



EBERHARDT SCHOOL OF BUSINESS

BusinessForecasting
Center

Unemployment in the San Joaquin Valley in 2009: Fish or Foreclosure?

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Summary

This report estimates and compares the economic impact of reduced water supply caused by the drought and environmental restrictions to the impact of the construction collapse caused by the foreclosure crisis. We critically examine previous estimates of job losses from the water shortage in the San Joaquin Valley and offer an alternative view. We find that water shortages are costing the San Joaquin Valley approximately 6,000 jobs and \$170 million in employee compensation. We conservatively estimate that the construction collapse has cost the Valley 47,000 jobs and \$1.8 billion in employee compensation. Non-employee income losses such as proprietor's income and corporate profits total \$330 million from water shortages and \$1.4 billion for construction. Reductions in water deliveries due to environmental regulations have increased the Valley unemployment rate by 0.1 percentage point, and the drought 0.2 percentage points for a total water shortage impact of a 0.3 percentage point increase in the unemployment rate. The construction collapse has increased unemployment by at least 2.5 percentage points, and is only one component of the foreclosure and housing crisis that continues to drive the majority of job loss in the San Joaquin Valley. Because of overlap between the construction and agricultural labor pools, the construction collapse has flooded the agricultural labor market with thousands of additional workers and further increased the difficulty of finding farm work this season.

Jeffrey Michael, Director of the Business Forecasting Center is the principal author of this report. Shaun Callahan and Andrew Padovani provided important research assistance. All studies and data referenced in this report are available on the internet. We are grateful for comments from David Zetland, The Pacific Institute, Environmental Defense Fund, and two anonymous reviewers on an early draft. The Business Forecasting Center did not seek or receive any external funding for this report.

Unemployment is currently 15.4% in the San Joaquin Valley, an increase of 5.6 percentage points from its level of 9.8% a year ago. Across the 8 counties of the San Joaquin Valley, unemployment ranges from 17.6% in Merced County to 13.9% in Madera County, and all counties have seen unemployment increase by 5 to 6 percentage points.¹ Rising joblessness is creating enormous economic and social problems. Understanding the relative importance of the forces behind current unemployment is important to economic development efforts and public policy issues. There have been a number of adverse economic shocks to the Valley in the past two years, including the foreclosure crisis, reduced water supply resulting from drought and environmental restrictions, the financial crisis and recession across the country and globe.

Agriculture is the largest industry in the Valley, and many people have attributed rising unemployment in the Valley to water shortages in the agriculture industry that have led to fallowed fields and lost agricultural revenue. Most media stories report between 30,000 and 90,000 lost jobs due to water shortages. If the job impacts were actually that large, water shortages would indeed be driving unemployment, and the current unemployment rate would be near 20%. However, there is ample evidence that the drought impacts on employment are grossly overstated. This report explains why the actual job impacts are lower and offers alternative estimates.

In addition to the drought, the San Joaquin Valley was hit early and hard by the foreclosure and housing crisis that triggered the current recession. The San Joaquin Valley has the highest foreclosure rates in the nation, as well as the largest decline in residential real estate values. Since 2007, San Joaquin Valley areas have continuously been at the top of national foreclosure rankings. The most recent report from RealtyTrac.com ranks U.S. metro areas by foreclosures, and finds the San Joaquin Valley holds 4 of the top 7 rankings in the U.S., and all Valley metro areas rank in the top 17 of the over 200 areas examined.² Homebuilding has declined by more than 80%, and the value of private building permits has declined by more than \$4.5 billion per year. Households have lost several billion dollars in home equity wealth leading to significant declines in consumer spending and plummeting tax revenues from sales and property taxes and development impact fees.

This report takes a critical look at water-related employment claims and offers alternative estimates. It discusses the link between construction and farm jobs in the regional labor market, and estimates employment impacts. We estimate that water shortages are costing the San Joaquin Valley approximately 6,000 jobs in 2009 and have increased unemployment by approximately 0.3 percentage points. In contrast, we estimate the decline in private construction activity alone has eliminated 47,000 jobs and boosted unemployment by at least 2.5 percentage points.

Farm and Construction Employment Patterns

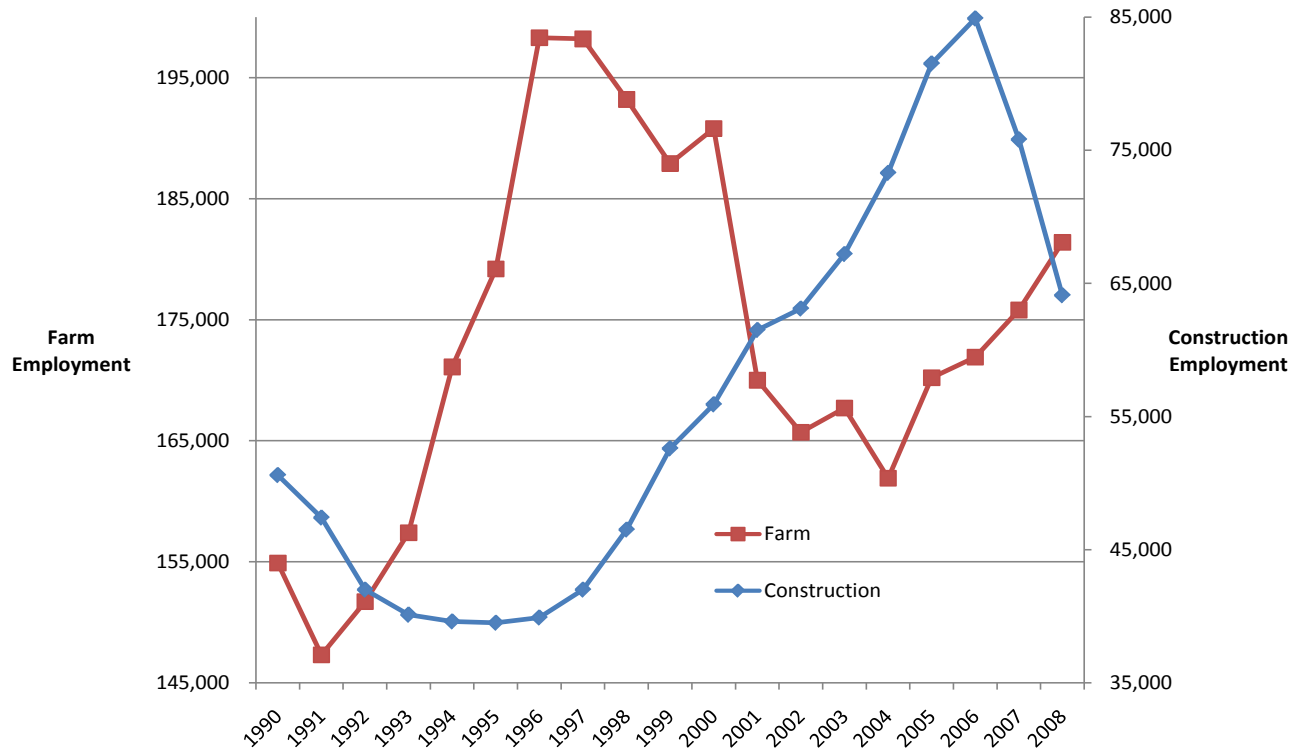
The prospective labor pools of many industries overlap. Farm workers are potential employees in the construction and service sector. Since farm work is seasonal, low-paying and physically demanding, many farm workers prefer employment in other sectors, and will frequently move from farming to construction and service jobs when possible. As employment opportunities in other sectors decrease,

