

Economic Contributions of San Luis Obispo County Agriculture



CROP REPORT PLUS

Agricultural Impact Associates 
"Quantifying the value of California agriculture"

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Economic Contributions of San Luis Obispo County Agriculture

SAN LUIS OBISPO COUNTY AGRICULTURE:

- ...contributes a total of **\$1.87 billion** to the local economy, including:
 - \$1.3 billion in direct economic output, which represents 8.1% of the county's total direct economic output.
 - \$578 million in multiplier effects, additional economic output in the form of expenditures by agriculture companies and their employees.
- ...provides **20,645 jobs** in San Luis Obispo County economy, including:
 - 15,619 direct employees, which is 9.7% of all jobs in the county or about 1 out of every ten workers.
 - 5,027 additional jobs made possible through multiplier effects, i.e. from expenditures by agriculture companies and their employees.
- ...makes **\$45.9 million** in indirect business tax payments, which represents 10% of the county's entire annual \$450 million budget.
- ...has exceptional crop diversity that provides critical economic stability within agriculture and to the county economy as a whole.

INTRODUCTION

Residents and visitors alike know and value the rural character of San Luis Obispo County. Farmers markets overflow with fresh produce and community spirit. Cattle graze the hillsides. Strawberries, grapes, and more than a hundred other crops grow in fertile soils and a moderate climate. Clearly, agriculture plays a key role in sustaining a healthy local economy. What's not so clear, however, is the true size of that role. How much money does agriculture pump into the local economy? How many jobs does agriculture support? In other words, just how important is agriculture as a driver of the county's economic health?

This report sheds light on these and related questions. Using multiple data sources and advanced economic modeling techniques, it analyzes agriculture's total contribution to the San Luis Obispo County economy. The report also examines agricultural diversity and its role in supporting economic resiliency, including a first-ever quantitative measure. On the whole, the findings offer important information for policy makers, the agricultural industry, the public, and anyone who values a vibrant local economy.



OUR APPROACH

When it comes to economic analysis, it's important to examine the fullest possible range of economic contributions. This report does that by focusing not just on direct economic effect such as farm production and employment, but also on multiplier effects. Multiplier effects are ripples through the economy. These ripples include inter-industry "business to business" supplier purchases, as well as "consumption spending" by employees. The **Multiplier Effects** section below explains this further.

It's appropriate to calculate multiplier effects when analyzing what economists call a basic industry. A basic industry is one that sells most of its products beyond the local area and thus brings outside money into local communities. Agriculture is a basic industry in San Luis Obispo County, so this report includes multiplier effects when describing agriculture's total economic contribution.

Our analysis only examines agriculture's economic contributions. To understand agriculture's full economic impact, one would also need to assess agricultural-related costs to society, for example net impacts on water and other natural resources. These impacts are important but lie beyond the scope of this study.

Our calculations draw from local and national data sources. Local sources include industry experts and the San Luis Obispo County Department of Agriculture's annual crop reports. Local experts included agriculture industry organizations and especially the county's Agricultural Liaison Advisory Board (ALAB), members of which provided critical input into the research. National data sources included federal government statistics and a widely used economic modeling program called IMPLAN®. Where data judgments were required, we used the most conservative (lowest) numbers and adjusted IMPLAN figures based on consultations with local experts and other sources. Except where otherwise noted, all figures are from the year 2011. Please contact the authors for additional details on the methods used.

