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California Drought Fact Sheet Series 3
Informing the general public about the 2012-16 drought

Drought Impacts on California Crops

Photo courtesy of NRCS.

Background

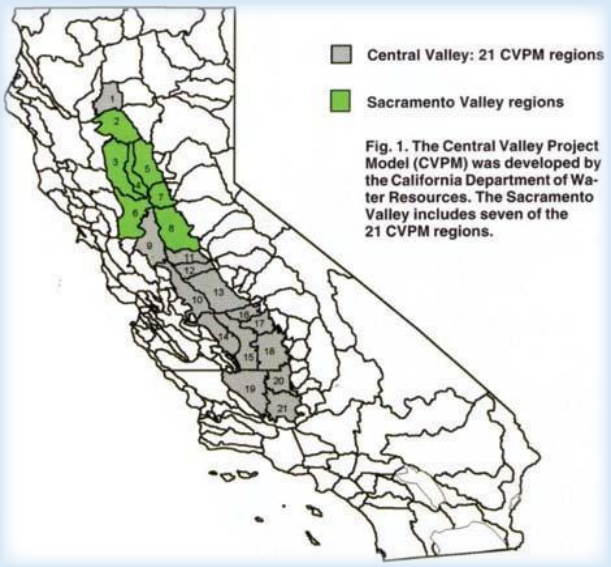
California's extensive water distribution systems and Mediterranean climate permit the state to produce more agricultural commodities than any other state in the nation. As such, California's farms (valued at $54 billion in 2014 [1]) typically produce more than 10-15% of the nation's agricultural GDP [2]. However, drought is a significant stressor in the state's most productive regions — especially the Central Valley.

Major Crop Types and Growing Areas

California farmers garner more revenue from specialty crops (fruits, nuts, and vegetables) than they do from field crops (like alfalfa, cotton, rice, and corn). Almonds are California's most valuable crop at $5.9 billion of revenue in 2014, closely followed by grapes with $5.2 billion [1]. These, along with the rest of the state's crops, are primarily farmed in major growing areas, including the Sacramento Valley, Delta, San Joaquin Valley, Central Coast, Southern Coast, and Imperial Valley.

Where do California farmers get water?

Farmers usually depend on surface water or groundwater for irrigation. Some farmers also utilize recycled municipal water. In the Central Valley, the biggest share of water is delivered by large-scale surface water projects. These include the State Water Project (SWP) that services 750,000 acres of farmland [8] and the Central Valley Project (CVP) that services 3 million acres [9].



Courtesy of Hyunok Lee et al.

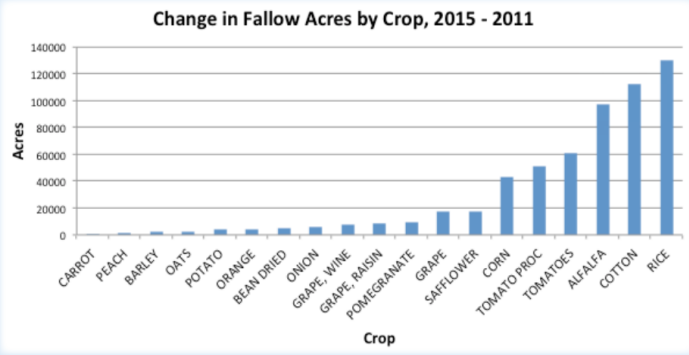
Map of Central Valley Project water service areas [12].

However, the drought has impacted the allocation of water from these projects. These cutbacks have been a serious concern for agricultural users across the state, and to keep their businesses afloat, many farmers have relied heavily on increasingly stressed groundwater resources. The details of the state's water policy and allocation are further discussed in Fact Sheet #4 in this series.

How are California farmers coping with the drought?

Net water shortages for agriculture due to the drought have most severely affected the Central Valley. Almost 1 million of California's 27 million acres of cropland were fallowed in the past two years [3]. Furthermore, farmers fallowed 37% more summer acres and 154% more year-round acres in 2015 than they did in 2011. This primarily impacted farmers in the South San Joaquin Valley, especially those growing field crops like cotton and those growing alfalfa for livestock forage [4].

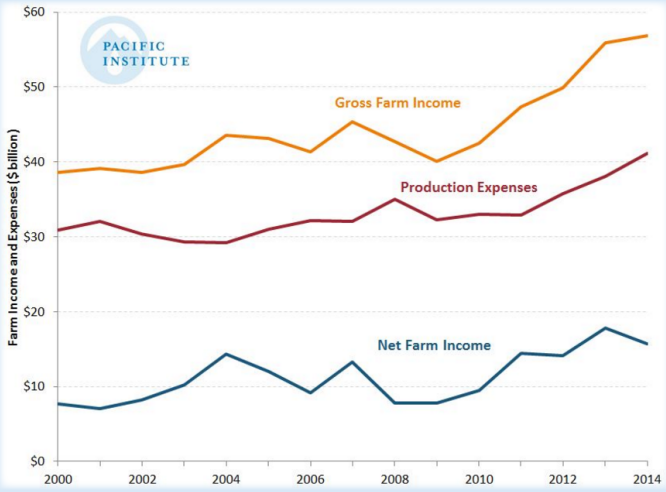
Additionally, some farmers in the Sacramento Valley found it more profitable to trade their water than use it themselves, which hurt production of crops like rice [3].



