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Appendix A: Specialty Crop Cluster Definition and Methodology
ABOUT THIS PROJECT

The value of specialty crops grown in the Sacramento region extends far beyond the farm, supporting further economic activity and jobs throughout the greater regional economy.

Growing specialty crop food and fiber in our region creates jobs and income both on and off the farm. This report—the first in the Food System Multipliers project—combines specialty crop production with core processing, support, and distribution industries into a regional Specialty Crop cluster, and explores connections between this cluster, the full Food and Agriculture cluster, and the larger regional economy. It draws on recent employment and other data to begin to quantify the substantial economic contribution of these core industries constituting the Sacramento region’s Specialty Crop cluster. Yet while this report’s cluster framing helps connect specialty crop production with related industries, it does not show the ripple effect of how these Specialty Crop cluster industries then interact with the larger economy. In response, SACOG has worked with project partners ERA Economics and BAE Urban Economics to construct an updated economic model that captures the impact of the region’s Specialty Crop cluster on the full regional economy. The results of the model—contained in the companion Specialty Crop Multiplier Study project deliverable—show how the economic activity documented here in this cluster assessment report circulates even further through a ripple, or multiplier, effect. Together the work of the Specialty Crop Assessment report describing the core cluster industries and the Specialty Crop Multiplier Study connecting this cluster to the larger regional economy are synthesized in the project’s executive summary to highlight the full economic contribution of specialty crops in the Sacramento region.

The Food System Multipliers for Specialty Crops in the Sacramento Region project is work conducted by SACOG in partnership with ERA Economics and BAE Urban Economics. Together, the project has developed updated data, economic modeling techniques and tools to better demonstrate the full economic value of specialty crop production in the Sacramento region. This first deliverable, the Specialty Crop Cluster Report: Sacramento Region, links specialty crop farms to a core cluster of processing, distribution and support industries. A companion Specialty Crop Multiplier Study then shows how this cluster interacts with the larger economy through a multiplier effect. The project’s Executive Summary combines these two technical deliverables for an integrated approach to specialty crop economic development.

Specialty crop agriculture in the Sacramento region is not only highly productive and diverse; it is a major economic driver. However, the role of specialty crops is often overlooked due to a poor understanding of how the industry’s economic impacts circulate throughout the larger regional economy. In response, the Sacramento Area Council of Governments (SACOG) has shifted the planning paradigm to more explicitly include analysis of agriculture and rural areas. Through technical work and stakeholder engagement, SACOG’s RUCS program strives to bring the region’s understanding of rural issues on par with those in urban settings and has demonstrated how policies and strategies impact both parts of the region.

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INTRODUCTION TO THE SPECIALTY CROP CLUSTER

This report moves beyond the farm to analyze the economic contributions of the specialty crop industry cluster, a subset of the larger Food and Agriculture Cluster, in the Sacramento region. An industry cluster is a group of interdependent firms and related institutions that are linked through strong relationships and transactions. The full range of inputs and outputs in the Specialty Crop cluster include various types and scales of production, markets, and value-added processing in addition to work on specialty crop farms. Related food industries provide resources and equipment for growing or harvesting specialty crops and processing, packaging, or using specialty crops to prepare other food products. In this analysis, SACOG divided industries within the Specialty Crop cluster into the following four subsectors:

Cluster research is a widely accepted practice for developing regional prosperity strategies for sustained job creation and growth that leverage unique regional strengths. Industry clusters increase firm competitiveness through shared infrastructure and a concentrated workforce; reduce operating costs with shorter supply chains; increase the flow of information regarding new business opportunities; and foster innovation with informal collaboration and heightened competition. Economic clusters often serve as the driving force of many regional economies.

*Specialty Crop Production* – These firms produce, farm, and harvest specialty crops. Specialty crop production firms include nut, vegetable, and fruit farming and harvesting; pre- and post-harvest activities; nursery and floriculture production; farm labor contractors; and farm management services.

*Specialty Crop Processing* – Firms in this segment of the cluster process, manufacture, package, or prepare food products using specialty crops as inputs. Specialty crop processing firms include oil processing; fruit, vegetable, and other specialty canning; and the specialty crop component of various processing industries such as dried and dehydrated food manufacturing; roasted nuts and peanut butter manufacturing, prepared sauce manufacturing; and wineries.

*Specialty Crop Distribution* – These firms store, transport, or sell specialty crop products in bulk quantities as merchant wholesalers. Specialty crop distribution firms include the specialty crop component of grocery, fruit and vegetable, confectionary, and alcoholic beverage merchant wholesalers; refrigerated and farm product warehousing and storage; and food service contractors.

*Specialty Crop Support* – Firms in this segment of the cluster support specialty agricultural production by providing resources and equipment for growing and harvesting specialty crop products. Specialty crop support firms include fertilizer and pesticide manufacturing, farm and food machinery and equipment manufacturing, farm supply merchant wholesalers, and nursery and florist merchant wholesalers.
Figure 1: Specialty Crop Cluster Components

Specialty Crop Cluster

- **Sector**: A broad set of similar economic activities — e.g. transportation.
- **Industry**: Individual industries within a sector.
- **Cluster**: Interdependent groups of firms and related institutions that gain benefits from their proximity and interactions.

**INTERNATIONAL TRADE**

**DOMESTIC TRADE**

**SPECIALTY CROP DISTRIBUTION**

**SUPPORT INDUSTRIES**

**FARM-TO-FORK**

**SPECIALTY CROP PRODUCTION**

**AGRI-TOURISM**

**BUSINESS SERVICES**

**RESEARCH & DEVELOPMENT**
The way that food reaches our tables is complicated, yet remarkable, as fresh and processed food travels in and out of our region daily. The fuller food system encompasses multiple business sectors providing a range of services that move food products from farms, orchards, and fields to consumers. Although some products arrive “raw,” most are transformed into processed or packaged goods along the way. As such, the food system extends beyond the farm to include an aggregation, distribution, and processing system that is both local and global in scale. Specialty crops—defined in this study as fruits, vegetables, tree nuts, horticulture and nursery crops—are an important part of this food system, whose production is linked to both input suppliers as well as related business industries along the full food supply chain.