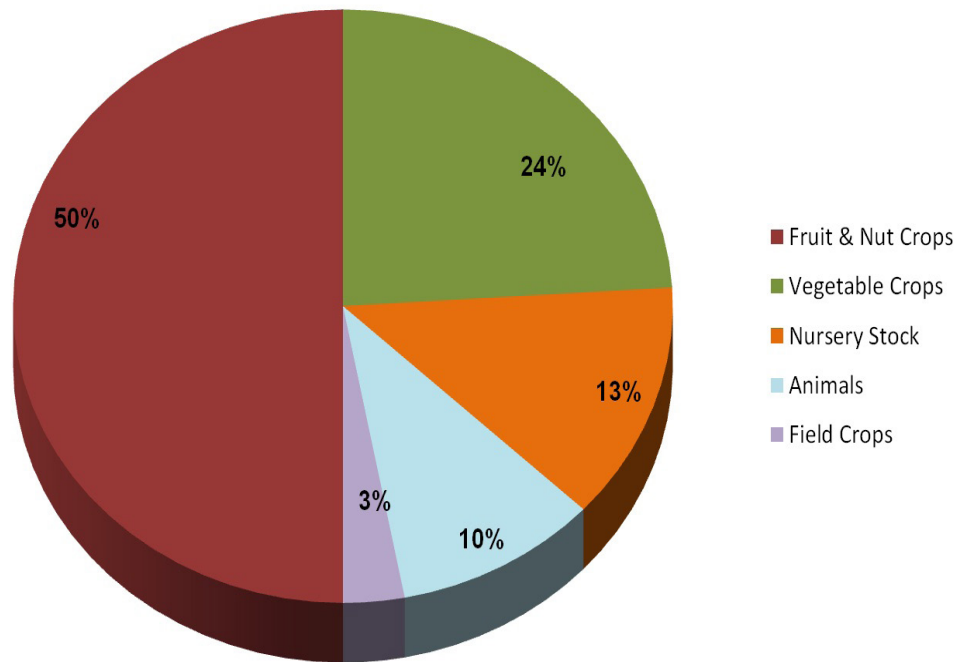
"DIRECT EFFECTS" OF SAN LUIS OBISPO COUNTY FARM PRODUCTION

This section focuses on the simplest measures of economic output: production and employment. It describes total farm production and how production has changed over recent years, as well as the number of agriculture jobs.

Figure 1 shows the various categories that make up San Luis Obispo County farm production value. Fruit and Nut Crops are the single largest production category by dollar value (50%). Key crops in this \$370 million category include strawberries (\$179 million), grapes (\$130 million), and avocados (\$17 million). Vegetable Crops represent the second largest category (\$170 million), including key crops such as broccoli (\$46 million) and lettuce (\$27 million). Together, these two categories account for 74% of the county's direct farm production values.

Total farm production value for 2011 was \$736 million. This figure comes from local industry surveys by the San Luis Obispo County Department of Agriculture, with validation by the federal government's economic data and by modeling from IMPLAN. This is a gross value that does not reflect net profit or loss experienced by individual growers or by the industry as a whole. Also, the figure does not include certain sectors that some California counties include under Agriculture, for example, forest products (\$3.8 million) and commercial fishing (\$4.0 million).

