Farming in a State of Extremes

Climate Change, Drought, and Agriculture in California

April 21. 2022

Alvar Escriva-Bou, Josue Medellin-Azuara, Ellen Hanak, John Abatzoglou, and Joshua Viers

Supported with funding from the California Department of Food and Agriculture, the National Oceanic and Atmospheric Administration, and the S. D. Bechtel, Jr. Foundation

PPIC PUBLIC POLICY INSTITUTE OF CALIFORNIA

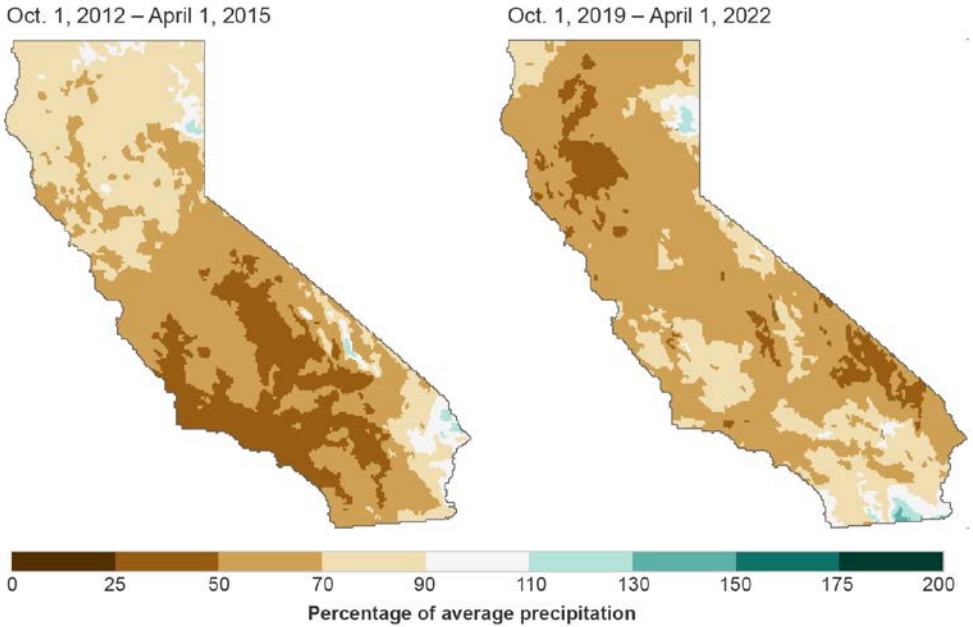
California's agricultural sector is the nation's largest, but water is a concern

- CA farms: >$50 billion annual revenue, >420,000 jobs
- Climate change, regulatory constraints, and groundwater depletion constrain water supplies
- Farming regions are home to many underserved communities

A fast-paced drought—fueled by climate change—is constraining water availability and increasing demands

- The current drought continues challenging patterns seen during the 2012-16 drought:
  - Warm and dry weather
  - Extreme swings between dries and wets (“precipitation whiplash”)
  - Challenges managing water for farms, cities, small communities, and the environment