In short, the Specialty Crop cluster impacts many elements of the Sacramento region’s overall economy. This study quantifies employment in the cluster’s core production, support, processing and distribution activities (represented by the colored circles in Figure 1 above). Employment in further related industries (such as those in greyed-out text above) are not included here because the project team could not isolate these industries’ related specialty crop activity without an updated economic model. The project’s companion Specialty Crop Multiplier Study deliverable performs this economic modeling to produce a broader multiplier effect of specialty crop production. So while the subsequent cluster analysis of this report does provide an updated investigation into the core activities connected to specialty crops within the food system in the Sacramento region, its data and job figures do not represent the full network of associated economic impacts and employment, which are covered in the project’s executive summary.

This report delves into the regional Specialty Crop cluster, quantifying employment and other data points for its four subsectors of production, processing, distribution and support. The data analysis begins by describing current conditions in the cluster, then explores recent trends as the cluster continues to support the region’s economic rebound, and concludes with a look forward to key challenges and opportunities in sustaining this recent growth. The study only includes the economic activity of specialty crop industries in the six-county SACOG region. For those cluster industries that include a blend of specialty and non-specialty economic activity, the project team used the IMPLAN base model and several data sets to estimate only the specialty crop component of the business service for analysis. This report’s technical appendix (A-1) describes our methodology to estimate the specialty crop elements in cluster industries, includes the data sources analyzed (including EMSI, IMPLAN, CREE, and the ES-202 Covered Employment and Wages Program), and assumptions. As such, it is important to recognize that the reported economic indicators for the cluster are estimates, but based on a synthesis of the best available data.
Part 1.
SPECIALTY CROP CLUSTER
CURRENT CONDITIONS
A survey conducted by the California Farm Bureau in 2012 found that many growers in the SACOG region experience labor shortages, and reported a statewide shortage between 10 percent and 30 percent. If unaddressed, this challenge could inhibit further growth in the cluster.

The Specialty Crop cluster is an important part of the Sacramento region’s economy. In 2014, direct employment in the cluster included almost 17,200 jobs or about 1.6 percent of total employment in the six-county region. As shown in Figure 2, the largest concentration of these jobs (63 percent) were in specialty crop production, a significantly greater proportion than the Food and Agriculture cluster as a whole, calling attention to the relative labor intensity of growing specialty crops. Remaining employment fell into the Specialty Crop cluster’s distribution (21 percent), processing (11 percent), and support (5 percent) subsectors respectively. Together, these “off-farm” industries make up 37 percent of employment in the Specialty Crop cluster, showcasing how food system job opportunities extend beyond the farm into other facets of the regional economy. This employment distribution among the subsectors is very similar to that of the specialty crop cluster for California as a whole. However, compared to agriculture at large in the region, the distribution subsection of the Specialty Crop cluster in particular has a lower proportion of employment.

**Figure 2: 2014 Sacramento Area Specialty Crop Employment by Subsector**

![Figure 2: 2014 Sacramento Area Specialty Crop Employment by Subsector](image)

Overall there are almost 1,200 establishments in the regional Specialty Crop cluster. Figure 3 displays the total number of establishments and the average number of jobs per establishment for the four cluster subsectors. The production subsector has the most firms (over 700), yet also has a lower average number of employees per establishment (15) as compared to other subsectors in the region (the support subsector is the lowest at 7 jobs per average establishment).

The processing subsector has a smaller number of total establishments (100), but has the highest average number of workers per establishment (21). This total of around 100 processing establishments does not include the components of specialty crop processing that occur on farms. Though the larger processing facilities in the region — such as fruit and vegetable canning — employ a high average of workers per establishment, recent RUCS work has centered on the market opportunity to complement regional specialty crop processing activities with a focus on mid-scale facilities such as food hubs.

Figure 3: Establishments and Average Employment per Establishment by Subsector, 2014

Worker annual average earnings in this study include an average of all wages, salaries, proprietor earnings and supplemental earnings (e.g., retirement benefits, bonuses) for all industries in the Specialty Crop sector. Average annual earnings for the Specialty Crop cluster in the region total about $43,750, where roughly 17 percent is from worker supplements. This is higher than the average annual earnings of $43,250 statewide for these same specialty crop industries. However, earnings for the full Food and Agriculture cluster in the Sacramento region are higher than the regional Specialty Crop average, totaling around $48,000 per year, owing to the large proportion of specialty crop workers employed in lower wage crop production jobs. As shown in Figure 4 on the next page, the support subsector provides the best cluster earnings in the region, which are higher than both the statewide Specialty Crop cluster and the larger Food and Agriculture cluster. Conversely, production provides the lowest earnings compared to the other subsectors. The processing and distribution sectors fall in the middle of cluster earnings, however, distribution is the only sector to offer lower earnings than the statewide Specialty Crop and larger regional Food and Agriculture clusters.
Figure 4: Weighted Average Total Earnings of Regional Specialty Crop Cluster Industry Employees by Subsector, Compared to the Larger Regional Food and Agriculture Cluster and the California Specialty Crop Cluster, 2014

A location quotient is a ratio that compares regional employment in a particular industry to employment in that same industry at a larger geography (in this case, California). A location quotient of less than one indicates a lower proportion of employment for that industry in the Sacramento region than in the state overall. A location quotient of more than one indicates a regional industry with higher concentration of employment compared to the state average.