FIGURE 1. DISTRIBUTION OF SAN LUIS OBISPO COUNTY AGRICULTURE BY PRODUCTION VALUE



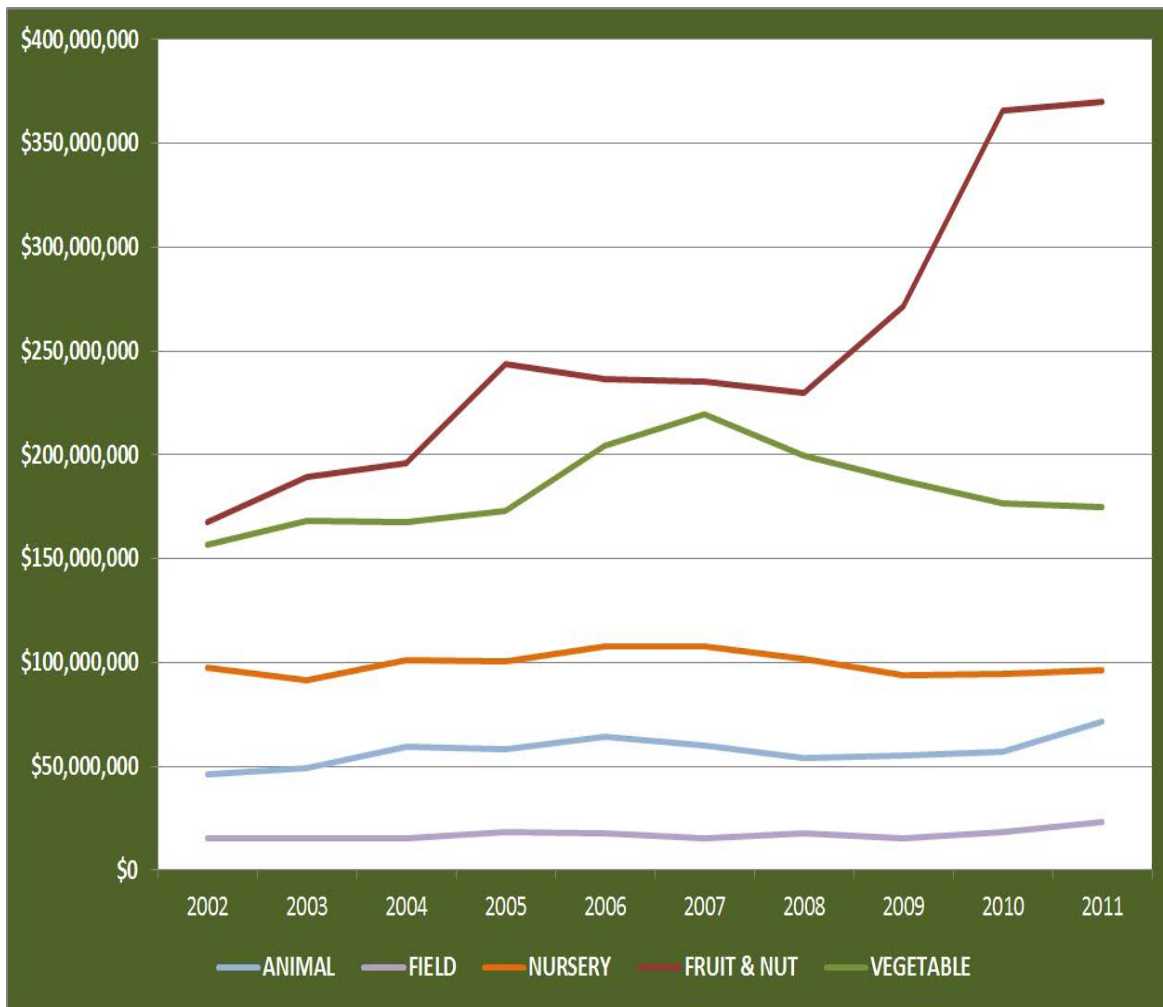
Source: 2011 San Luis Obispo County Crop Report and IMPLAN

How has farm production changed over time? Crop Reports often show production trends for the ten previous years. **Figure 2** takes such analysis a step further by specifying not just the production trend, but also the growth rates. It also adjusts for inflation using a standard measure called the Consumer Price Index (CPI).

For example, the cumulative growth in agricultural production for ten years following 2001 was 50.3%, from \$490 million to \$736 million. Such growth is especially impressive given that two economic recessions occurred during this time. Based on the Consumer Price Index, inflation totaled 27% over the decade. This means that the “real” (inflation adjusted) production increase was 23.3%, or just under half the original figure. Growers made more revenues than ever in 2011, but they also paid 27% more for tractors, seed, gas, and everything else compared to a decade prior. **Figure 2** shows inflation-adjusted effects on specific production categories. Vegetable Crops and Nursery Stock, for example, were both negative for the decade.