¹ California Employment Development Department (EDD).
<<http://www.labormarketinfo.edd.ca.gov/?PAGEID=166>>

² <http://www.realtytrac.com/ContentManagement/PressRelease.aspx?channelid=9&ItemID=6965>

many of the newly unemployed will move back into the seasonal farm labor market. The large overlap and link between construction and farm jobs is particularly important to understanding the current unemployment situation in the San Joaquin Valley. Figure 1 charts farm and construction employment in the San Joaquin Valley since 1990³. Both declined during the drought and recession of 1991, but in general there is a strong inverse relationship between the two sectors, particularly in the last decade. Farm employment is up significantly since the drought began in 2006, and has even increased slightly during the first half of 2009 compared to 2008, despite severe water shortages in some areas.

Figure 1. San Joaquin Valley Farm and Construction Employment.



Source: California EDD

Over the past ten to fifteen years, the San Joaquin Valley economy has changed significantly. The most recent wet year in which farms received their full allocation of irrigation water was 2006, and it can be compared to the mid and late 1990s, another period of full water allocation. Table 1 uses Fresno County data to illustrate the shift in key economic indicators between 1996 and 2006.^{4, 5} Over this decade, the unemployment rate dropped substantially while employment in the County’s dominant agriculture industry declined by 25% (15,500). Nearly 56,000 new, non-farm jobs were created in this decade including 11,000 in construction and over 42,000 in services. Farm output increased while employment declined as a number of factors have reduced the labor intensity of agriculture. In addition to the growth of construction employment and other sectors competing for workers, farm labor supply was affected by changes to immigration enforcement in 2001. The demand for labor by farms was also

³ California EDD. <<http://www.labormarketinfo.edd.ca.gov/?PAGEID=166>>

⁴ California EDD. <<http://www.labormarketinfo.edd.ca.gov/?PAGEID=166>>

⁵ U.S. Census Bureau.

affected by a series of minimum wage increases beginning in 1996 that increased labor costs, greater mechanization, and crop shifting. Between 1996 and 2006, milk production increased by 72% and almond acreage increased by 127% to nearly 100,000 acres.

Table 1. Comparing Fresno County Economic Indicators in Wet Years.

	1996	2006
Unemployment Rate	13.4%	8.0%
Labor Force	370,500	414,600
Farm Employment	62,000	46,500
Non-Farm Employment	246,800	302,600
Share of Farm Employment	20.1%	13.6%
Housing Starts	3502	5336

Source: California Employment Development Department and U.S. Census Bureau

The California EDD's payroll data for the first half of 2009 is displayed in Table 2. The current data shows no evidence of a drought effect, and illustrate why reports of drought job losses between 30,000 and 90,000 are implausible. For each of the first six months of 2009, San Joaquin Valley farm jobs have increased over the previous year. In fact, when the data is disaggregated by County, San Joaquin County is the only area that shows a consistent drop in farm employment in 2009. This is surprising because San Joaquin County is the only part of the Valley that is upstream from the Delta water pumps, including a large amount of farmland in the Delta itself. As of June 2009, the data shows farm jobs in the seven counties south of the Delta water pumps is 3,200 higher than in June 2008. Over the same 12 month period, private non-farm employment in the same areas declined by 30,200. Compared to the beginning of the recession two years ago, farm jobs are up by 12,500, while private non-farm jobs have declined by 40,400. Of course, this doesn't mean that the drought has had no impact, as some farming areas on the west side of the Valley have suffered significant drought losses.

