

# LOCAL HARVEST

Developing the Central Valley  
Workforce for California's  
Future Agriculture

A photograph of two workers in a vineyard. They are wearing caps and long-sleeved shirts, and are sorting through large white bins filled with harvested blue grapes. The background shows a tractor and more grapevines.

Kevin Klowden and  
Priscilla Hamilton



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# INTRODUCTION

California's Central Valley is legendary for its agricultural prosperity. It is the United States' single most productive agricultural region, a capital of such high-value products as almonds, grapes, and lettuce, as well as peaches, citrus, and tomatoes. It is a major supplier of meat and the nation's largest dairy producer. Because of this remarkable abundance, the region is a major contributor to California's exports. It is also the birthplace of notable innovations in agribusiness and manufacturing.

Despite these clear advantages, the Central Valley has not been able to capitalize on the capacity of its workforce and position itself as a center for value-added functions such as manufacturing and export. The entire agricultural value chain, from farms to agricultural technology suppliers, food processors, and logistics businesses, suffers from underinvestment. Despite the impressive volume of high-value agricultural products generated in the Central Valley, private equity investment outside the Sacramento metropolitan region is largely limited to Kern County's energy sector, as documented in the 2013 Milken Institute publication *Industry Growth and Investment in the Central Valley: The Past 10 Years*. In this study, we identified only one agricultural acquisition during the past decade, which took place between 2005 and 2006.<sup>1</sup>

The ability of the region to attract investment is hampered by the widespread public perception that its workforce is undertrained. These stereotypes are outlined in the *Economist* in a 2010 article<sup>2</sup>: The agricultural workforce is seen as undereducated and largely composed of new immigrants with few useful skills. These concerns over the state of local human capital, and the resulting belief that the region has little of value to offer outside investors, have left the area undercapitalized.

To explore how best to overcome these barriers, address concerns that curtail investment in the Central Valley, and boost the local economy, regional stakeholders were convened at a workshop at the University of California, Merced, in May 2013. This discussion and subsequent phone conversations and follow-up meetings identified the human capital needs of the agricultural sector in the Central Valley as a priority. Contrary to perception, the agricultural value chain has significant need for skilled and semi-skilled workers. A better-trained workforce will improve not only the economic health of the region but also the prosperity of the entire state. Our research and the feedback from key stakeholders in business and education concur: The region's workforce can be improved by mechanisms that link workers to demonstrated employer need. To address these key issues, we convened a working roundtable at Fresno Pacific University in October 2013. The recommendations of this report are adapted directly from the conclusions reached during the roundtable by the stakeholders and Milken Institute.

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1. Kevin Klowden, Priscilla Hamilton, and Perry Wong, "Industry Growth and Investment in the Central Valley: The Past 10 Years," Milken Institute, February 2013, p. 3. <http://www.milkeninstitute.org/publications/publications.taf?function=detail&ID=38801396&cat=resrep> (accessed March 2014).

