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Impacts of the 2007-2009 California Drought: What Really Happened?

Surprising Outcomes for California's Agriculture, Energy, and the Environment

June 16, 2011, Oakland, California: California's three-year drought, which ended with this season's cool and wet weather, had complicated and serious impacts that have been poorly understood and reported. Some of the impacts were expected; others were surprising. The Pacific Institute has just completed a nine-month assessment of new data from California's agricultural, energy, and environmental sectors to evaluate actual consequences of the drought for the state.

Analysis of state and federal data released over the past year finds that contrary to much of the media reporting, California's agricultural community proved flexible and resilient, generating agricultural revenues in 2007, 2008, and 2009 that were the highest on record. And agriculture-related occupations remained a stable portion of total jobs available in areas directly impacted by water supply restrictions. Less frequently reported were the substantial impacts on energy production and aquatic ecosystems during the drought, which were economically and environmentally significant.

"More severe drought is inevitable, and the U.S. – and California in particular – has not reformed drought monitoring, evaluation, planning, and response strategies the way other countries and regions have," said Juliet Christian-Smith, senior research associate at the Pacific Institute and lead author of the report. "To become more resilient to future droughts, it will be critical to shift from crisis-driven responses to long-term mitigation strategies."

The Pacific Institute analysis, ***Impacts of the California Drought from 2007-2009***, focused on three drought-sensitive sectors: agricultural production, energy production, and ecosystem health. Among the critical findings:

Farm income rose as farmers implemented diverse coping strategies.
California's agricultural sector coped with reduced water availability with strategies like expanded reliance on local groundwater, temporary water transfers, fallowing, and shifting cropping patterns and types. These strategies proved highly successful. Overall, California's 81,500 farms and ranches grossed $34.8 billion in revenue in 2009 – the third highest year on record and just below the all-time high of $38.4 billion in 2008, the second year of the drought.

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Statewide, historical rates of decline in acreage actually slowed during the drought. Yield remained high throughout the drought period, only dropping below 2006 (wet year) levels once and in a single crop category, field and seed crops, during the final year of the drought (2009). Counties in the San Joaquin Valley largely sustained yields and revenue in the production of their top ranking (highest value) crops throughout the drought.

Agricultural impacts were not equally distributed.

Data from individual drought-impacted counties and irrigation districts detail highly varied impacts among, and even within, counties. For instance, while the total gross revenue of Fresno County agriculture increased by 2% during the drought years, gross revenue in neighboring Kern and Kings Counties declined by 9% and 19%, respectively. And while Fresno, Kern, and Kings Counties all fallowed land at higher rates during the drought, nearby Tulare County did not. In fact, Tulare County harvested more acres in both 2008 and 2009 than it did in 2006, a wet year. These differences reflect the uneven distribution of water in California. For instance, priority contractors received 100% of their supply of Central Valley Project water throughout the drought, while other users received between 10% and 50%.

Longer-term droughts will be more damaging for all sectors examined.

The report also finds that many coping strategies applied in California provide short-term relief, but would not provide water security in the face of a longer or more severe drought. Quick fixes to short-term water supply reductions employed during the drought, if continued, could prove disastrous for the future of sustainable freshwater supply and those dependent on this supply. For example, the average groundwater depletion rate in the San Joaquin Valley doubled during the 2006-2010 time period; Westlands Water District groundwater pumping was 19 times greater in 2009 than in 2006. Some of the adverse impacts of groundwater mining are already apparent in this region.

To prepare for future droughts, the report recommends putting in place new drought management strategies capable of addressing the risks of longer and more severe water shortfalls, such as improving water efficiency, enhancing groundwater recharge, establishing longer-term water transfer programs and systems for monitoring and evaluating those transfers, restoring critical ecosystem flows and habitat, planting drought-resistant crops, adjusting grazing schedules and intensity, improving soil moisture management, expanding energy conservation and efficiency programs, and diversifying the state's energy portfolio with a focus on renewable energy sources.

Farm job losses were largely unrelated to water constraints.

The most recent U.S. Census data and California Employment Development Department data demonstrate that agriculture-related jobs were not disproportionally reduced in areas experiencing water-supply restrictions. Rather, widespread job losses over the drought period were more severe in non-agricultural sectors, such as sales and construction. The Great Valley Center reports that in the Central Valley, there was a 2% gain in agriculture-related jobs between 2003 and 2009, but a 44% reduction in construction-related jobs over that same time. Also striking is that when wetter weather returned in 2009-2010, unemployment rates still rose in every San Joaquin Valley County, despite greater water supplies. The poverty and high unemployment in the region are real and systemic, but this has been true even in wet years.

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"These data show that unemployment in the San Joaquin Valley is a long-term problem, not simply the result of the recent drought. The poverty rate in the southern San Joaquin Valley – ironically one of the highest-grossing agricultural regions in the world – has been consistently above 20% for a decade," said Christian-Smith. "Hunger, homelessness, and other signs of poverty are real and happening, and they are happening in wet years and dry ones. Genuine efforts to address chronic poverty in the region are needed."

Energy costs to consumers rose during the drought.
California hydropower production declined significantly during the drought years as water flows dropped, with both economic and environmental costs. Much of this lost hydropower was made up with the purchase and combustion of natural gas, costing California rate payers $1.7 billion and producing an additional 13 million tons of carbon dioxide (approximately a 10% increase in average annual CO_2 emissions from California power plants), along with substantial quantities of other pollutants that are known contributors to the formation of smog and triggers for asthma.

Harmful impacts to California ecosystems increased.
Unlike the agricultural sector, ecosystems have fewer coping strategies to maintain health and productivity. Multiple factors play a central role in ecosystem health and affect fisheries, water availability, river flow timing, water volumes and quality – and all were affected by the drought. The Pacific Coast salmon fishery was closed in 2008 and 2009; delta smelt, longfin smelt, American shad, and threadfin shad were also at record lows. Salmon fishery closures during the drought are estimated to have cost around 1,800 jobs and $118.4 million in income compared to the salmon fishery in 2004 and 2005.

In addition, many of the state's environmental flows went unmet during the drought period, affecting aquatic ecosystems and decreasing protections for endangered species in the form of maintained freshwater flows in rivers and streams. The salinity in the Bay Delta in 2008 was the highest on record since 1992, impacting water quality for in-Delta users and affecting waterfowl and wildlife refuge and fisheries habitat.

With the state's growing population, the declining health of ecosystems, and climate change, there is growing pressure on water resources. The Pacific Institute report ***Impacts of the California Drought from 2007-2009*** brings to the fore the complex nature of drought impacts to California, and the need to develop robust and resilient strategies to cope with future droughts. The full report, which includes recommendations for improving drought planning and management, an executive summary, and short video, are available free at http://www.pacinst.org/reports/california_drought_impacts/

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