Location quotient (LQ) analysis provides a useful tool to identify regional economic specializations (see box at left). Compared to the full state economy, employment within the Sacramento region’s Specialty Crop cluster is far less concentrated on average. As shown in Figure 5 below, the support subsector has the highest concentration of employment (0.70) within the cluster, which is still a lower concentration of employment compared to the state average in this industry. The distribution subsector has the lowest concentration within the cluster at 0.47, while production (0.52) and processing (0.56) in the Sacramento region still exhibit only about half of the average statewide employment concentration. Compared to the full Food and Agriculture cluster, the Specialty Crop cluster generally includes less concentrated employment across sectors.
Within the cluster subsectors, there are many individual industries with regional location quotients significantly above average. Several prominent examples include:

- **Processing** – dried and dehydrated food manufacturing (3.19 LQ), roasted nut manufacturing (2.87 LQ), specialty canning (1.86 LQ), and oilseed processing (1.36 LQ);
- **Distribution** – specialty crop warehousing and storage (3.96 LQ); and
- **Support** – farm and garden machinery and equipment (1.18 LQ).

Subsector industries with location quotients significantly below the state average include:

- **Distribution** – refrigerated warehousing and storage (0.12 LQ) and wine and distilled alcoholic beverage merchants (0.24 LQ); and
- **Production** – farm management services (0.09 LQ) and crop harvesting primarily by machine (0.31 LQ).

**Figure 5: Total Specialty Crop Employment and Location Quotient by Subsector, 2014**

Geographic Concentration

Firms in a cluster draw a productive advantage from their geographic concentration. In addition to co-location, firms in a cluster share common resources and technologies and rely on a similar labor pool and institutions. Hotspot mapping analysis measures where cluster employment is most concentrated. By design, the hotspot analysis does not visually display all areas of activity, just those with distinct co-location. As such, the following maps do not depict all the various specialty crop food system employment that occurs throughout the entire six-county Sacramento region. However, the results show how Specialty Crop cluster employment extends far beyond the farm. Figure 6a below illustrates where employees in the Specialty Crop cluster are most concentrated within the region, using SACOG’s Draft 2015 Employment Inventory.¹ Overall, the largest concentration of cluster employees is located in the city of Woodland, followed by the cities West Sacramento (northeast) and Sacramento (downtown and southeast). Additionally, there is a significant grouping of employees in Yuba City and the community of Courtland in Sacramento County. Compared to the larger Food and Agriculture cluster, these Specialty Crop cluster concentrations are more substantial in Woodland and Courtland and less substantial in Marysville, Davis, Rocklin, and Galt.

¹ SACOG’s Draft 2015 Employment Inventory was developed using data from the Employment Development Department. The information is in draft form, as SACOG is currently reviewing and editing the data for final release later this year. While employment estimates may change on a smaller scale, the location and total of employees at the cluster level provides useful information about employment concentration. The employment concentration maps use the spatial analyst function in GIS to calculate “densities” of employment by standard deviation from the mean to show where employment is clustered geographically.
Employment concentrations vary when broken out by Specialty Crop cluster subsector, as shown in Figure 6b (1-4). Jobs in the production subsector are concentrated around Galt and the area of Sacramento County between the cities of Sacramento, Rancho Cordova, and Elk Grove. Areas near the communities of Ryde (Sacramento County), Norton (Yolo County), and Garden Valley (El Dorado County) also include significant concentrations of production jobs. Other lower concentrations are present throughout Sacramento, Sutter, and Yolo Counties. When compared to the larger Food and Agriculture cluster, the Garden Valley concentration is more prominent and the concentrations in Davis, Marysville, Woodland, and Yuba City are less prominent. Generally, these findings of production employment distribution stem from the inclusion of farm labor contractor firms in the production segment of the cluster. These firms may be incorporated in a single facility, but supply labor to farms across the region. Thus in Figure 6b.1 below, the mapping emphasizes the physical location of specialty crop farm labor supply firms, not necessarily how this labor spreads to farms throughout the region.

The regional nature of the Specialty Crop cluster becomes particularly apparent when paired with the RUCS crop map showing acres of specialty crop production. Figure 6c below provides a simplified version of the crop map which identifies specialty crops in the region (the full map includes crop data at the individual field and crop level). While the production component of the cluster is more dispersed in terms of employment (as shown in Figure 6b), its substantial specialty crop output supports the additional economic activity and jobs found in the other subsectors of the cluster. In other words, without specialty crop production, the rest of the cluster’s contribution to the regional economy would be severely limited. The modeling and scenarios included in the Food System Multipliers project’s companion Specialty Crop Multiplier Study help show how an increase in specialty crop production leads to further economic activity along the regional supply chain (or, how a decrease in specialty crop production would lead to economic contraction throughout the cluster, and throughout the economy as a whole).

Specialty crop distribution employment generally follows the same concentration pattern as the larger Food and Agriculture cluster. These jobs are primarily located in the cities of Yuba City and Sacramento (north, downtown, and southeast) and the community of Ryde (Sacramento County), with a less significant concentration in Rocklin. Processing is characterized by large employment concentrations in Woodland and downtown Sacramento, with eastern Sacramento city and county demonstrating less significant specialty crop concentrations than the full Food and Agriculture processing sub-cluster. Finally, the support subsector includes significant concentrations in Davis, west of Woodland and West Sacramento, and Yuba City, plus significant groupings between Rocklin and Loomis and west of Auburn. The Specialty Crop support subsector demonstrates the most variation of the subsectors when compared to the larger Food and Agriculture cluster — with greater employment concentrations near Davis, Loomis, Rocklin, and West Sacramento and lesser concentrations in Live Oak, McClellan Airfield, Sacramento, Rancho Cordova, and the community of Walnut Grove.
Figure 6a: Specialty Crop Cluster Employment Concentration
Figure 6b: Employment Concentration by Specialty Crop Cluster Subsector

* Farm labor contractor firms in the production segment of the cluster may be incorporated in a single facility, but supply labor to farms across the region. The map emphasizes the physical location of farm labor supply firms, not necessarily how the labor spreads throughout the region. All maps show areas of particular concentration, not each subsector's full economic activity.
Figure 6c: RUCS 2012 Specialty Crop Map

Data Source: SACOG Crop Data, 2012; Base Map Source: ESRI, USGS.
In addition to providing jobs both on and off the farm, the Specialty Crop cluster also plays an important role in the region’s overall economic activity. This report uses an updated IMPLAN model to measure the direct economic output of the various components of the Specialty Crop cluster.