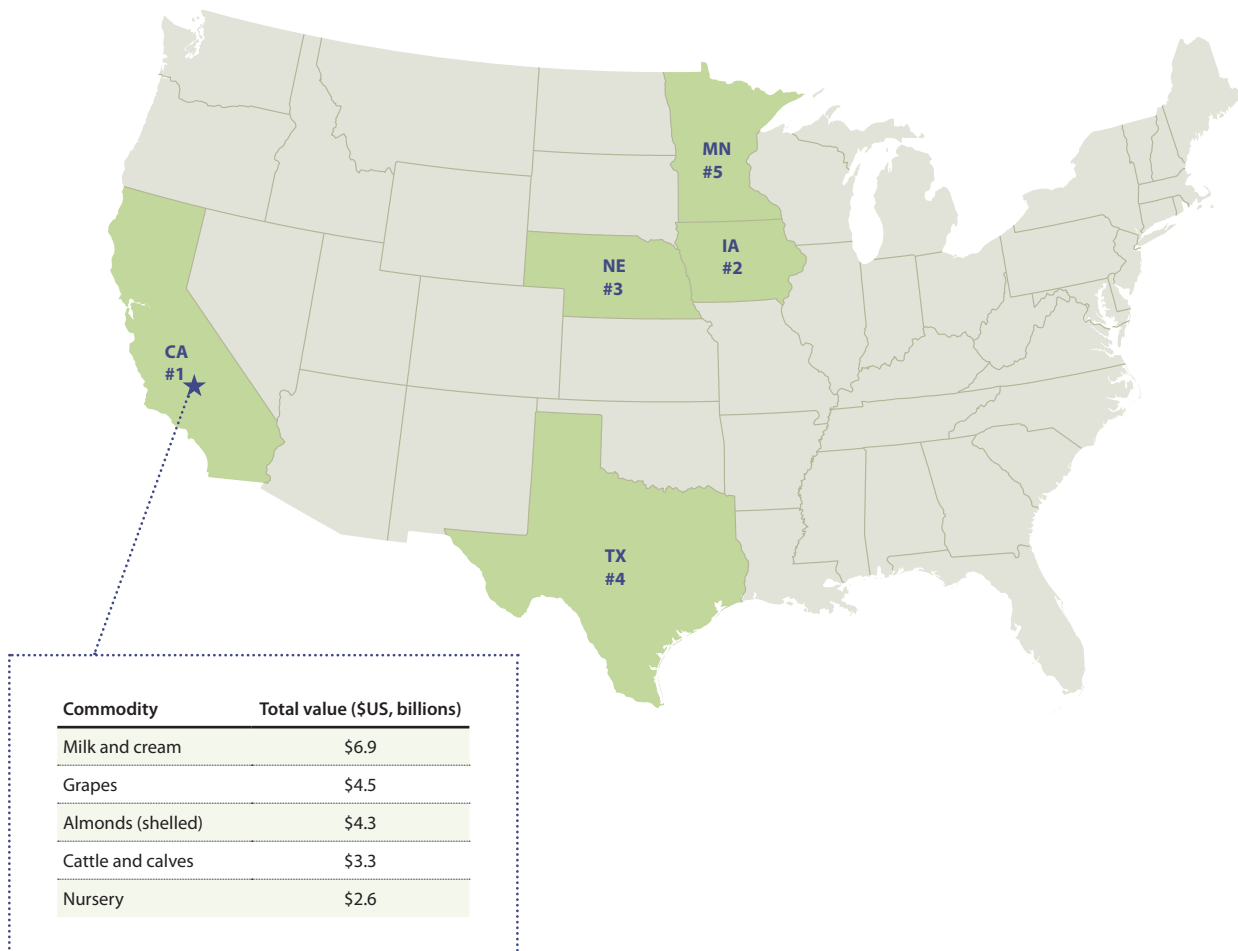
2. "California's Central Valley: The Appalachia of the West," *The Economist*, January 21, 2010, <http://www.economist.com/node/15331478> (accessed March 2014).

# A SECTOR IN TRANSITION

## An Agricultural Powerhouse

The Golden State is home to only 4 percent of farmland in the United States, yet it leads the nation in agricultural output. More than half of all fruits, nuts, and vegetables consumed in the United States are grown in California. In 2012, the state produced more than 350 agricultural crops totaling more than \$40 billion.<sup>3</sup> This output represented a 3 percent increase in cash receipts from the previous year, due to an uptick in dairy production and an increase in demand for grapes and almonds.<sup>4</sup>

Figure 1: California leads the U.S. in agricultural output



Source: California Employment Development Department.

3. California Department of Food and Agriculture, California Agricultural Production Statistics, <http://www.cdfa.ca.gov/statistics> (accessed March 2014).

4. Ibid.

During the past decade, the value of California's agricultural exports has risen steadily. Recent growth is driven in particular by emerging markets in China and India, where rapid urbanization and greater purchasing power are increasing demand for fresh produce, specialty crops, and processed foods.<sup>5</sup> Due to increased worldwide demand, almonds are now the state's third most valuable agricultural commodity and its single biggest export. California now supplies 82 percent of the world's almonds. Seventy percent of the state's crop is shipped overseas,<sup>6</sup> adding up to a \$2.5 billion market.<sup>7</sup> Demand is projected to increase as markets expand in North America and Europe.<sup>8</sup>

**Figure 2: The value of California agricultural exports is increasing**



Sources: California Department of Food and Agriculture; Milken Institute.