FIGURE 2. TEN YEAR TRENDS IN GROSS PRODUCTION VALUES



	Production Value		Total Change	Inflation-Adjusted
	2001	2011		
Vegetable Crops	\$152,531,000	\$174,981,000	14.7%	-12.3%
Fruit & Nut Crops	\$182,415,000	\$370,365,000	103%	76%
Nursery Stock	\$91,295,500	\$96,454,000	5.7%	-21.3%
Field Crops	\$17,025,000	\$22,929,000	34.7%	7.7%
Animals	\$46,517,000	\$71,479,000	53.7%	26.7%

How many people work in agricultural production? Agricultural production directly employed 12,276 people in San Luis Obispo County. The figure includes farm workers as well as proprietors but does not include food processing jobs, which we discuss below. The figure includes farm workers who may reside outside of San Luis Obispo County, but work primarily within the county. It does not include minor employment attributable to the forestry sector (15 jobs) and commercial fishing (54 jobs). Unfortunately, employment data for prior years are incomplete and poor quality, making historical comparisons impractical.

"MULTIPLIER EFFECTS" OF SAN LUIS OBISPO COUNTY FARM PRODUCTION

This section quantifies the economic "ripples" that farm production creates in the local economy. These ripples take two forms: indirect effects and induced effects. The first consists of "business to business" supplier purchases. For example, when a grower buys farm equipment, fertilizer, seed, insurance, banking services, and other inputs, the grower creates indirect effects. The second ripple type, induced effects, consists of "consumption spending" by agriculture business owners and employees. They buy housing, healthcare, leisure activities, and other things for their households. All of this spending creates ripples in the economy.

Figure 3 shows agriculture's direct, indirect, and induced economic effects within the county, for major production categories. The numbers are based on IMPLAN, which is rooted in U.S. Bureau of Economic Analysis production categories and data and other sources, with adjustments based on local research and expert input. Note that category names differ from the County's annual crop reports. They follow a standard classification system used nationwide, called the North American Industrial Classification System (NAICS). Each NAICS category has an explicit definition. For example, "Support activities for agricultural production" refers to soil preparation, planting, cultivating, harvesting, labor contracting, postharvest crop activities, and various other farm management services.

Agricultural production created \$1.1 billion in total economic output within the county. The indirect and induced spending supported an additional 3,589 jobs within the county, bringing agriculture-related production's total employment to 15,864.

FIGURE 3: ECONOMIC EFFECTS OF FARM PRODUCTION

Farm Production Sector	Direct	Indirect	Induced	Total
	Output Effect (\$ Millions)			
Fruit farming	\$384	\$94.4	\$104.1	\$582.7
Vegetable and melon farming	\$159	\$41.7	\$36.7	\$237.6
Greenhouse, nursery, and floriculture production	\$81	\$10.7	\$22.3	\$114.3
Support activities for agriculture and forestry	\$37	\$2.9	\$21.4	\$60.9
Cattle ranching and farming	\$34	\$23.8	\$2.3	\$59.9
All other crop farming	\$17	\$7.0	\$2.7	\$26.7
Tree nut farming	\$18	\$4.0	\$3.5	\$25.2
Animal production, except cattle, poultry & eggs	\$4	\$0.9	\$0.4	\$5.7
Grain farming	\$2	\$0.8	\$0.2	\$2.9
Total Economic Output	\$736.2	\$186.2	\$193.5	\$1,116.0
Employment Effect (# Jobs)				
Total Employment	12,276	1,908	1,681	15,864

Sources: IMPLAN, U.S. Bureau of Economic Analysis. All figures are for 2011.

Farm production tells only part of the story. San Luis Obispo County is home to several food processors that play a key role in the local economy. This section captures the economic value of local food processing. It is neither an exact science nor a full assessment, but rather gives the reader a basic overview of the topic.

To avoid overstating the numbers, we only included food manufacturers and sectors that fit two strict criteria: 1) they use mostly local agricultural inputs; and 2) they are unlikely to exist here without the presence of the associated agricultural sector. Many processing facilities would not exist in San Luis Obispo County were it not for the abundant supply of animals, vegetables, fruit, and other raw agricultural products. For example, more than 50 local olive growers produce oil using the world's largest mobile olive miller. A recent local land use ordinance has facilitated this kind of value added processing.