Graph courtesy of Melton et al.

Net change in fallowing acreage in California, compared to the baseline non-drought year 2011 [4].

Surprisingly, despite these stressors, farmers on the whole have done a remarkable job so far in adapting to the drought. Recent data indicate that net farm income in 2014 was the second highest in California's history, and that farm employment also hit a record high [5].



Courtesy of H. Cooley, K. Donnelly, P. Gleick and the Pacific Institute

Despite rising costs of production (linked to groundwater pumping), gross revenues rose to maintain a high net income. Note: this graph combines animal and crop farms, but crop farm data also follow the same trend [5].

This surprising display of adaptation is likely the result of numerous factors. Heavy groundwater use, though unsustainable, has been key to this short-term success. However, farmers are also taking other steps, such as switching to higher-value crops and employing more efficient irrigation practices, to cope with drought [5].

How will drought affect the future of California agriculture?

Ongoing drought will pose challenges for crops that:

- Are especially sensitive to low water quality or high salinity, such as grapes.
- Are growing in areas where groundwater levels and/or quality have declined, such as certain areas of the North and Central Coast.
- Have high water demand but low value, such as alfalfa, for which switching to more efficient irrigation may be a proportionally large cost.

Despite this inherent challenge, some alfalfa farmers have chosen to install subsurface drip irrigation systems on their land—a positive sign of a larger shift towards water efficiency. Drought will also pressure farmers to plant crops more appropriate for their regional water availability and climate. For example, water stress will favor lettuce production in moister coastal areas such as the Salinas Valley as opposed to inland areas where water demand of the crop is higher [10, 11]. Water transfers between low-value, water-intensive crop farms and those growing higher-value crops will also likely become more common [12].

Although we cannot be certain of how agriculture will transform into the future, farmers that use their experience with this drought to inform their adaptation decisions will be the most able to maximize their opportunities.

How will drought affect consumers?

So far most consumers have seen only moderate crop price impacts because groundwater has supplemented the falling stock of surface water. However, as supplies become more stressed and groundwater become increasingly depleted and expensive to extract, it is probable that consumers will have to cope with higher food prices, different seasonal patterns, and decreased availability [3].

Policy makers, water agencies, farmers, and other stakeholders will all have a role to play in responding to drought and minimizing its potential damage.

Where can farmers get more information?

- *Federal/State Agency Assistance Programs* – large variety of programs offering technical and financial support, incentives for investments in water irrigation/treatment/distribution or other ecosystem quality protection, grant opportunities: http://www.cdfa.ca.gov/drought/
- Irrigation Strategies for Almonds, Pistachios, Stone Fruit, Walnuts, Alfalfa, Olives, etc.: http://ucmanageddrought.ucdavis.edu/Agriculture/

1. https://www.cdfa.ca.gov/statistics/PDFs/2015Report.pdf
2. http://www.bea.gov/iTable/iTableHtml.cfm?reqid=70&step=10&isuri=1&7003=200&7035=-1&7004=naics&7005=4&7006=06000&7036=-1&7001=1200&7002=1&7090=70&7007=-1&7093=percentofus
3. https://watershed.ucdavis.edu/files/biblio/Final_Drought%20Report_08182015_Full_Report_WithAppendices.pdf
4. https://nex.nasa.gov/nex/static/media/other/Central_Valley_Fallowing_Data_Report_14Oct2015.pdf
5. http://pacinst.org/national-geographic-scienceblogs-impacts-of-the-california-drought-part-2-net-agricultural-income/
6. http://ajed.assembly.ca.gov/sites/ajed.assembly.ca.gov/files/Fast%20Facts%20on%20California's%20Agricultural%20Economy.pdf
7. http://www.cdfa.ca.gov/statistics
8. http://www.water.ca.gov/swp/
9. http://www.water.ca.gov/swp/cvp.cfm
10. http://anrcatalog.ucanr.edu/pdf/7215.pdf
11. http://anrcatalog.ucanr.edu/pdf/7216.pdf
12. http://pacinst.org/wp-content/uploads/sites/21/2015/08/ImpactsOnCaliforniaDrought-Ag.pdf
13. http://californiaagriculture.ucanr.edu/landingpage.cfm?article=ca.v055n02p33&fulltext=yes

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