Much of this productivity is concentrated in the Central Valley, the fertile bottomland west of the Sierras that stretches from Redding south through Bakersfield. The San Joaquin Valley alone—the 27,000-square-mile region south of Stockton—accounts for 70 percent of the state's agricultural output.

While increasing demand for California-grown foods holds promise for the state's economic future, the picture for particular producers is likely to change considerably. Small family farms are being replaced by larger operations that rely on technology to remain competitive.<sup>9</sup> These sophisticated operations require a skilled workforce—but there are concerns about whether enough of the right kind of workers will be available and ready to seize this opportunity.

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5. Philip Martin and J. Edward Taylor, "Ripe With Change: Evolving Farm Labor Markets in the United States, Mexico, and Central America," Wilson Center and Migration Policy Institute, 2013. <http://www.migrationpolicy.org/pubs/RMSG-Agriculture.pdf> (accessed March 2014); David Pierson, "California Farms Lead the Way in Almond Production," *Los Angeles Times*, Jan. 12, 2014, <http://www.latimes.com/business/la-fi-california-almonds-20140112,0,5408540.story> (accessed March 2014); Anita Regmi, (ed.), "Changing Structure of Global Food Consumption and Trade," Agriculture and Trade Report WRS-01-1, US Department of Agriculture Economic Research Service, Market and Trade Economics Division, [http://www.ers.usda.gov/media/293585/wrs011b\\_1\\_.pdf](http://www.ers.usda.gov/media/293585/wrs011b_1_.pdf)

6. Pierson.

7. Ibid.

8. Ibid.

9. State of California Employment Development Department, "Detailed Guide for Farmers, Ranchers, and Other Agricultural Managers in California," <http://www.labormarketinfo.edd.ca.gov/OccGuides/Detail.aspx?Soccode=119013&Geography=060100000> (accessed March 2014).

## Low-Skill, Low-Wage Labor

In the San Joaquin Valley, educational attainment rates are among the lowest in the nation.<sup>10</sup> Three of the 10 Metropolitan Statistical Areas (MSAs) in the U.S. with the lowest average years of schooling are in the San Joaquin Valley. Visalia-Porterville in Tulare County ranks last in the nation, with an average of 11.85 years of education in 2010. The real GDP per capita in this metropolitan area was only \$29,060—well below the national average of \$51,749.<sup>11</sup>

**Figure 3: Education rates in the San Joaquin Valley are among the lowest in the nation**



Rank	Metro	Average years of schooling	Real GDP per capita (US\$)
1	Visalia-Porterville, CA	11.85	29,060
2	Yakima, WA	11.92	30,656
3	Salinas, CA	11.97	36,982
4	Brownsville-Harlingen, TX	12.13	24,619
5	Merced, CA	12.18	25,334
6	McAllen-Edinburg-Mission, TX	12.20	21,044
7	Bakersfield-Delano, CA	12.33	40,494
8	Houma-Bayou Cane-Thibodaux, LA	12.55	50,280
9	Elkhart-Goshen, IN	12.67	48,212
10	Odessa, TX	12.67	54,634

Source: Milken Institute.

The low educational attainment rates in the San Joaquin Valley can largely be explained by the fact that the region is dominated by low-skill agricultural jobs. From 1990 to 2010, the value of labor-intensive crops, which require low-skill, low-wage labor, doubled from \$25 billion to \$50 billion in the U.S.<sup>12</sup> Because California is the sole U.S. producer of 14 labor-intensive crops such as almonds, the state has significantly more farmworkers than any other state in the nation. In 2012, these laborers earned a mean annual wage of \$19,668.<sup>13</sup>

10. California Department of Food and Agriculture, California Agricultural Statistics Review, 2012-2013, <http://www.cdffa.ca.gov/statistics/> (accessed March 2014); Ross DeVol et al., "A Matter of Degrees: The Effect of Educational Attainment on Regional Economic Prosperity," Milken Institute, February 2013.

11. DeVol et al.

12. Martin and Taylor, "Ripe With Change: Evolving Farm Labor Markets in the United States, Mexico, and Central America." Values based on nominal dollars.