As shown in Figure 7, output from the region’s specialty crop farms and nurseries contributes over $1 billion to the regional economy each year. Specialty crop processing is also over a billion-dollar industry in greater Sacramento. The direct output of specialty crop support ($400 million) and distribution ($700 million) industries round out the annual economic impact of these main segments of the Specialty Crop cluster.²

Taken together, the various components of the Specialty Crop cluster add to nearly $4 billion in direct output in the Sacramento regional economy. This total counts the value of the specialty crop several times, at each point in the supply chain from production to distribution. Isolating the value add of the cluster by individual sector provides a measure of how much the value of the specialty crop is increased at each stage of the supply chain, exclusive of initial costs. This report estimates the direct total value add of the cluster at $1.2 billion a year.

Figure 7: Specialty Crop Cluster Direct Output and Value Add, 2013


² These findings draw on an updated IMPLAN model produced by the project team. Note that the IMPLAN analysis uses data for the year 2013 (a year earlier than the 2014 employment and firm data cited here). Due to data limitations, the economic contribution of the distribution segment is limited compared to employment. See this report’s companion deliverable, Specialty Crop Multiplier Study, for an explanation of the updated IMPLAN model.
Part 2.
RECENT TRENDS
EMPLOYMENT CHANGE

The Specialty Crop cluster has outpaced the region at large in economic recovery.

Like all areas of the economy, specialty crop agriculture as a whole was influenced by the recent recession. Yet while most segments of the economy were shedding jobs, the specialty crop cluster as a whole was actually growing during the recession, and during the recovery has added jobs at a rate faster than the regional economy at large. Indeed, while the region as a whole still had not recovered all jobs lost during the recent recession by the study base year of 2014, the Specialty Crop cluster grew in employment by over 6 percent over the same period. This section of the report explores some recent trends in how the Specialty Crop cluster has rallied from recession to better compete on the local, national, and global stage.

As shown in Figure 8, with a few losses in 2010 and 2013, the specialty crop cluster has generally been adding jobs since 2008, totaling an increase of about 1,000 jobs. The production subsector of the cluster realized highest overall growth in number of new jobs (781), with the processing component of the cluster having the highest employment growth as a percentage (13%). Employment in the support subsector of the cluster grew a modest five percent over the last seven years. While the other subsectors generally follow a similar employment increase pattern to that of the cluster as a whole, the distribution pattern is actually “U”-shaped, with a decrease until 2011 before increasing again through 2014. Distribution was also the only subsector to actually lose jobs (-1%) overall between 2008 and 2014.
Figure 8: Specialty Crop Cluster Employment Change from 2008 to 2014

Figure 9 below incorporates current conditions and recent trends in the cluster into a single graphic. The bubble chart compares regional employment growth from 2008 to 2014 (on the x axis of graph) to the current concentration of employment in the region (y axis), with the size of the bubble indicating the current total number of jobs for each segment of the Specialty Crop cluster. The graphic presents the findings of the above section: all subsectors in the Sacramento region Specialty Crop cluster have a lower concentration of employment than the statewide average. Yet regional employment in the cluster has been growing, led by the production (overall number of jobs) and processing (percentage of job growth) components of the cluster. The distribution segment seemed most susceptible to the recent recession, losing jobs up to 2011 then adding year-over-year through 2014. The support subsector of the cluster saw minor employment growth from 2008 to 2014.

**Figure 9: Specialty Crop Cluster Employment Change and Concentration**


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3 Location quotient is for year 2014 compared to the California average. Likewise, total employment is for 2014.
The Specialty Crop cluster falls within a larger food and agriculture system. When the Specialty Crop cluster’s contribution to the larger agriculture sector is isolated, several interesting elements emerge to better understand specialty crop developments influencing the food system, as illustrated by Figure 10 below. Specialty crop production includes far more employment than non-specialty crops in the Sacramento region, yet all the other non-specialty crop sectors (i.e., processing, support, distribution) include more employment than their specialty counterparts. While the Specialty Crop cluster has grown in employment between 2008 and 2014, the non-specialty portion of the regional food system in aggregate has actually declined in employment by four percent. This finding for the remainder of the Food and Agriculture cluster stems from a sharp decrease in processing employment while production employment was flat, so that the increases in distribution and support employment do not balance out the net loss in food jobs not associated with specialty crop agriculture.

**Figure 10: Cluster Employment Change and Concentration – Specialty and Non-Specialty Elements of the Food System**

In the past several years, the value of regional specialty crop production has soared.

As shown in Figure 11, the total value of agriculture production in the SACOG region rose from $1.6 billion in 2008 to $2.4 billion in 2014 — an increase of 49 percent. Even when adjusted for inflation this translates to an increase of 36 percent in real dollars, far outpacing the regional economy as a whole.\(^4\) With a substantial increase of 108 percent in total value (89 percent when adjusted for inflation), specialty crops saw an increase in value from $700 million to nearly $1.5 billion from 2008 to 2014.\(^5\) To highlight this trend, the following section compares production of specialty vs. all agricultural crops, showing how specialty crops accounted for 95 percent of the growth in production value between 2008 and 2014.

The RUCS appendix of SACOG’s MTP/SCS demonstrates that while the value of agricultural commodities in the region had declined in near parallel with the decline in agricultural acres in the past, record commodity prices today have somewhat reversed this trend, where it appears that some fallowed land has been brought back into production to take advantage of higher prices in the marketplace.