In an opposite example, we did not include the county's \$10 million per year coffee and tea manufacturing sector because its raw product (coffee beans and tea leaves) are produced elsewhere. Similarly, we excluded the county's \$6

million beer brewing industry because local brewers get most of their barley, hops, and other key ingredients from the Pacific Northwest and Germany. The same applies to the county's \$42.3 million/year seasoning and dressing manufacturing sector, with most spice ingredients sourced outside the county.

We also took precautions to avoid double-counting. For example, we did not factor wine grape production into this section because the Farm Production section above already captures the dollar value of wine grapes. We only calculated the dollar value that wineries add to wine grapes by producing wine.

Figure 4 shows the economic effects of locally sourced, value added food processing. As described earlier, it uses



relevant categories and data adapted from IMPLAN, which come from the U.S. Bureau of Economic Analysis and the NAICS. For example, the category "All other food manufacturing" includes processed leafy greens, peeled or cut vegetables, and other perishable prepared foods. We selected categories and validated the numbers in consultation with our advisory group of local experts, in particular members of the county Agricultural Liaison Advisory Board.

Note that the local wine industry has commissioned studies providing in-depth analysis beyond what is possible in this shorter, more general study. This includes, for example, estimating the retail value of local wines that are sold in stores and restaurants nationwide. It also includes the greater geographical area lying beyond the county boundary.

One study commissioned by the Paso Robles Wine Country Alliance and the Economic Vitality Corporation attempted to estimate the amount of tourism revenue and employment attributable to wineries. The study acknowledged significant challenges and uncertainties associated with such estimates. According to the 2007 study, an estimated 12% to 21% of tourists to San Luis Obispo County visit at least one winery. While the actual economic impacts of wine tourism and other forms of agricultural tourism remain elusive and are not included in the current analysis, they are no doubt significant given tourism's prominent role in the county economy.

Local food processing produced an estimated \$559 million in direct output. Multiplier effects bring the total value to \$758 million. The sector directly employed 3,343 workers. These workers and their employers spent enough money in the local economy to support an additional 1,438 jobs, bringing the total food processing employment effect to 4,781. Wineries account for the overwhelming majority of these totals: 90.0% of output and 94.6% of employment.

FIGURE 4: ECONOMIC EFFECT OF LOCALLY SOURCED, VALUE-ADDED FOOD PROCESSING

Selected Food Processing Sectors	Direct	Indirect	Induced	Total
	Output Effects (\$ Millions)			
Wineries	\$498.3	\$129.2	\$54.5	\$682.1
Fats and oils refining and blending (olive oil)	\$39.4	\$4.8	\$1.0	\$45.2
Fruit and vegetable canning, pickling, and drying	\$14.2	\$3.6	\$1.2	\$18.9
Animal (except poultry) slaughtering, rendering & processing	\$4.0	\$3.0	\$0.4	\$7.4
All other food manufacturing	\$3.5	\$0.8	\$0.3	\$4.6
Total Economic Output:	\$559.4	\$141.3	\$57.4	\$758.1
Employment Effect (# Jobs)				
Total Employment:	3,343	941	497	4,781

Sources: IMPLAN, U.S. Bureau of Economic Analysis, and local industry experts. All figures are for 2011.

TOTAL ECONOMIC CONTRIBUTION OF SAN LUIS OBISPO COUNTY AGRICULTURE

The previous sections have provided key pieces to an economic puzzle. This section combines those puzzle pieces into a final picture showing the overall economic effect of San Luis Obispo County agriculture.

As **Figure 5** shows, the total economic contribution of San Luis Obispo County agriculture is just under \$1.9 billion. This consists of \$1.3 billion in direct output from production and processing, plus \$578 million in multiplier effects. Total employment is 20,645. This includes 15,619 jobs directly in agriculture, which represents 9.7% of the county's total jobs or about 1 out of every 10 workers. Note that Agriculture companies paid \$45.9 million in indirect business taxes. This included excise taxes, property taxes, fees, licenses, and sales taxes. It did not include taxes on profit or income. To put that number in perspective, it represents about 10% of the entire \$450 million San Luis Obispo County budget for 2011-2012.