13. CDFA, 2012; Figures based on authors' calculations of EDD's Occupation Employment Survey data.



### Complexities of Agricultural Employment

Although demand for low-skill workers in the San Joaquin Valley can be intense, it also is unstable. Workers with less than a high school diploma may be in high demand one year and not the next because decisions about what to produce and how to produce it are a function of price fluctuations, climate, crop diseases, and federal farm subsidies.<sup>14</sup> One consequence is that the region is plagued by some of the highest unemployment rates in the nation. Another outcome is an abundance of low-skill labor suited to fill immediate short-term needs. This employment dynamic does not favor the development of an educated and skilled workforce suitable for high-wage, full-time positions.<sup>15</sup>

At the same time, higher-wage positions are harder to fill, leading to relatively steady employment rates for workers with at least a college education. But those workers who do complete high school often have trouble recognizing opportunities for more skilled, higher-paying positions in the agricultural value chain. In California, an increase in workers who have a high school diploma or better leads to a significant decrease in farm work as a share of employment.<sup>16</sup>

Graduating into middle management of farms and ranches has typically been a way for semi-skilled workers to advance. But historically, throughout the Central Valley, such opportunities for advancement have been rare. The state Employment Development Department anticipates that farm, ranch, and other agricultural manager positions will grow at only 1 percent annually between 2008 and 2018, opening up just 475 jobs each year.<sup>17</sup> Yet in some parts of the agriculture industry, this is starting to change.

### A Looming Skills Gap

Demand for low-wage, low-skill labor will persist in the production of certain crops that cannot be easily mechanized, such as artichokes and strawberries. But in general, agriculture is becoming more technologically sophisticated and complex, driving greater demand for skilled labor. The production of many crops, including top California commodities like almonds and grapes, is becoming increasingly mechanized.<sup>18</sup> At Paramount Farms, a division of Los Angeles-based Roll Global, an average of 350 job openings exist at any given time for high-skilled, entry-level positions. Of those, 84 percent require an associate's degree or technical certificate and 16 percent require a bachelor's degree.<sup>19</sup>

The result is a looming skills gap. The mix of industries in the region continues to diversify and shift toward more skilled occupations, particularly in sectors that support agriculture. Larger agricultural operations are supported by a greater range of firms<sup>20</sup> such as irrigation, pesticide, and food-processing companies. Most processes at these companies are technologically advanced, requiring workers with more education and higher skill levels than most in the region possess.

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14. State of California Employment Development Department, "Detailed Guide for Farmers, Ranchers, and Other Agricultural Managers in California."

15. Martin and Taylor, "Ripe With Change."

16. James R. Barth, Kevin Klowden, and Donald Markwardt, "Mind the Gaps: Closing Income and Educational Disparities in California," Milken Institute, November 2013.

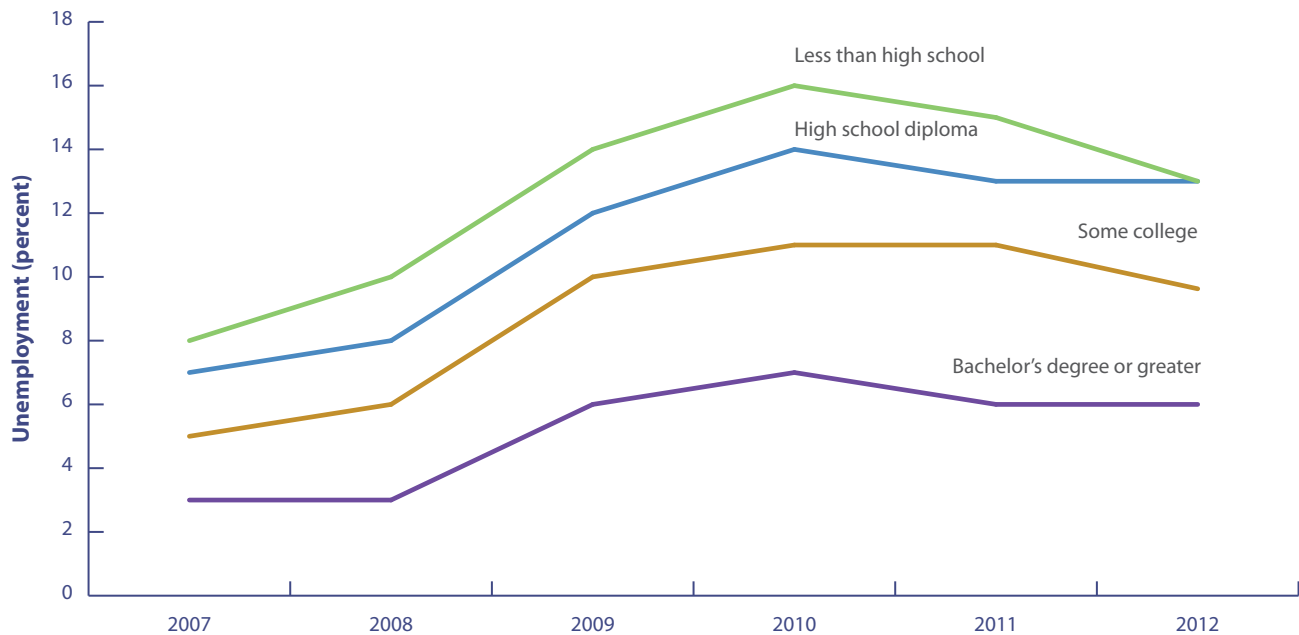
17. State of California Employment Development Department, Projections of Employment by Industry and Occupation, [http://www.labormarketinfo.edd.ca.gov/LMID/Projections\\_of\\_Employment\\_by\\_Industry\\_and\\_Occupation.html](http://www.labormarketinfo.edd.ca.gov/LMID/Projections_of_Employment_by_Industry_and_Occupation.html) (accessed March 2014).