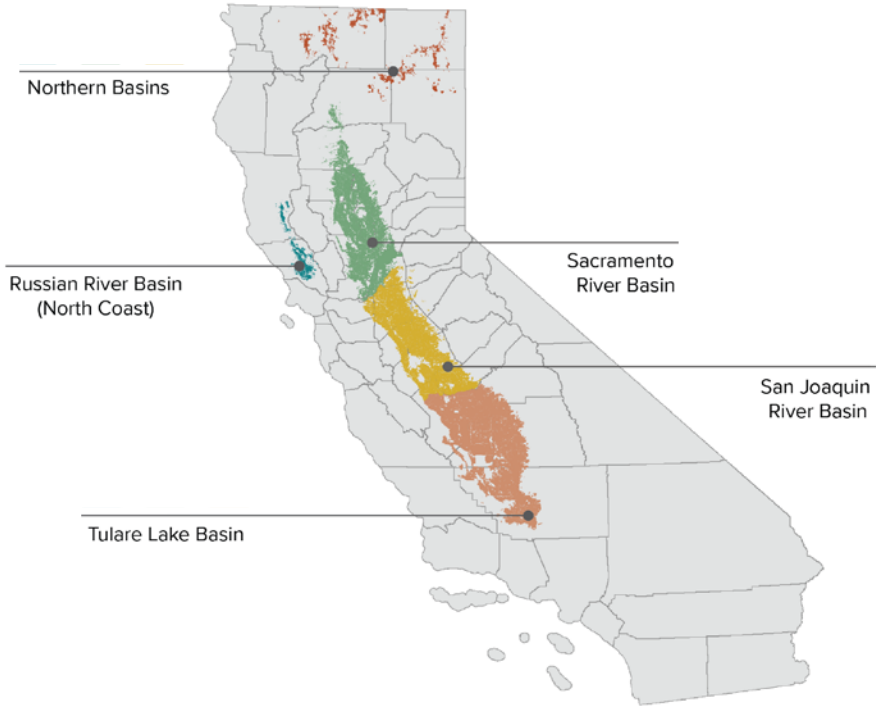
This drought has hit normally water-rich northern regions especially hard



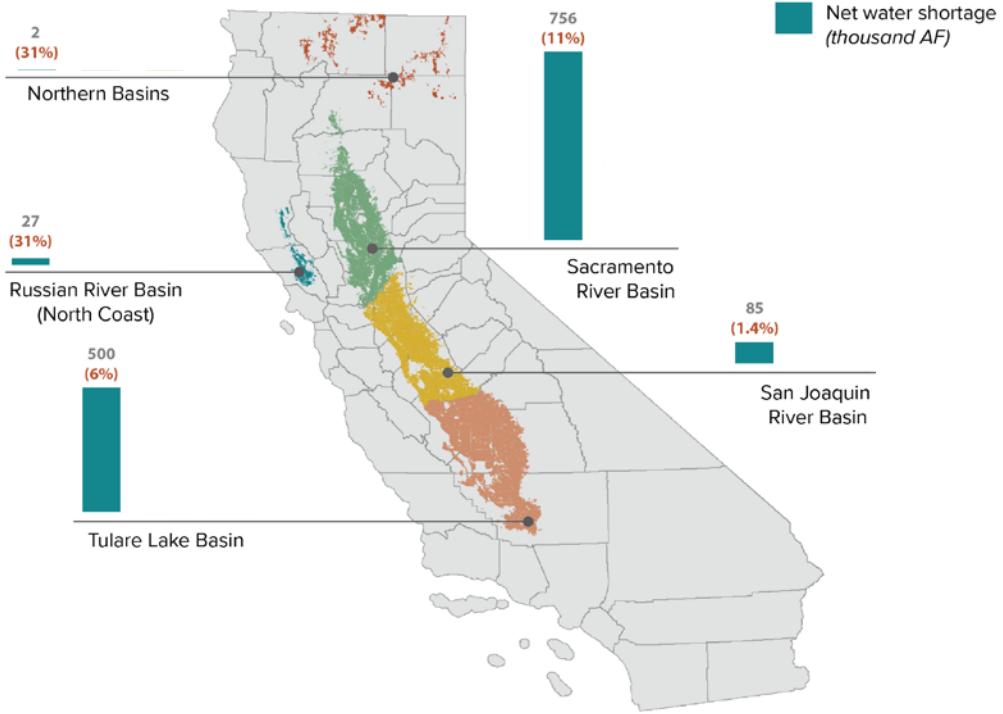
In 2021, drought raised farm costs and reduced revenue

- Drought reduced surface water to farms in 2021 by 5.5 maf
- Surface shortages increased groundwater pumping, other costs
- Water shortages led to ~400,000 acres fallowed and other impacts
- Direct economic cost ~$1.1 billion, and $1.7 billion including upstream sectors