Figure 11: Economic Impact Change, 2008-2014 (in nominal dollars)*


*Nominal dollars are the value of the output in its given year and are not adjusted for inflation.


\(^5\) Note that this $1.5 billion figure is for the year 2014, one year after the study’s 2013 IMPLAN estimate of $1.11 billion for the farmgate/production component of the cluster.
As shown in Figures 12a and 12b respectively, 63 percent of total farmgate value and 69 percent of specialty crop farmgate value in the region were generated by Sutter and Yolo Counties in 2014. Conversely, El Dorado and Placer counties have the lowest agricultural and specialty crop values in the region, including timber. El Dorado, Sutter, Yolo, and Yuba counties all have a similar proportion of specialty crops value as compared to total agricultural value (ranging from 59 to 70 percent), while Placer County has a far lower proportion of specialty crop value at 23 percent. The proportion of total agricultural value by county was very similar from 2008 to 2014, only shifting 1 to 2 percent. This trend was similar for specialty crops, except for a more significant decrease in Sacramento County (-9 percent) and increase in Sutter County (+5 percent) over the same period.


While county agriculture reports generally categorize crop and livestock yields in a similar fashion, there is some variation in the type of crops rolled up into a given category which makes it difficult to truly normalize the reports for comparison across counties. Within this dataset these discrepancies occur in El Dorado County where the report includes data from Alpine County, Yolo County which includes an organic category encompassing some non-specialty crops, and Yuba County which includes some miscellaneous field crops in a vegetable crop category. However, these differences are minor overall and the data still provides useful county comparisons.
Within the region, specialty crops (including Christmas trees) generated more than three times the value per acre in 2012 than other non-specialty agricultural products (excluding timber). Specialty crops in all counties generated a higher value per acre than non-specialty crops, although the difference was most pronounced in El Dorado (factor of 19.86) and Yuba (factor of 6.27) counties and least evident in Sutter (factor of 2.2) and Placer (factor of 3.62) counties. Sacramento County had the highest specialty crop value per acre ($4,782), while Placer County had the lowest ($2,417).

**Figure 13: Specialty Crop Value per Acre**

![Graph showing specialty and non-specialty crop values per acre across counties, with ratios indicated.]

*Figure 13 includes the value and acreage of specialty timber (e.g. Christmas Trees), but excludes non-specialty timber, due to the difficulty in accurately differentiating acreage of timber-producing land from other forested areas within the Crop Map. The data represented in Figures 11, 12a, & 12b include both specialty and non-specialty timber values.*
Part 3. LOOKING FORWARD
EMPLOYMENT TRENDS AND PROJECTIONS

This section uses employment projection estimates from EMSI to look out five years from the study base year of 2014. These estimates provide one possible indicator of future conditions in the Specialty Crop cluster if current trend lines continue, yet it is also important to recognize the region’s potential to change this trajectory as the data and tools contained in the Food System Multipliers project translate into proactive strategies and investments. The following section illustrates some other potential future outcomes in the cluster drawing on RUCS cases studies, food hub financial analyses and other regional activities.

As shown in Figure 15, the EMSI estimates project that regional employment in the Specialty Crop cluster will continue to increase as it has since 2010, though at a slower rate. While Specialty Crop cluster employment grew about 6 percent from 2008 to 2014, the expected growth rate from 2014 to 2019 is less than 3 percent. Overall, the cluster is expected to add an additional 470 jobs by 2019.

Figure 15: Employment Trends and Projections, 2008-2019

As shown in Table 1, the distribution subsector, which actually lost jobs between 2008 and 2014, is projected to add both the greatest number (273) and proportion (8%) of specialty crop jobs by 2019. The support subsector, which experienced a lower growth rate compared to other sectors in the past, is also expected to experience job growth by 2019 (48 jobs, 5%). After adding the highest percentage of jobs of any sector between 2008 and 2014 (13%), the processing subsector is projected to experience a lower rate of job growth by 2019 (3%). And while the production subsector experienced significant job growth from 2008 to 2014 (8%), the sector is projected to have the lowest proportional job growth by 2019 (less than 1%).

Table 1: Employment Projections by Subsector, 2014–2019

<table>
<thead>
<tr>
<th>Specialty Crop Subsector</th>
<th>2014 Jobs</th>
<th>2019 Jobs</th>
<th># Change</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>10,765</td>
<td>10,857</td>
<td>92</td>
<td>0.9%</td>
</tr>
<tr>
<td>Distribution</td>
<td>3,600</td>
<td>3,873</td>
<td>273</td>
<td>7.6%</td>
</tr>
<tr>
<td>Processing</td>
<td>1,906</td>
<td>1,962</td>
<td>56</td>
<td>2.9%</td>
</tr>
<tr>
<td>Support</td>
<td>916</td>
<td>964</td>
<td>48</td>
<td>5.2%</td>
</tr>
<tr>
<td><strong>Total Cluster Jobs</strong></td>
<td><strong>17,187</strong></td>
<td><strong>17,656</strong></td>
<td><strong>469</strong></td>
<td><strong>2.7%</strong></td>
</tr>
</tbody>
</table>

ALTERNATIVE CLUSTER TRAJECTORIES: RUCS CASE STUDY

Emerging market opportunities coupled with the data, tools, and planning contained in the *Food System Multipliers for Specialty Crops in the Sacramento Region* project (among other efforts) have the potential to dramatically change the trajectory of this vital Specialty Crop cluster into the future. Through its scenario planning efforts, RUCS has developed a suite of tools and models to test a range of changes in market demand and cost of production to illustrate alternative possible futures in the cluster that respond differently to market changes and supportive strategies. These scenarios model an increase in specialty crop and value-adding activities that meet the rapidly increasing demand for locally-grown food (including regional institutions such as schools, hospitals, or even the Sacramento Kings basketball arena) to show how emerging market opportunities can result in employment not only in the production component of the cluster, but across the full specialty crop supply chain.