18. Martin and Taylor, "Ripe With Change"; State of California Employment Development Department, "Detailed Guide for Farmworkers and Laborers, Crop, Nursery, and Greenhouse in California," <http://www.labormarketinfo.edd.ca.gov/OccGuides/Detail.aspx?Soccode=452092&Geography=0601000000> (accessed March 2014).

19. Paramount Farms corporate information. ([www.paramountfarms.com](http://www.paramountfarms.com))

20. Martin and Taylor, "Ripe With Change"; State of California Employment Development Department, "Detailed Guide for Farmers, Ranchers, and Other Agricultural Managers in California."

Figure 4: Employment gap by education in the San Joaquin Valley, 2007-2012



Sources: American Community Survey (ACS, 1-year estimates); Milken Institute.

For example, agriculture increasingly uses programmable logic controllers (PLCs), computers used in factories or industrial operations. Machines used in food processing and irrigation rely on PLCs to monitor production and update processes. Workers in food-processing plants use PLCs to monitor temperature at various stages of the packaging process and make adjustments as necessary to maintain food safety. Irrigation workers use wireless technology to control PLCs out in the field to ensure that drip systems conserve water and maximize output. Finding skilled workers for these positions will be crucial for the region's agricultural sector to maintain its competitive edge.

Expertise in plant science is also in high demand. Employment in this field in 2020 is projected to be 230 jobs in Kings County, 220 in Fresno and 90 in Kern.<sup>21</sup> Additionally, pest control advisors will be needed to meet state and federal environmental regulations. These licensed professional production consultants serve agriculture and horticulture producers. They specialize in pest management but are also important to crop producers in a wide range of production concerns related to plant health. They are an example of an increasingly important position requiring technical training and certification that can be acquired at two-year schools such as West Hills College.

Conversely, although the energy sector is also growing rapidly, few positions will be available in that industry for workers seeking significant opportunities for training and advancement. Demand for petroleum engineers, a position that requires at least a bachelor's degree,<sup>22</sup> has grown at 3.4 percent annually. However, just 16 of these positions are estimated to open each year, mostly in energy-rich Bakersfield. This metropolitan area is one of the least educated in the nation, suggesting that petroleum engineers are likely to be recruited from outside the region, as has been the case in other fast-developing energy centers such as North Dakota. Currently, Bakersfield is projected to experience the greatest share of employment growth in jobs that require at least some post-secondary education, but this growth will likely be the result of increased demand in the energy industry.