UC Davis Reports of Water Shortage Impacts

Media reports and public discussion have focused on estimated job losses from two recent reports from UC Davis led by Professor Richard Howitt. The initial report was published in January 2009 and estimated 2009 revenue losses from \$1.2 to \$1.6 billion, and job losses of 60,000 to 80,000.⁶ They released an update of the analysis in May 2009 that took into account spring rains and better groundwater

⁶ Howitt, Richard E., Duncan MacEwan, and Josué Medellín-Azuara. "[Economic Impacts of Reductions in Delta Exports on Central Valley Agriculture.](http://www.agecon.ucdavis.edu/extension/update/articles/v12n3_1.pdf)" http://www.agecon.ucdavis.edu/extension/update/articles/v12n3_1.pdf

information to refine the estimates. The May update estimated 2009 revenue losses between \$627 million and \$710 million and employment losses of 31,000 to 35,000.⁷

Table 2. San Joaquin Valley Employment Change as of June 2009

	Change from June 2008	Change from June 2007	Change from June 2006
<i>San Joaquin Valley</i>			
Farm Jobs	900	14,500	16,400
Private Non-Farm Jobs	-37,200	-53,000	-43,800
<i>Seven South of Delta Counties</i>			
Farm Jobs	3,200	12,500	15,500
Private Non-Farm Jobs	-30,200	-40,400	-33,700
<i>San Joaquin County</i>			
Farm Jobs	-2,300	2,000	900
Private Non-Farm Jobs	-7,000	-12,600	-10,100

Source: California EDD

The estimates in these studies are made in two steps. First, the Statewide Agricultural Production Model (SWAP) is used to link water deliveries to crop production and farm revenue assuming 2008 prices and costs. We feel this step of the analysis is very credible, and reflects years of excellent research on production agriculture and water use at UC Davis. It is the second step of the analysis that is problematic.

The second step of the analysis inputs the estimated change in revenue from the first step of the study into an economic simulation model that translates revenue changes into job and income losses across the San Joaquin Valley. This second stage of their analysis has two serious flaws that result in large overestimates of job losses. First, the multiplier effects are far larger than other published studies of California agriculture, and the estimated ratio of agricultural revenue to jobs is inconsistent with current

⁷ Richard E. Howitt, Duncan MacEwan, Josué Medellín-Azuara, Steve Hatchett "Economic Impacts of Reductions in Delta Exports on Central Valley Agriculture Update Summary" Available on-line at http://www.kysq.org/docs/DWR_Update_052209.pdf

data. In response to an inquiry for technical information about the modeling for jobs and income estimates, Professor Howitt replied that the modeling was done by staff at the State Water Resources Control Board (SWRCB) and referred detailed questions to the SWRCB. Dr. Howitt agreed that their multipliers were large, and stated that he was in the process of switching to the IMPLAN model used in this report. Second, the UC Davis study does not describe nor consider the effect of local labor market conditions. Impact studies overestimate job effects when labor markets are not in equilibrium, and widespread agricultural labor shortages have been reported in recent years.

Agricultural Revenue and Jobs

The ratio of revenue to employment in the recent UC Davis studies is implausibly high, two to three times higher than reported in other recent economic impact studies for agriculture from UC Berkeley, the University of the Pacific, and earlier studies by other agricultural economists at UC Davis. The UC Davis estimates of water shortage impacts estimate nearly 50 jobs per \$1 million change in agricultural revenue, including multiplier effects.

How do these multiplier effects compare to other studies? The UC Davis Agricultural Issues Center, led by Professor Dan Sumner, published agriculture employment multipliers in *Agriculture's Role in the Economy*, chapter 5 of the Measure of California Agriculture. Using 2002 dollars, Sumner estimates 23.8 jobs per \$1 million of agricultural revenue, a ratio that would be lower using more recent crop prices. Berkeley Economic Consulting, led by UC Berkeley Professor David Sunding, recently estimated the impacts of Delta Smelt pumping restrictions for a group of Delta water exporters.⁸ Using 2007 crop prices, Sunding et. al. estimate Delta Smelt pumping restrictions will result in \$61.35 million in reduced agricultural revenue and a total of 720 lost jobs, or 11.7 jobs per \$1 million in lost agricultural revenue. The University of the Pacific Business Forecasting Center (BFC) estimated the economic impact of San Joaquin County agriculture in 2008.⁹ Considering multiplier impacts and upstream impacts on food processing and wineries linked to the local agriculture sector, Pacific's BFC found a total impact of 16.4 jobs per \$1 million in agricultural revenue.

Finally, we look at a recent non-California example, the 2006 Georgia drought as assessed by the Center for Agribusiness and Economic Development at the University of Georgia. The mix of crops lost in the Georgia drought is led by cotton, pecans, peanuts, hay, corn, and a variety of vegetables including tomatoes and melons. It is more comparable to the San Joaquin Valley than most other farming areas in the U.S. The 2006 Georgia drought was estimated to reduce agricultural revenue by \$819 million and total job losses were estimated between 9,000 and 17,450, or 11 to 21 jobs per \$1 million in lost agricultural revenues.¹⁰

⁸ Economic Impacts of the Wanger Interim Order for Delta Smelt. <http://www.sustainabledelta.com/pdf/BEC.FinalReport.8Dec08.pdf>

⁹ Economic Impact of San Joaquin County Agriculture. <http://forecast.pacific.edu/regional-analyst/regional-analyst-newsletter-Sept08-web.pdf>

¹⁰ <http://www.caed.uga.edu/publications/2006/pdf/CR-06-06.pdf>

Table 3. Estimated total job impacts per \$1 million in agricultural revenue, selected studies. Job estimates include direct, indirect and induced (i.e. multiplier) effects.

Study	Jobs per \$1 million in agricultural revenue	Study Area	Base Year for prices and revenue*
Howitt et. al. (UC Davis 2009 Drought)	49.7	San Joaquin Valley	2008
<i>Other related studies</i>			
Sumner et. al. (Berkeley Economic Consulting)	11.7	San Joaquin Valley	2007
Sunding et. al. (UC Davis Ag. Issues Center)	23.8	San Joaquin Valley	2002
Michael et. al. (University of the Pacific)	16.4	San Joaquin County	2007
Georgia Drought (University of Georgia)	11-21	Georgia	2006

* Year refers to the base year for the analysis which impacts crop prices and revenue. More recent years will typically show slightly smaller job effects per \$1 million in revenue as prices rise over time.