We studied the agricultural regions most impacted by drought in 2021

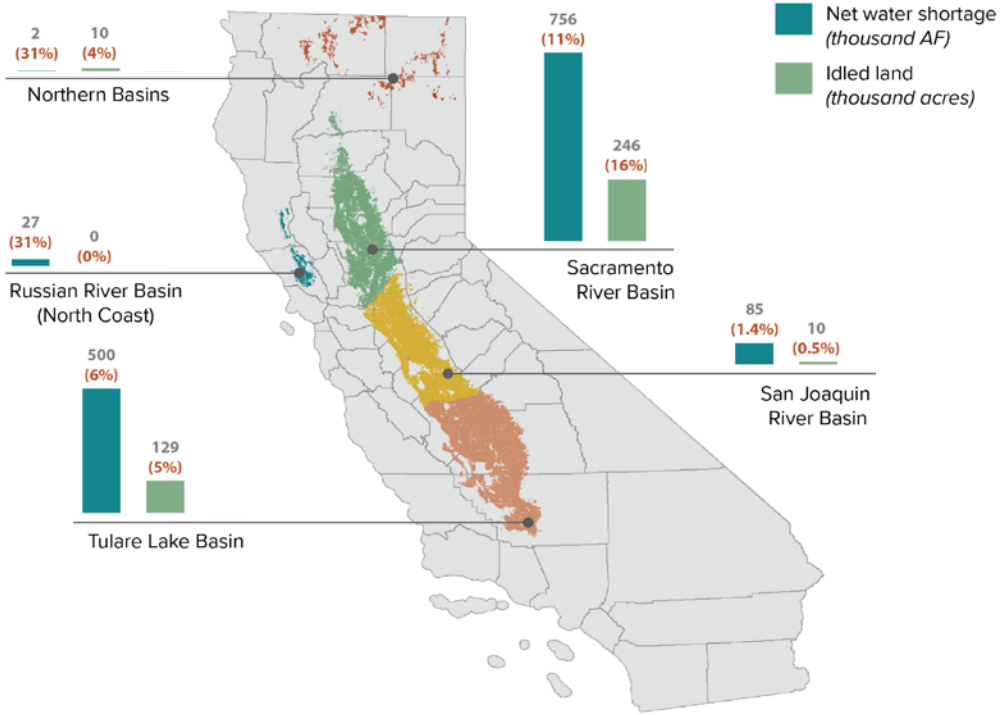


Water shortages were most severe in the Sacramento Valley and North Coast



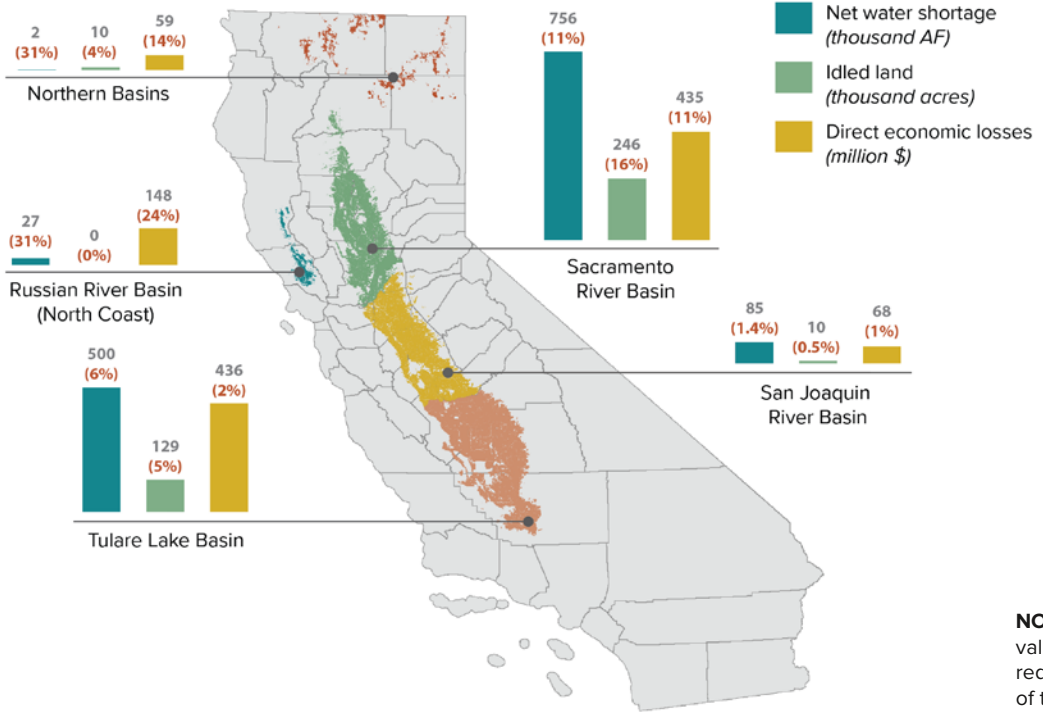
NOTE: The numbers above the bars show the values for each variable in each region, while the red numbers in parentheses show the percentage of the impact with respect to the regional baseline.