One of the various scenarios of focus for RUCS has been on ways to internalize more of our food system, in turn reducing economic leakage out of the region. This is especially true for specialty crops where there is demonstrated demand but limited supply. In particular, these scenarios test out burgeoning local market opportunities that respond to consumer demand while offering growers a means to diversify. For example, one scenario conducted in a case study for Yuba County analyzed the effects of a major cropping pattern shift to specialty crops geared to local consumption (see Figure 16 on the following page). While the scenario represents an extreme boundary-setting example of possible future change, the following maps of the results show the potential for sustained economic return and specialty crop cluster employment opportunities as smaller shifts occur in the food system. Notably, the modeled scenario quadrupled overall production value in the study area, along with an increase in labor demand (and thus job opportunities). Other scenarios—such as those conducted in RUCS’ *Sacramento Regional Agricultural Infrastructure Project*7—exhibit the potential to capitalize on opportunities in regional processing through investments in mid-scale facilities such as food hubs.

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7 The Regional Agricultural Infrastructure Project was funded in part through the Specialty Crop Block Grant Program’s 2011 cycle (project SCB11039).
The above map measures the estimated increase in farm labor from a possible future scenario capitalizing on the increasing demand for local specialty crops, with the map below estimating grower return from the same scenario. Together these RUCS scenarios illustrate market opportunities that augment economic return and lead to more employment opportunities for specialty crop producers, and further along the specialty crop value chain.
CONCLUSION

Summary, Challenges, and Opportunities

The Specialty Crop cluster has deep roots in the region’s history and will be an essential component of the region’s future. California is the fourth largest agricultural economy in the world and the Sacramento region is a vital part of that economy, with some of the most productive farmland on earth. In addition to productive farmland, the Sacramento region boasts an unrivaled array of food system assets, including multi-generational knowhow, world-renowned agricultural institutions like UC Davis, food entrepreneurs, favorable climate and water supply, and engaged policymakers to name a few. Through value-added opportunities like that of the food hub, specialty crops will increase the capacity of the landscape to generate economic value and jobs, making agriculture an even more impactful economic engine.

This Specialty Crop cluster analysis in turn illustrates how these elements affect the overall regional economy: the direct components of the cluster account for over 17,000 jobs spread throughout the region and almost $4 billion in combined output value, with a direct total value add of $1.2 billion a year. While production is the largest subsector in the Specialty Crop cluster, there is also significant “off farm” employment (37 percent) in distribution, processing, and support. Recent employment and output trends suggest strong regional competitive advantages in the cluster; indeed, the cluster has outpaced the overall regional economy in its recovery from the recession. The Specialty Crop cluster analysis provides the following insight into where there are existing opportunities for benefits to the regional economy:

- The Specialty Crop cluster has helped the region rebound from recession: the cluster saw job growth from 2008 to 2014 that outpaced the regional average, led by the production and processing subsectors.
- The distribution subsector includes a significant number of jobs and is projected to add the greatest number and proportion of jobs by 2019.
- The support subsector provides the highest earnings in the region (higher than the state and larger Food and Agriculture cluster), has the highest concentration of employment as compared to the average for the California economy, and is projected to experience the job growth through 2019.
- The production subsector is more dispersed in terms of employment and includes the greatest amount of employment of the Specialty Crop cluster. Additionally, its substantial output demonstrates the regional nature of the cluster, supporting the additional economic activity and jobs found in the other subsectors.
- Specialty crops have driven the region’s agriculture production sector to record levels of economic output. Specialty crops in all counties generated a higher value per acre than non-specialty crops, where Sutter County had both the greatest output in 2014 and largest value increase since 2008. The Specialty Crop cluster directly contributed over half of the larger Food and Agriculture cluster output in 2014 and accounted for 95 percent of the growth in value of the larger cluster’s production component between 2008 and 2014.

In addition to highlighting regional strengths, the Specialty Crop cluster analysis provides further insight into where there are currently challenges for the regional economy:
• The distribution subsector has the lowest concentration of employment as compared to the average for the full statewide economy and experienced the lowest amount of growth of all the sectors between 2008 to 2014 (an overall loss of 1%).

• The region faces a constrained agricultural labor supply, which can inhibit future growth. Overall, worker earnings in the full Food and Agriculture cluster are higher than the Specialty Crop average, owing to the large proportion of specialty crop workers employed in lower wage crop production jobs. The production subsector provides the lowest earnings compared to the other subsectors and is projected to experience the lowest percentage of (and only slight) job growth by 2019.

• The support subsector has the lowest direct output value of the cluster. Additionally, Yolo County generates the lowest proportion of specialty crop value and Sacramento County actually saw a decrease in specialty crop value from 2008 to 2014.

• While Specialty Crop cluster employment grew almost 6 percent from 2008 to 2014, the growth rate from 2014 to 2019 is expected to be half that. However, the development of an action plan for the larger Food and Agriculture cluster and other regional initiatives speak to the Sacramento region’s potential to proactively change trajectory and capitalize on promising market developments supporting further regional jobs and economic activity.

The full range of economic contributions from specialty crops and their ancillary industries, or the “multiplier effect”, reflects various types and scales of production, markets and value-added processing within the SACOG region.
In short, this report demonstrates the direct contribution of Specialty Crop industries to the regional economy and begins to illustrate how growing food and fiber creates jobs and income, both on and off the farm. The full economic impact of an industry cluster spreads throughout its entire value chain. This cluster analysis includes the core cluster industries of production, processing support and distribution, but does not include related food system elements such as consumption establishments or other activity in R&D, environmental services or agri-tourism. As such, the data and analysis contained in the report constitute an important initial — though still incomplete — look into the cluster and its role in the Sacramento region’s economy.