Agricultural Labor Shortage Effects

For most of this decade, California’s agricultural industry has reported its biggest challenge is a shortage of labor, not water. Many media reports chronicled the labor shortage which was generally attributed to workers leaving farm work for better paying jobs such as construction and tougher enforcement of immigration laws. An October 2005 article in Time Magazine was typical:

This season, raisin farmers are short by 40,000 workers and stand to lose as much as 60% of their annual \$500 million production...It’s a “pending disaster” says Tom Nassif, president and CEO of Western Growers...Already, he says, the San Joaquin Valley is missing about 70,000 of the workers it needs...An estimated 40% of the region’s illegal agricultural workers have already migrated to the construction industry. The growers insist that their margins on produce are too small to offer higher wages.¹¹

More recent accounts from non-press sources indicate that the shortage has continued to be critical until very recently when the recession hit. For example, Jim Rietkirk, Vice Chair of the California Farm Bureau Labor Committee testified at the May 2007 meeting of the state Board of Food and Agriculture that, “There is an estimated 30% shortage on labor supply this season.”¹² Senator Diane Feinstein’s webpage reports,

In 2006, growers in California reported their harvesting crews were down by as much as 20 percent. The costs are in the stratosphere. If the labor shortage continues, it means \$3

¹¹ Laura Locke. “Slim Pickings in California.” Time Magazine, October 4, 2005.

¹² California State Board of Food and Agriculture. Meeting Minutes for May 23, 2007. <http://www.cdfa.ca.gov/State_Board/pdfs/SteBrdMtgMinMay07.pdf>

billion a year in the short-term and as much as \$4.1 billion a year in the long-term. Just in California.¹³

In May 2009, Senator Feinstein issued a news release that led with the following quote,

Today across the United States, there are not enough agricultural workers to pick, prune, pack or harvest our country's crops. With an inadequate supply of workers, farmers from Maine to California, and from Washington State to Georgia, have watched their produce rot and their farms lay fallow over the years.¹⁴

The substantial decrease in farm employment in the San Joaquin Valley since the late 1990s may be viewed as impartial evidence of the farm labor shortage, although there are certainly other contributing factors.

Some reports question the severity of the agricultural worker shortage. Philip Martin, a professor of Agricultural Economics at UC Davis, authored a November 2007 study titled *Farm Labor Shortages: How Real? What Response?*, Martin argues that a serious shortage would cause significant increases in farm worker wages and fruit and vegetable prices, and notes that there is little evidence of either effect.¹⁵ A 2006 report by the Congressional Research Service titled "Farm Labor Shortages and Immigration Policy" reaches a similar conclusion, noting that underemployment among farm workers remains substantial.

It is difficult to know exactly how large the reported agricultural labor shortage has been in the San Joaquin Valley. However, it is clear that most agricultural employers in the Valley have had to manage with fewer employees than they would like in recent years, and this has likely had some negative impact on production. This is important to understanding the impact of the current drought on farm employment. If there is a 30% labor shortage as the Farm Bureau estimates, a less than 10% reduction in irrigated acres will decrease the labor shortage and have little effect on unemployment. Workers will certainly be laid off from farms with fallowed acreage, but other farmers should be eager to hire the displaced workers, alleviate their labor shortages and bolster their harvests. In reality, labor market frictions such as geography and job search will prevent a completely smooth transition, and some unemployment will still result.

Figures 2 and 3 illustrate a labor shortage with basic supply and demand analysis. Wages are held constant in these figures for clarity, an assumption that does not affect the main result. This simple framework helps explain the recent paradox that has seen farm jobs increase even as a drought reduces acres planted. In a shortage, the number of jobs is completely determined by labor supply and shifts to labor demand by farmers will only reduce the amount of the shortage, not the total number of jobs. Figure 2 is a simplified representation of the Valley farm labor market in 2007 and 2008. Although the

¹³ Senator Dianne Feinstein. "Passing AgJOBS." <http://feinstein.senate.gov/public/index.cfm?FuseAction=IssueStatements.View&Issue_id=5b8ec07d-7e9c-9af9-7db0-a78f6ef6c78e>

¹⁴ Senator Dianne Feinstein. "Senator Feinstein Introduces Legislation to Relieve Labor Crisis in Agriculture." <http://feinstein.senate.gov/public/index.cfm?FuseAction=NewsRoom.PressReleases&ContentRecord_id=405eb8ec-5056-8059-76cd-3299775ec5d0&Region_id=&Issue_id=5b8ec07d-7e9c-9af9-7db0-a78f6ef6c78e>

¹⁵ Philip Martin. "Farm Labor Shortages: How Real? What Response?" Center for Immigration Studies, November 2007.

early effects of water shortages decrease labor demand in 2008, total farm jobs increase from point A to point B because a decrease in construction increases farm labor supply, reducing the shortage. In Figure 2, the number of farm jobs is the same whether or not the drought occurs.

Figure 2. Small Drought Does Not Impact Farm Jobs in Labor Shortage.