Almost 400,000 acres of land went idle, a majority in the Sacramento Valley



NOTE: The numbers above the bars show the values for each variable in each region, while the red numbers in parentheses show the percentage of the impact with respect to the regional baseline.

Drought hit northern regions hardest as a share of ag economy

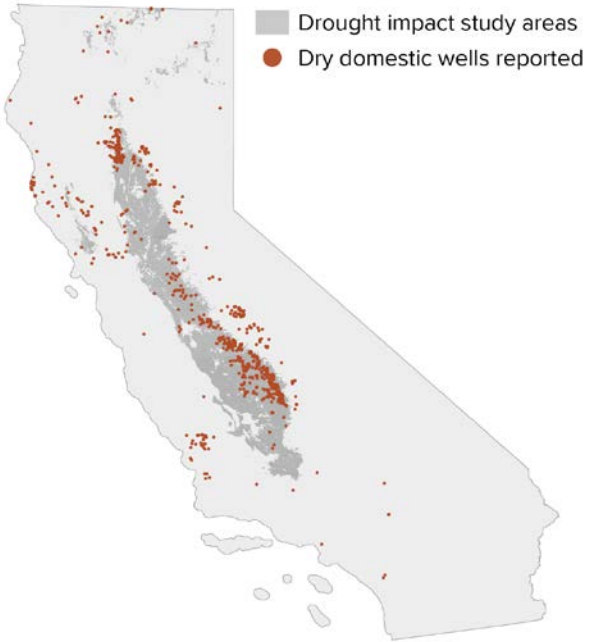


NOTE: The numbers above the bars show the values for each variable in each region, while the red numbers in parentheses show the percentage of the impact with respect to the regional baseline.

The drought has raised challenges for SGMA implementation

- Nearly 1,000 wells went dry during 2021
- Subsidence also increased in 2021, though less than in the last drought
- SGMA plans in the San Joaquin Valley must address the undesirable impacts of overpumping

Domestic dry wells in 2021



2022 is going to be much harder across California

- Surface deliveries at all-time low
- Groundwater pumping will increase
  - More dry wells, subsidence
- Increased fallowing and economic impacts
- Ecosystems will be hit hard
- Cities will face tougher challenges than in 2021

Local, state, federal actions could help farming regions adapt to a changing climate

- Urgent need to address the undesirable impacts of increased pumping
- To reduce risks, farm regions need to accelerate demand management:
  - Allocations, trading, and land repurposing
- To take advantage of wet years, improve water storage and conveyance

Notes on the use of these slides

These slides were created to accompany a presentation. They do not include full documentation of sources, data samples, methods, and interpretations. To avoid misinterpretations, please contact:

Alvar Escriva-Bou (escriva@ppic.org, 916-440-1125)

Thank you for your interest in this work.