21. EDD Occupational Outlook for 2010-2020, Standard Occupation Code "Agriculture and Food Science Technicians"

22. State of California Employment Development Department, Projections of Employment by Industry and Occupation.

# POLICY RECOMMENDATIONS

## Identify Key Areas of Workforce Need

At the Fresno workshop following the initial UC Merced meeting, participants described the shift toward automation that is taking place at many of the more successful farming and food-processing operations throughout the valley. As farming increasingly relies on automation and advanced technology, demand for skilled workers will only intensify. There will be greater need to fill positions in manufacturing, packaging, and particularly implementing water systems and controlling water usage.

Two particular areas of demand that should be emphasized are the anticipated need for PLC operators and for quality control experts in food processing. As water management becomes increasingly important, the ability to utilize PLCs effectively, both at farms and in manufacturing and processing, will become essential. In addition, demand for trained quality control experts will intensify as food quality regulations become more specific and as food exports reach new international markets.

## Increase Cooperation and Engage Students

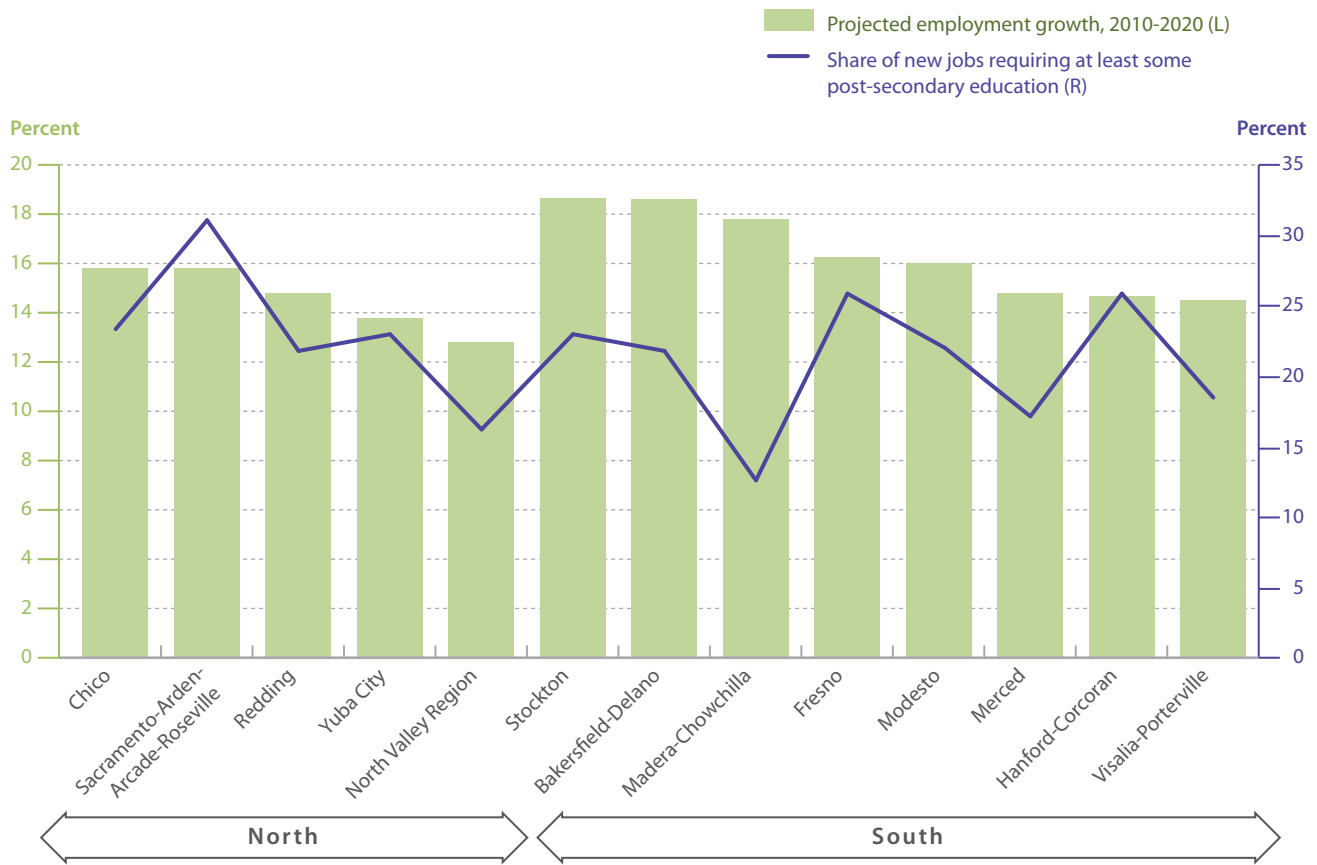
One significant advance toward fulfilling the staffing needs of ag-related companies would be to increase transparency and cooperation in information sharing. Every two years, the Fresno Workforce Investment Board conducts a highly praised regional survey of its members and cooperating partners to develop an effective strategy for matching workers with potential employers. However, ag-related businesses as a sector have not participated in the survey to any significant extent. For this workforce program to be most effective, it should include participants from the entire agricultural value chain.