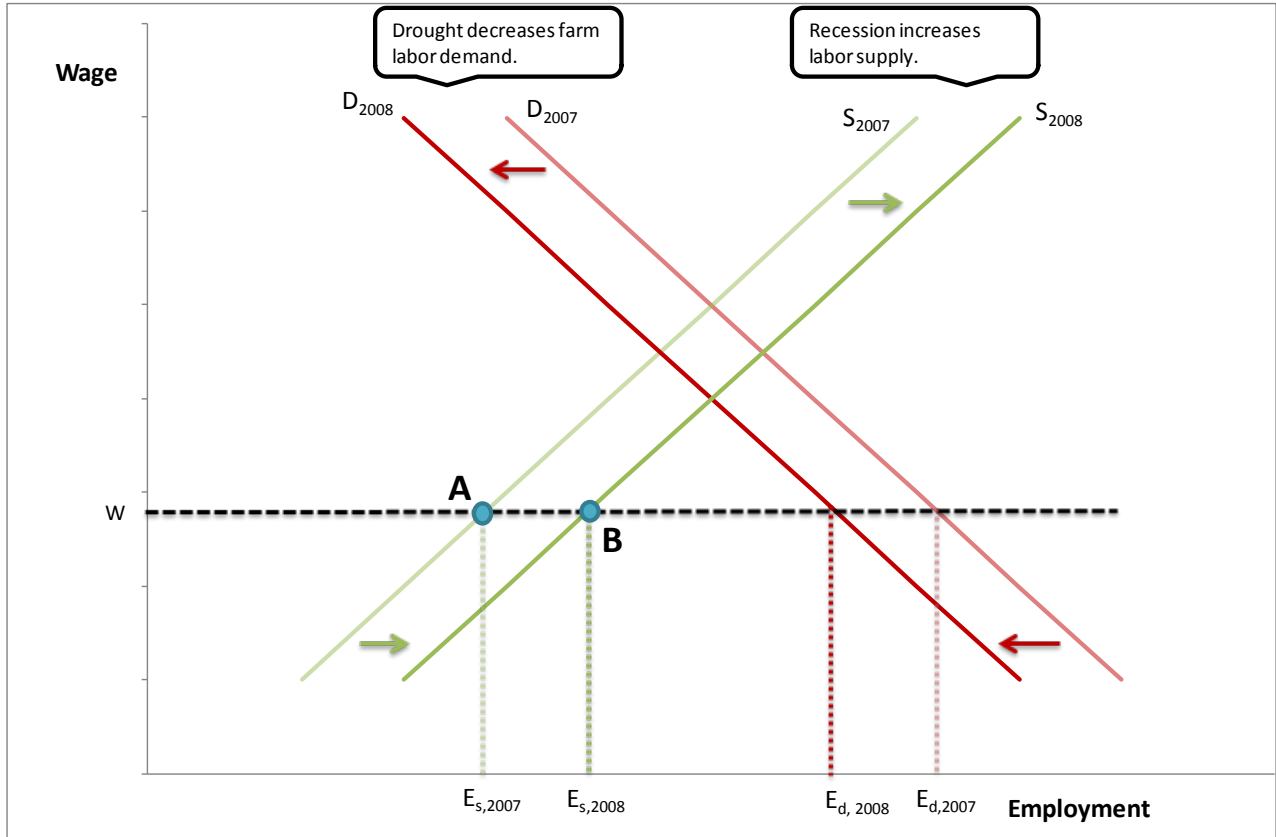


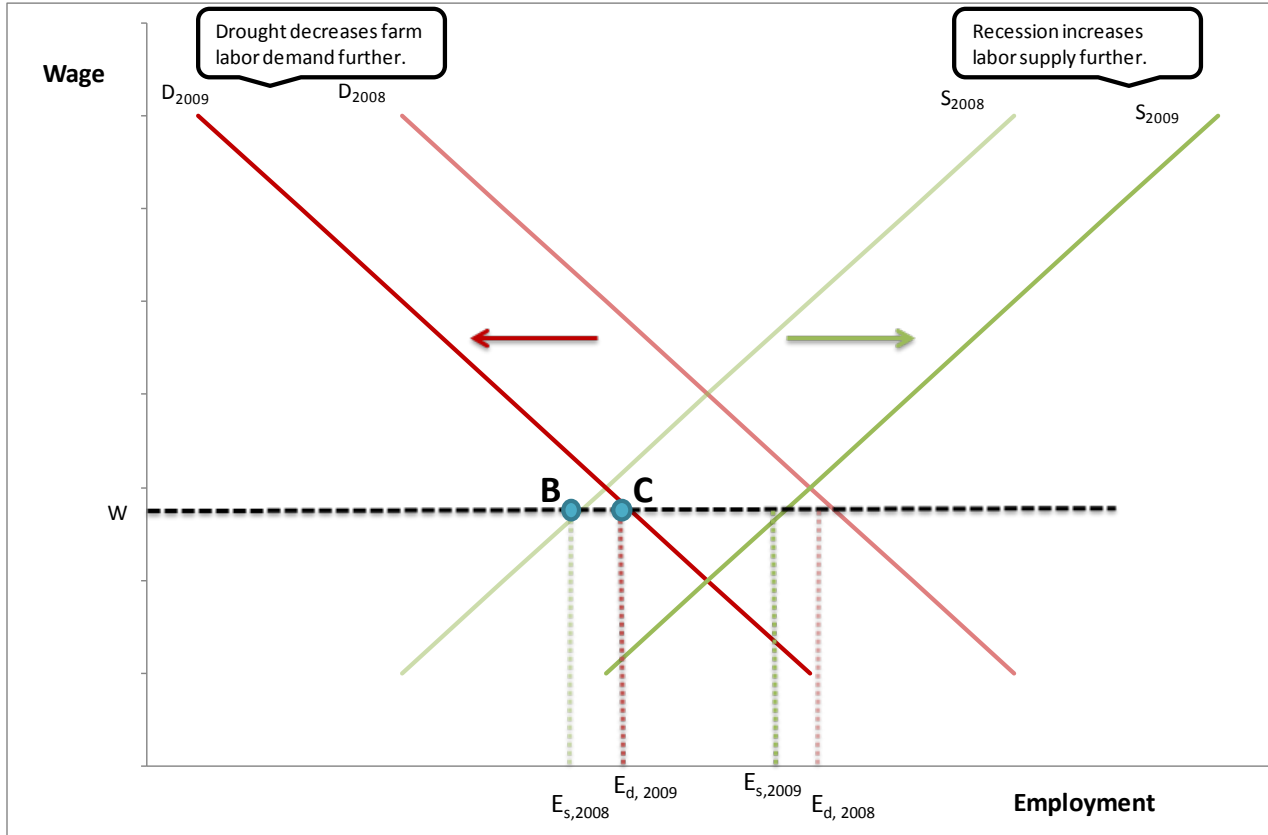
Figure 3 illustrates a smaller shortage and larger drought impact, broadly similar to the change between 2008 and 2009. Total jobs may still increase (illustrated in the move from point B to point C) even when shifts to supply and demand can be large enough to shift the market from a labor shortage to a labor surplus (i.e. unemployment). In Figure 3, the impact of the drought on farm jobs is the difference between where employment would be without the drought ($E_{s,2009}$) and actual employment ($E_{d,2009}$). Economic impact studies, like those discussed in the previous section, focus on the effect of labor demand and will overestimate employment effects when labor markets have shortages.

