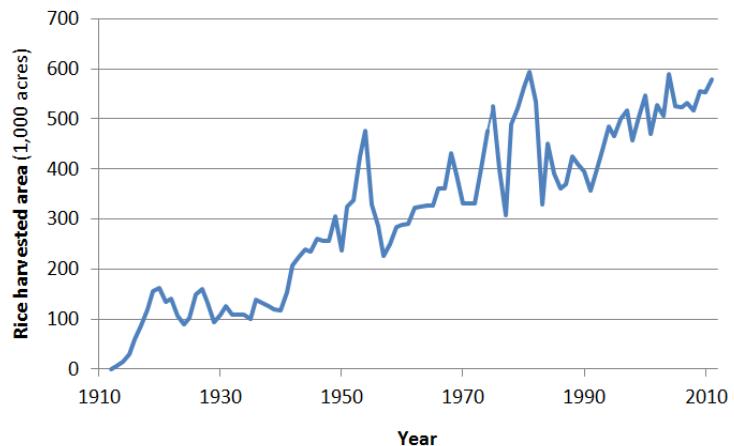


Figure 1: Harvested rice acreage in California from 1912 to 2011 [4].

growers. Subsequently, rice was grown successfully in two different areas in the Sacramento Valley in 1911. These plantings marked the beginning of the commercial rice production in California [5].

Following its successful introduction, rice production increased quickly over the following years, reaching 162,000 acres in 1920 (Figure 1) [4]. While the rice area did not further expand during the next two decades, it increased again after 1940. Since 1940, the rice area increased by an average of more than 6,000 acres a year to reach 580,000 acres in 2011 (Figure 1). However, the annual fluctuations during that period were at times extreme. Volatile world market prices and water variable availability contributed to these fluctuations [1].

California growers produce about 20% of the U.S. rice harvest. Medium grain varieties dominate California production, accounting for roughly 90% of the production. In contrast, with a share of 74%, long grain varieties dominate the U.S. production, followed by medium grain

varieties with 25%. Short grain varieties account for only about 1% of U.S. rice production. Due to the differences in rice types produced, only 0.3%

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of U.S. long grain rice is produced in California, while this proportion is 75% for medium grain rice and 98% for short grain rice [3].

Production Regions

Commercial rice production started in the Sacramento Valley, which is still the main production area. In 2012, more than 95% of the rice produced in California came from the Sacramento Valley, with Colusa, Sutter, Butte, and Glenn being the dominant counties (Figure 2) [3].

In the Sacramento Valley, rice is grown on soils with a high clay content or a restrictive layer, which reduce water infiltration. These soils are ideal for rice production, but less favorable for other crops. Rice production in the San Joaquin Valley is small mainly because crops which return a higher income per acre can be grown on the more fertile soils there. In addition, the water supply is more restricted in the San Joaquin Valley compared to the Sacramento Valley [5].



Figure 2: Location of the five leading rice producing counties in California [3].

Yield

Rice grain yield increased considerably over time (Figure 3). While the average yield obtained in California between 1912 and 1940 ranged between 2,000 and 3,000 lbs/acre, it is now more than 8,000 lbs/acre. The main yield increase took place between the 1950s and the 1990s. The use of mineral fertilizer, high yielding varieties, the introduction of more efficient farm equipment, and improved cultural practices such as weed, pest and insect control, as well as water management have all contributed to the yield increase [6].

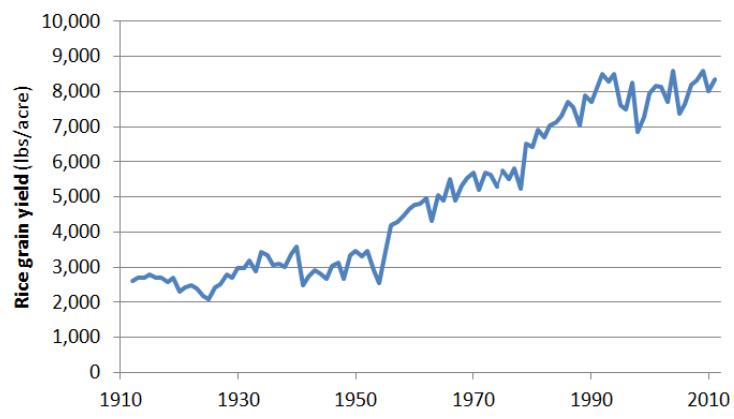


Figure 3: Development of rice yield since 1912 in California [4].

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