The common perception that farming offers limited job prospects should be actively dispelled by directly engaging with students, beginning in elementary school and progressing all the way through college. Among the Hmong of the Central Valley, for example, many families encourage young people to leave the agricultural sector in favor of opportunities in other industries. Students and other potential future workers need to be made aware of the career pathways in the agricultural value chain beyond migrant farming and simple food processing and be introduced to the skills that will be required for these careers. Demonstrating the higher salaries and greater opportunities for workers trained in quality control and PLCs is essential.

## Expand Successful Regional Efforts to Connect Education and Training to Employer Need

The greatest challenge facing the Central Valley will be to develop programs that have the capacity to reach and educate students and workers for real jobs to meet the demand for skilled workers from the private sector. One effective means to develop systems to address workforce skills gaps and the needs of the agricultural value chain is to examine current regional best practices. During the roundtable, several participants described their involvement in partnerships and linked learning programs, which connect employers, educators, and workforce training to teach students tangible skills that will be directly useful in the workplace.

Figure 5: Anticipated employment growth highest in metros focused on energy and agriculture



Sources: California Employment Development Department (Projections of Employment); Milken Institute.

One significant issue that arose during the Fresno discussion is the need to educate high school students about opportunities throughout the agricultural value chain and provide them with the skills they will need to be prepared for these careers. Linked learning programs and publicly funded efforts have been used to engage students in the region, including a high-profile partnership between the Fresno and Clovis School districts called the Center for Advanced Research and Technology (CART). CART provides a significant opportunity to engage urban students, who have among the highest dropout rates of all students, and connect them with training necessary for knowledge-based and skilled positions in the workforce, including but not limited to ag-related fields.

A notable effort being made at a linked learning partnership is the one overseen by Roll Global, whose Paramount Farms division based in Kern County is the world’s largest grower of almonds and pistachios. The recently established Paramount Agriculture Career Academy (PACA), starting this fall, will join Bakersfield College, West Hills College Coalinga, and Reedley College with three (and eventually five) high schools to offer an integrated academic program for dual credit. While still in high school, PACA students will complete an apprenticeship in one of three agriculture pathways, in addition to receiving instruction from community college faculty and industry experts.

Several other local two-year colleges have forged similar partnerships, particularly in the State Center Community College District, which includes Fresno, Madera, and nearby communities. At the Fresno meeting, participants discussed the model of Reedley College, which has made a concerted effort to partner with local businesses to expand educational opportunities.

Four-year institutions such as California State University, Fresno have established partnerships that should be recognized, expanded, and developed. Cal State Fresno hosts the Water and Energy Technology (WET) incubator, which fosters technology transfer and develops new companies in water technology. This program might enhance its impact by establishing clearer mechanisms linking growing companies in the agricultural value chain to workers seeking long-term employment. The new University of California campus at Merced might also be leveraged to improve worker training and education. Although the UC campus does not have a dedicated program in agriculture, it does have applied programs in engineering and technology that could be linked directly with employers.

### Identify and Develop Public-Private Partnerships and Funding Sources

The regional water technology partnership is one of the most successful and wide-ranging models for linked learning in the San Joaquin Valley. The “Blue Tech Valley” partnership links agricultural product companies and farms, device producers such as Jain Irrigation, and the WET incubator at Fresno State. These relationships create opportunities for startups as well as for employment at more established companies. This promising partnership should establish clear long-term goals and sources of funding and maintain a high level of participation from its partners.