Changes to labor demand can lead to shifts in the location of jobs across different employers and space, and these displacements do create localized unemployment and commuting costs even when total employment grows. Current payroll data in the San Joaquin Valley shows some evidence of a west to east shift in farm jobs.¹⁶ Kings County, the only county totally located on the drought impacted west side of the Valley, has lost 300 farm jobs this year and farm jobs are down 1,600 since the drought began 3

¹⁶ California EDD. <<http://www.labormarketinfo.edd.ca.gov/?PAGEID=166>>

years ago. It's less drought impacted neighbor to the west, Tulare County, has gained 2,100 farm jobs over the past 12 months and has 9,500 more farm jobs than three years ago.

Figure 3. Labor Shortage Reduces the Impact of Large Drought on Farm Jobs



Economic Impact of Drought and Environmental Restrictions on Agriculture

In this section, we estimate the number of jobs lost in the San Joaquin Valley due to the drought and environmental restrictions on Delta water pumping. We utilize several approaches, based on both acreage and revenue losses, to estimate the direct and indirect employment effects using standard multipliers from IMPLAN - the most widely utilized model for economic impact analysis. The analysis accounts for indirect and induced effects such as employment in transportation, warehousing, box manufacturing, and employee spending in the service sector. In addition, we make further adjustments to consider upstream losses in the food processing sector such as canneries. Finally, we consider the impact of recent farm labor shortages in our interpretation of the results.

First, we distributed the \$627 million to \$710 million in revenue losses from the UC Davis study across agricultural sectors in the IMPLAN model, with the input-output relationships constructed using the latest 2007 data available from the U.S. Bureau of Economic Analysis. The distribution of revenue losses across crops was based on a combination of estimates from County Agricultural Commissioner reports reported by the Farm Bureau and the distribution used in the Berkeley Economic Consulting study

on Delta Smelt pumping restrictions.¹⁷ The distribution of revenue losses was 40% to vegetables and melons, 30% to cotton, and 10% each to grains, nuts, and other crops. Varying these proportions did not have large impacts on estimated losses. To account for upstream job losses, we added an additional direct impact of 1,100 lost food processing jobs, primarily in canneries.

The result is between 5,608 and 6,350 lost agricultural jobs on farms and with agricultural support services such as farm labor contractors. Total estimated employment impact across all economic sectors in the San Joaquin Valley range from 10,878 to 12,319. Including all multiplier effects, the IMPLAN model estimates a total loss of \$732 million in income, including \$339 million in employee compensation, \$65.4 million in proprietor's income, and a \$328 million decline in other property income such as corporate profits. The IMPLAN model estimates of income loss do not include the cost of additional groundwater pumping which is estimated by UC Davis to cut an additional \$130 million from farm income.

As an alternative method and check on our model results, we can utilize the most recent data on revenue/employment ratios and apply multipliers published by UC Davis rather than our own. In 2008, Fresno County had farm revenue of \$5.66 billion and 49,100 agricultural jobs. That is a direct impact of 8.67 agricultural jobs per \$1 million in revenue. Combining Fresno, Kings and Kern counties, the 3 areas most impacted by the drought, gives a direct 2008 impact of 9.18 agricultural jobs per \$1 million in revenue and we use this slightly larger estimate. Applying the 1.64 agricultural employment multiplier reported by the UC Davis Agricultural Issues Center (Sumner et. al.), yields a total impact of 15.05 jobs per \$1 million in agricultural revenue. If we make a generous allowance for 1 "upstream" processing job for every 5 farm jobs, the total employment impact is boosted further to 18.06 jobs per \$1 million in farm revenue. Utilizing UC Davis projections of \$627 million to \$710 million in lost farm revenue due to 2009 water shortages, we estimate between 5,755 and 6,518 lost agricultural jobs and between 11,324 and 12,823 total lost jobs including multiplier effects.

As an additional approach and check, we estimate job losses utilizing reports of fallowed acres. Estimates of the increase in fallowed acres from the drought range from 200,000 acres in a Department of Water Resources posted on the Environmental Defense Fund website, to 300,000 acres in the recent UC Davis estimates to around 450,000 acres in reports by the California Farm Bureau.¹⁸ We utilize the 300,000 acre estimate as a reasonable midpoint. Across the San Joaquin Valley in 2007, there was an average of 46 acres in production per agricultural worker. In a May 2009 declaration for a Delta Smelt case heard by the Federal Court in Fresno, Westlands Water District officials used 60 acres per worker as a rule-of-thumb to estimate job losses within the hard hit Westlands area. Using a range of 46 to 60 acres per worker and an estimated 300,000 fallowed acres, yields a direct loss of 5,000 to 6,522 agricultural jobs. Accounting for upstream processing jobs and downstream multipliers results in a total estimated decline of between 9,840 and 12,835 jobs.

All three approaches yield very similar estimates of employment losses. The average total job loss across scenarios is 11,700 across the San Joaquin Valley, about one-third the level of employment

¹⁷California Farm Bureau. Damage totals mount from lack of farm water.
<http://www.cfbf.com/agalert/AgAlertStory.cfm?ID=1343&ck=674BFC5F6B72706FB769F5E93667BD23>

¹⁸ Lester Snow. Letter from Director of the Department of Water Resources.
<<http://blogs.edf.org/waterfront/files/2009/06/sjv-water-supplies-5-13-09.pdf>>

loss reported in the most recent UC Davis report. However, this estimate of 11,700 jobs makes no adjustment to account for labor market shortages common before the drought, so they should be viewed as an upper bound on potential employment effects. As discussed earlier, a large labor shortage could mean that a drought that reduces the amount of land under cultivation could theoretically have zero impact on total farm employment. Thus, the total impact of current water shortages on employment ranges between 0 and 11,700 jobs.