Building on the work contained in this cluster assessment, SACOG—through a partnership with ERA Economics and BAE Urban Economics—has developed an updated economic model based on primary survey and other data to capture the full ripple effect of how the Specialty Crop cluster’s output circulates through the larger regional economy. In addition to describing the larger economic contribution of specialty crop production, this work in the Specialty Crop Multiplier Model deliverable also had produced a new scenario tool for stakeholders to test possible policy and investment decisions supporting specialty crop expansion.

Together these tools and research will enable SACOG and its partners to complete much needed economic analysis to illustrate the importance of specialty crop production in the region and easily and effectively communicate the economic impact of specialty crop production to a wide audience, with particular attention to local policy makers. By demonstrating the economic potential of agricultural lands and related food industries, there will be more incentive to invest in specialty crop production and food chain infrastructure and to preserve working lands. This will enhance the marketability and competiveness of specialty crops of all California producers by creating new economic opportunities through expanding markets and increasing the value of their products. It will also inform potential regulatory reform at various levels, ensuring the viability of California specialty crops for the next generation by creating a more flexible regulatory environment to start a new business and/or farm. These tools will be a valuable asset to public and private stakeholders by providing much needed data to facilitate the development of effective strategies, investments, and policies that support specialty crop agriculture.
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In Partnership with:

CENTERS OF EXCELLENCE | NORTHERN CALIFORNIA REGION

which assisted in data collection efforts for this study.

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APPENDIX A: SPECIALTY CROP CLUSTER DEFINITION AND METHODOLOGY

The North American Industry Classification System (NAICS) is the standard grouping scheme used by Federal statistical agencies to categorize business establishments and collect statistical data related to the economy. Official U.S. business economy datasets are organized by this NAICS classification scheme, and most proprietary employment datasets also align to the NAICS structure given its leading role in database management. The NAICS numbering system starts with a general classification of major economic sectors listed by a two-digit code. For example, the entire agriculture sector is grouped with forestry, fishing, and hunting in the two-digit code NAICS 11, while construction is NAICS 23 and education is NAICS 61. Each digit added to the two-digit sector code provides more detail on the industry activity, with the fullest detail at a maximum of six digits. An industry example of this organizational structure from most detailed to broadest listing is strawberry farming (NAICS 111333), which is nested within non-citrus fruit and tree nut farming at the five-digit level (11133), then fruit and tree nut farming at the four-digit level (1113), within crop production (111) at the three-digit level, and finally within NAICS sector 11—agriculture, forestry, fishing and hunting—at the broadest level.

The base economic and employment data used in this Specialty Crop Cluster Assessment: Sacramento Region report is an Economic Modeling Specialists International (EMSI) dataset on the six-county SACOG region (El Dorado, Placer, Sacramento, Sutter, Yolo and Yuba counties) covering the period of 2008 to 2014. EMSI aggregates over 90 data sources into a unified rollup of wages, employment, firms, and other indicators. The Los Rios Center of Excellence provided the EMSI data for this project; all analysis and conclusions come from SACOG. The dataset is organized by the NAICS classification scheme, providing indicators by industry at the six-digit level.

As the EMSI data reports at the six-digit NAICS level it represents a highly detailed look into business economy indicators across specific industries. Likewise, the data overcomes many disclosure limitations and gaps in coverage compared to other sources that also operate at the detailed six-digit industry coding, thus providing very specific details for individual industries in the economy. Even at the most detailed six-digit NAICS level however, project staff needed to conduct further work to isolate only specialty crop industries for analysis in this study. The first step staff took was to group those NAICS codes at the six-digit level that were exclusively specialty crop (such as NAICS 111333 Strawberry Farming or NAICS 311421 Fruit and Vegetable Canning) for further analysis. The team then excluded all NAICS codes with no specialty crop activity (any NAICS code outside of the agriculture cluster, and those agriculture industries that were non-specialty crops, such as NAICS 111140 Corn Farming or NAICS 311615 Poultry Processing) from the cluster. While these steps helped organized the vast majority of the 1,100 industries at the NAICS six-digit into the specialty crop cluster or non-specialty activity, several industries remained that due to their NAICS definition included both specialty and non-specialty crop activity (for example, the NAICS industry 115115 Farm Labor Contractors and Crew...
Leaders includes business services provided to specialty crop producers, but also to other crop production.

To isolate the specialty crop component of these industries that include a blend of specialty crop and other economic activity (hereafter “proportional industries”), the project team took a series of steps based on supplemental data and modeling activities to estimate the specialty crop component of proportional industries. As such, the data and analysis contained in this cluster report only includes the economic activity generated by the specialty crop cluster. The steps to arrive at these specialty crop estimates are described in turn.

First, while the EMSI dataset provided economic data at the six-digit level for the vast majority of industries in the regional economy, the base data set actually aggregated industries within crop production to a broader industry coding. To isolate those specialty crop industries within the broader crop production category, the production team drew on the Covered Employment and Wages Program (commonly referred to as the ES-202), produced in tandem by the Bureau of Labor Statistics, the U.S. Department of Labor, and the State Employment Security Agency. Like the EMSI data, the team analyzed the 2014 ES-202 data for the same six-county geography. As the EMSI dataset includes estimates for self-employed and sole proprietor workers, the final step for the production component of the specialty crop cluster was to apply these additional worker categories to the ES-202 specialty crop production industries. The ES-202 program produces a comprehensive tabulation of employment and wage information for workers covered by State unemployment insurance (UI) laws and Federal workers covered by the Unemployment Compensation for Federal Employees (UCFE) program. It is a cooperative program involving the Bureau of Labor Statistics (BLS) of the U.S. Department of Labor and the State Employment Security Agencies (SESAs). Thus, together these sources provide consistency between the production segment and the other subsectors of the cluster.