Resources are available in the region to further develop a linked learning infrastructure. The James Irvine Foundation, with a mandate limited to activities within California, has already devoted more than \$2.5 million to developing and promoting linked learning programs, one of its three major program areas. The Irvine Foundation’s efforts are now joined with a \$3 million project sponsored by the state community college system.<sup>23</sup>

Starting this year, funds will also be available through the California Careers Pathways Trust, a program sponsored by state Senator Darrell Steinberg. This initiative includes support for 40 three-year grants, with several funded at up to \$15 million.<sup>24</sup> These programs do not provide long-term operating funds, but if used effectively they can establish an infrastructure for broader long-term linked learning programs. It is essential that Central Valley linked learning efforts not only develop strategies for program implementation but also effectively communicate those strategies to both students and funders.

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23. California Department of Education press release, “State Schools Chief Torlakson Teams With Community Colleges and Nonprofit Partner to Direct \$7.5 Million to Linked Learning Programs,” October 3, 2013, <http://www.cde.ca.gov/nr/ne/yr13/yr13rel100.asp> (accessed March 2014).

24. Teresa Watanabe, “\$250-million Grant Program Launched to Link Learning and Careers,” *Los Angeles Times*, January 21, 2014. <http://www.latimes.com/local/lanow/la-me-ln-career-ed-20140121,0,434522.story>.



# CONCLUSION

California's Central Valley agricultural region faces many challenges in the near future. The current drought will intensify the need for skilled workers to manage scarce water resources and help implement efficiency and technology improvements on farms. Stricter governmental regulations on food production and the growth of new markets for processed and packaged foods are creating new demand for skilled human capital in the agricultural value chain. Increasing demand for trained operators of programmable logic controllers, quality control specialists, and workers suited for specialized manufacturing are all a direct result of the technological transformation of what had previously been considered almost exclusively a center of low-skill employment.

Given the Central Valley's low educational attainment rates and high levels of unemployment, effective partnerships between agricultural businesses, institutions of higher learning, public high schools, and workforce development centers are essential. Effective programs in linked learning and targeted education that provide greater opportunities for students and a focus on areas with clear local demand such as agricultural technology and manufacturing will achieve the greatest results.

# APPENDIX

## Fresno Roundtable Participants

**Robert Alcazar**

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**Brian Angus**

*Fresno Economic Opportunities Commission*

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**Anthony Primavera**

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**Luis Santana**

*Reading and Beyond*

**Alice Saviez**

*Saviez Farms*

**Bill Smittcamp**

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**Kevin Klowden** is a managing economist at the Milken Institute, where he serves as director of the California Center. He specializes in the study of demographic and spatial factors (the distribution of resources, business locations, and movement of labor) and how these are influenced by public policy and in turn affect regional economies. Klowden was the lead author of *Fighting Production Flight: Improving California's Filmed Entertainment Tax Credit Program*, *Film Flight: Lost Production and Its Economic Impact in California*, and *The Writers' Strike of 2007-2008: The Economic Impact of Digital Distribution*, each of which analyzes the changing dynamics of the entertainment industry. In addition, Klowden was the lead author of *Strategies for Expanding California's Exports*, which focused on the vital role trade and exports play in the state economy and its underperformance relative to the country over the past decade. He has also written on the role of transportation infrastructure in economic growth and job creation and has addressed the role of technology-based development in publications such as the *2012 State Technology and Science Index*, *North America's High-Tech Economy*, and location-specific studies on Arkansas and Arizona. He also coordinated the Milken Institute's two-year Los Angeles Economy Project, seeking public-policy and private-sector solutions to challenges the region faces amid a growing unskilled labor pool. Klowden has served on multiple advisory boards on business growth, economic development, and infrastructure. He holds graduate degrees from the University of Chicago and the London School of Economics.

**Priscilla Hamilton** is a research analyst with the Milken Institute, focusing on regional economic development and policy issues. She is also interested in the economics of media and technology's role in addressing socioeconomic problems. In the past, she worked for the Federal Reserve Bank of Boston and the Carter Center, where she conducted spatial analysis on a project assessing the broadcast range of the media in relation to electoral and demographic data in 12 Latin American countries. She received her bachelor's degree in international affairs and modern language from Georgia Tech and a master's in public policy from the University of Southern California.



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