The fact that current payroll data for the Valley consistently shows farm employment gains suggests that the drought impact may be closer to 0 than 11,700. To be conservative, our final estimate of total job losses from the current water shortage is 6,000, slightly above the midpoint between the lower and upper bounds. Estimated income loss (except pumping costs) would be adjusted in a similar manner, placing total losses at \$500 million which are highly concentrated geographically on west side farms.

Economic Impact of the Construction Collapse

In a typical year, the San Joaquin Valley requires nearly 25,000 new housing units to keep pace with new household formation in a region approaching 4 million in population. Data from the Construction Industry Research Board (CIRB) shows that the home building boom peaked from 2003 to 2005, when the San Joaquin Valley was producing over 30,000 new units per year. In 2006, home building fell by 25% from the peak, to a level of 26,000 units. Production fell below 20,000 housing units in 2007, and dropped below 10,000 units in 2008 for the first time since CIRB records began in 1980. Through the first 6 months of 2009, residential building is on pace for another record low of 6,500 units, an over 80% decline from peak levels. In the past year of deep recession, the construction collapse has spread to the non-residential sector which has declined by nearly 50%.¹⁹

In determining the economic impact of decreased construction, we have to determine the appropriate base year from which to measure the decline. To be conservative, our estimates measure the decline from 2006 levels rather than the peak years of 2003-05. The pace of homebuilding in 2006 was near a long-run sustainable level, and non-residential building was not abnormally high. In 2006, the CIRB reports the value of all private building in the San Joaquin Valley at \$6.6 billion. In 2009, private building is on pace for a total of \$2.1 billion. We used the IMPLAN model to calculate the impact of the \$4.5 billion decrease in construction activity, allocating \$3.6 billion of the decline to residential construction and \$900 million to non-residential construction.

The model shows a direct employment decrease of 23,908 construction jobs. California EDD data show an actual loss of 32,300 construction jobs in the San Joaquin Valley since June 2006, which supports the argument that our estimates of construction related job losses are very conservative. Including indirect and induced effects, total job losses from the collapse in Valley construction is estimated to be 46,787.²⁰ Total income is \$3.2 billion lower, including a \$1.8 billion loss in employee compensation, \$610 million in proprietor's income, and an \$829 million decrease in other income such as corporate profits.

¹⁹ California Construction Review. Construction Industry Research Board. <http://www.cirbdata.com/>

²⁰ If we had used employment losses as a starting point for the impact analysis, the total impact would be 63,200 lost jobs. The higher numbers using this approach could reflect a decrease in public sector construction that we do not include, or construction layoffs that lag behind the home building peak. Our primary estimates are driven by revenue changes to be consistent with our calculations for the farm sector.

It should be noted that these construction impacts are only part of the effect of the real estate meltdown. The over 50% decline in real estate values across the San Joaquin Valley has greatly reduced household wealth and consumer spending. According to U.S. Census data, the total value of owner-occupied residential real estate was near \$50 billion in 2007, and large increases in real estate prices were fueling consumer spending.²¹ Since 2007, at least \$25 billion in San Joaquin Valley household wealth has evaporated. Most economists estimate consumer spending declines 5 cents for each \$1 dollar change in home equity wealth, so it is reasonable to assume declining home values have decreased consumption of San Joaquin Valley households by about \$1 billion. We estimate this has cost another 5,000 to 10,000 jobs across the Valley. Finally, the decline in property values has devastated government revenues through declining property taxes, sales taxes, and development impact fees. Employment losses from state and local government cuts are only now beginning to be felt.

Summary and Conclusion

The rise in unemployment is creating great economic hardship in the San Joaquin Valley, particularly among lower income households in the Central Valley. A disproportionate share of the impact has been felt by Latino households who make up large shares of employees in the construction and farm sectors. We estimate that water shortages from the drought and Delta environmental needs have led to the loss of 6,000 jobs and \$170 million in employee compensation across the San Joaquin Valley. The collapse in construction has cost 47,000 jobs and \$1.8 billion in employee compensation.

Table 4. Summary of the Estimated Total Economic Impact of Water Shortages and the Construction Collapse on the San Joaquin Valley in 2009.

	Lost Jobs	Employee Compensation	Proprietors Income, Corporate Profits, and other Property Income.
Water Shortage	6,000	\$170 million	\$330 million
Construction Collapse	47,000	\$1.77 billion	\$1.40 billion

Most experts agree that no more than one-third of the current reduction in water deliveries from the Delta can be attributed to actions to protect the Delta Smelt. The drought has a much larger impact. Thus, no more than 2,000 lost jobs can be attributed to the protection of endangered species in the Delta. The Berkeley Economic Consulting study puts the loss well below 1,000. Compared to the San Joaquin Valley's labor force of 1.84 million, environmental restrictions have increased the San Joaquin Valley unemployment rate by no more than 0.1 percentage point, and total water related losses have increased unemployment by 0.3 percentage points. The evidence is clear that water shortages are not the primary driver of unemployment. Most media reports are citing exaggerated water shortage job losses that are 5 to 15 times the actual impact.

²¹ Author calculation from county level Census Bureau data.

The much larger force behind San Joaquin Valley unemployment is the construction collapse driven by the on-going foreclosure crisis. Construction job losses are 8 times larger than those created by water shortages, and employee compensation losses are over 10 times bigger. Our conservative estimate of 47,000 lost jobs translates into a 2.5 percentage point increase in the unemployment rate, nearly half the 5 to 6 point increase experienced across the region. Because construction is the largest sector for self-employment, the impact of the construction collapse on the unemployment rate is larger than the 2.5 percentage point boost attributed to construction payrolls. Many sole proprietorships and small businesses in construction and housing related fields have failed. In addition, the total effects of the housing and foreclosure crisis go well beyond construction including decreased consumer spending from an estimated \$25 billion decline in home equity wealth across the San Joaquin Valley.