Next, the project team turned to those proportional industries in the processing, distribution, and support segments of the specialty crop cluster. Using the base IMPLAN model, the project team estimated the portion of these industries’ inputs that were specialty crop related. The IMPLAN model is a widely-used tool for estimating how money from one industry flows through the larger regional economy. The model uses national industry data and county-level economic data to generate a series of multipliers, which in turn estimate the total economic implications of economic activity. The team used these model estimates to the split the proportion of economic activity in these industries related to specialty crop production as part of the cluster, and removed the remainder. Some of these proportional industries had a high degree of specialty crop activity in the region. For example, SACOG’s analysis of the region’s IMPLAN model suggest that about 75 percent of all economic activity in the farm labor contractors industry stems from specialty crop production, given the labor-intensity of specialty crops compared to non-specialty crops. In other industries the specialty crop contribution was quite small (such as ice cream and frozen dessert manufacturing, which does include some fruit and tree nut inputs, but is mostly non-specialty crops). Note that to generate these splits the team
used the IMPLAN model for the year 2013, a year earlier than the 2014 employment data. The team conducted this IMPLAN analysis both on proportional industries within the study area (using an IMPLAN model for the six-county region) as well as all of California (with an IMPLAN model of the full state) in order to perform the project’s location quotient analysis. In conjunction with the work on the production sector, this work produced the study year economic indicators for each specialty crop industry within the cluster.

Finally, the team drew on the California Regional Economies Employment (CREE) series to estimate the change in proportion of specialty crop production for each year between 2008 and 2014. The California Regional Economies Employment (CREE) Series provides non-confidential annual average employment and wage data for the United States, California, and all 58 California counties. It is an outgrowth of the California Regional Economies Project (CREP) and sponsored by the California Workforce Development Board. The team then applied these estimates to the base EMSI data to create a time series for the specialty crop cluster over the last seven years. The methodology assumed that the change in the proportion of specialty crop production over the time series applied to the other three subsectors of the cluster as well. Overall the proportion only changed by less than one percent for the time series, so this assumption has a very minor effect on the study indicators.

In short, the project team drew on multiple data sources and the IMPLAN model to isolate the specialty crop component of proportional industries given the limitations in standard industry classification. To create the full cluster, the team then included this specialty crop proportion in conjunction with industries identified as exclusively specialty crop through their industry code, while excluding all non-specialty crop industries from analysis. It is important to note that the results are estimates for economic indicators within the specialty crop cluster, but that these estimates are based on standard economic data and modeling techniques. The following page lists the specialty crop cluster by NAICS code, and indicates which industries are full specialty crop and which are proportional and derived from the study’s methodology to isolate specialty crop economic activity.
The Specialty Crop cluster is comprised of the following NAICS codes:

### Processing
- 311224 Soybean and Other Oilseed Processing*
- 311340 Non-chocolate Confectionery Manufacturing*
- 311351 Chocolate and Confectionery Manufacturing from Cacao Beans*
- 311352 Confectionery Manufacturing from Purchased Chocolate*
- 311411 Frozen Fruit, Juice, and Vegetable Manufacturing
- 311421 Fruit and Vegetable Canning
- 311422 Specialty Canning*
- 311423 Dried and Dehydrated Food Manufacturing*
- 311520 Ice Cream and Frozen Dessert Manufacturing*
- 311813 Frozen Cakes, Pies, and Other Pastries Manufacturing*
- 311911 Roasted Nuts and Peanut Butter Manufacturing*
- 311930 Flavored Syrup and Concentrate Manufacturing*
- 311941 Mayonnaise, Dressing, and Other Prepared Sauce Manufacturing*
- 311942 Spice and Extract Manufacturing*
- 312130 Wineries

### Support
- 325311 Nitrogenous Fertilizer Manufacturing*
- 325312 Phosphatic Fertilizer Manufacturing*
- 325314 Fertilizer (Mixing Only) Manufacturing*
- 325320 Pesticide and Other Agricultural Chemical Manufacturing*
- 331111 Farm Machinery and Equipment Manufacturing*
- 333241 Food Product Machinery Manufacturing*
- 423820 Farm and Garden Machinery and Equipment Merchant Wholesalers*
- 424910 Farm Supplies Merchant Wholesalers*
- 424930 Flower, Nursery Stock, and Florists’ Supplies Merchant Wholesalers

### Distribution
- 424410 General Line Grocery Merchant Wholesalers*
- 424420 Packaged Frozen Food Merchant Wholesalers*
- 424450 Confectionery Merchant Wholesalers*
- 424480 Fresh Fruit and Vegetable Merchant Wholesalers
- 424490 Other Grocery and Related Products Merchant Wholesalers*
- 424820 Wine and Distilled Alcoholic Beverage Merchant Wholesalers*
- 493120 Refrigerated Warehousing and Storage*
- 493130 Farm Product Warehousing and Storage*
- 722310 Food Service Contractors*

### Production
- 111130 Dry Pea and Bean Farming
- 111219 Other Vegetable (except Potato) and Melon Farming
- 111310 Orange Groves
- 111320 Citrus (except Orange) Groves
- 111331 Apple Orchards
- 111332 Grape Vineyards
- 111333 Strawberry Farming
- 111334 Berry (except Strawberry) Farming
- 111335 Tree Nut Farming
- 111336 Fruit and Tree Nut Combination Farming
- 111339 Other Non-Citrus Fruit Farming
- 111411 Mushroom Production
- 111412 Other Food Crops Grown Under Cover
- 111421 Nursery and Tree Production
- 111422 Floriculture Production
- 115112 Soil Preparation, Planting, and Cultivating*
- 115113 Crop Harvesting, Primarily by Machine*
- 115114 Postharvest Crop Activities (except Cotton Ginning)*
- 115115 Farm Labor Contractors and Crew Leaders*
- 115116 Farm Management Services*

*These industries include a blend of specialty crop and non-specialty crop activity. We applied adjustment factors to isolate solely the specialty crop component from inclusion in the cluster.