Appendix: Unemployment on the West Side of Fresno County

Most media attention of the drought impact has centered on the small, farming communities on the west side of Fresno County. Mendota's estimated 38.5% unemployment rate has been the rallying point for more water deliveries, and most reports have focused on the economic problems in Mendota and the neighboring communities of Firebaugh and San Joaquin. These communities are in the heart of the Westlands Water District, where irrigation water has been most constrained. The economic suffering in these communities is very real, and the worst drought impacts are indeed concentrated here. Given historical trends and the series of economic shocks endured by the residents of these small towns, we believe local unemployment could exceed 40%. However, it is important to understand the data, long-term trends and other events before concluding that more irrigation water will solve a long-developing economic crisis in the area.

First, it is important to understand the unemployment estimates. The current unemployment rates reported in these communities are not from a current survey, and are very unreliable. The only real unemployment surveys in these small towns occur at the decennial Census. In between Census dates, unemployment estimates are made with county level surveys with samples far too small to provide meaningful information for individual cities and towns. To construct city level unemployment rates, the California EDD shares the current county level totals to cities in fixed proportion to the 2000 Census data.²² In other words, the California EDD calculation assumes that Mendota is always home to 0.75% of Fresno County's employed residents and 2.63% of its unemployed residents because these were the proportions found in 2000. Thus, the wild swings in Mendota's reported unemployment rates reflect the shocking 31.77% unemployment rate found in the 2000 Census, a time of high water supplies, and do not contain any current, local information.

Since the only valid local unemployment data comes at 10 year intervals, it is illuminating to look at long-run trends in the Census data. Table 5 reports the unemployment rate for these west side communities since 1960, the earliest year of consistent data. To maintain consistency across the decades, the table reports unemployment rates for Census tracts which include the farming areas surrounding each of these towns. The Census tract unemployment rates are slightly different than the more commonly reported statistics for the towns. For example, the 2000 Census reported 31.77% unemployment in the city of Mendota, and 29.88% unemployment in the Mendota Census tract.

²² <http://www.calmis.ca.gov/file/1fmonth/allsubs.xls>

Table 5. Historical Unemployment Rates on the West Side of Fresno County.

	1960	1970	1980	1990	2000
San Joaquin - Tranquility	5.58%	5.82%	9.13%	19.05%	23.89%
Mendota	9.99%	10.67%	21.00%	20.12%	29.88%
Firebaugh	2.29%	9.76%	12.79%	15.22%	21.84%

Source: U.S. Census Bureau data available from the National Historic Geographic Information System, www.nhgis.org

The first Central Valley Project (CVP) water was delivered to the area in 1968 and starts the intensification and transformation of the local agriculture industry. In 1982, the Reclamation Reform Act eliminated the residency requirement and increased the acreage limits for farms receiving subsidized CVP water deliveries. Irrigation water has clearly increased agricultural production, farm income, farmland values, and the demand for farm labor in the area. It is very debatable whether increased irrigation water improved the overall prosperity of the communities or its residents. In 1960, these communities had single digit unemployment rates comparable to the rest of the United States and California. In 2000, they were among the poorest places in America. Mendota’s 32% unemployment rate in 2000 was the highest of all 474 towns in California. Per capita income was below \$7,000, 70% below the U.S. average and significantly less than many developing countries.

A few years ago, the local economy began to pick up and reverse its 30 year slide. Construction was beginning on a new federal prison that will eventually bring hundreds of high-paying jobs. Building activity was soaring. In 2005, Mendota alone recorded permits for over 200 new housing units, 10 times the typical level.²³ The supply of irrigation water to local farms was high, and land fallowing was low.

Then, beginning in 2006, a series of shocks hit many of the higher-paying jobs in the area. This was followed by large reductions in water deliveries to local farms in 2008, and even greater fallowing of fields in 2009. When considering these effects, it is important to realize that the total labor force of the 3 neighboring communities combined is only about 11,000 with fewer than 8,000 typically employed. Thus, a few hundred lost jobs can send unemployment soaring in these small towns. Although this report finds that drought related job losses are relatively small across the Valley, the impacts are disproportionately concentrated in these areas. Water shortages have had a big impact on local jobs, but the west side economy also absorbed the following events shortly before the water impacts hit.²⁴

- A \$250 million federal prison construction project started in 2006 outside Mendota, and was scheduled to open in 2008 after 2 years of construction. The 2nd year of construction funding was diverted to other purposes and the enormous construction project stopped for 2 years just as the recession and drought hit. Funding was recently restored to complete the project and the prison is scheduled to finally open in 2010 (bringing 350 much needed permanent, high-paying jobs).

²³ Census building permit data by place is available at <http://censtats.census.gov/bldg/bldgprmt.shtml>.

²⁴ Information for the first three bullets came from a variety of articles in the Fresno Bee. The last bullet point reports Census building permit data.

- In 2006, two major food processing plants closed in these communities. ConAgra cut 230 year-round jobs in a tomato processing plant. De Francesco and Sons closed an onion and garlic processing plant that employed 187, although this plant was recently purchased and is reopening this year.
- In 2008, the Spreckels sugar refinery in Mendota closed, laying off its 200 employees. The closure was attributed to declining sugar beet acreage as local farmers have shifted to other crops.
- The foreclosure crisis and homebuilding collapse hits. Although less publicized than in suburban areas, this region experienced its own building boom and had high sub-prime exposure and foreclosures. For example, Mendota building permit data shows an average of 107 new housing units were built each year during the peak sub-prime lending peak of 2003 to 2007. This is four times higher than the average of the preceding decade.