FIGURE 5. OVERALL ECONOMIC EFFECTS OF SAN LUIS OBISPO COUNTY AGRICULTURE

Type of Effect	Direct	Indirect	Induced	Total
Farm Production Sector				
Output Effect (\$ Millions)	\$736	\$186	\$194	\$1,116
Employment Effect (# Jobs)	12,276	1,908	1,681	15,864
Locally Sourced, Value Added Food Processing Sector				
Output Effect (\$ Millions)	\$559	\$141	\$57	\$758
Employment Effect (# Jobs)	3,343	941	497	4,781
Total Value of Agricultural Sector				
Output Effect (\$ Millions)	\$1,296	\$328	\$251	\$1,874
Employment Effect (# Jobs)	15,619	2,849	2,178	20,645

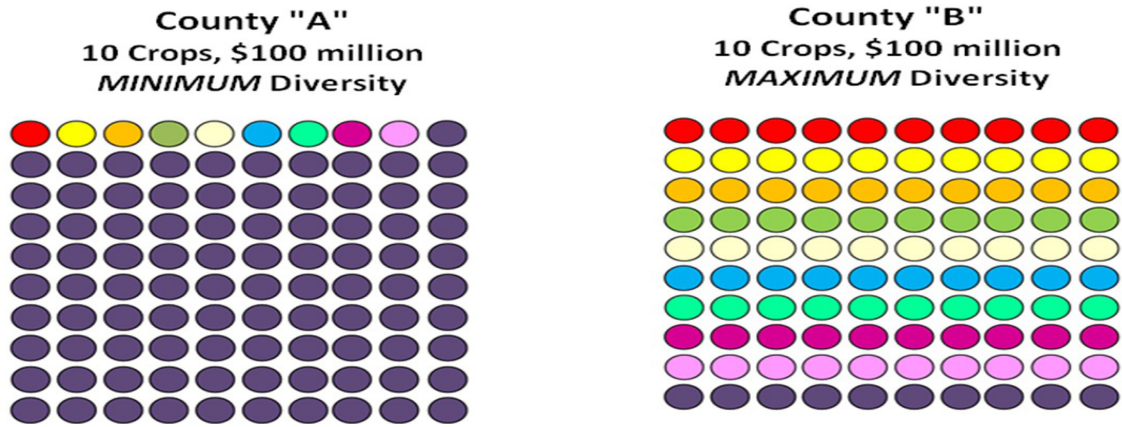
THE VALUE OF AGRICULTURAL DIVERSITY

Economists like to disagree on things but there’s one thing they all can agree on: a diverse economy is a resilient economy. Any region that depends on a large number of economic sectors will generally be less vulnerable to catastrophic shocks. This important economic principle applies to agricultural diversity, too. For example, a county with just one or two main crops faces higher vulnerability to shocks in the form of price drops, disease outbreaks, new regulations, new competitors, spikes in the cost of key inputs, and other unpleasant surprises. Meanwhile, a county with a diverse agricultural industry can withstand shocks to certain crops without unraveling the entire agricultural economy. Bottom line: having “all your eggs in a single basket” is never a good idea, especially when it comes to something as economically important as agriculture. Agricultural diversity is like a valuable insurance policy against economic calamity, the premiums and coverage for which have never been calculated.

Unfortunately, robust measures of San Luis Obispo agricultural diversity do not exist, let alone its economic value to the county. People see diverse crops growing in well tended fields and farmers markets overflowing with different kinds of food, but no one has attempted to quantify that diversity. Part of the reason is that measuring diversity is a complex job. It requires more than just counting the different things for sale at the farmers market or listed in the County’s annual crop report. Measuring diversity includes the number of different crops grown, as well as an assessment of their economic abundance or evenness.

For example, imagine two California counties where the annual farm production value is \$100 million each. Both counties grow ten different kinds of crops. In County “A,” a single crop contributes 91% of the revenue and the nine other crops make up 1% each (see Figure 6 below). In County “B” the ten crop types all contribute equally, at 10% each. Both counties have the same number of crops and total revenues, but County “B” is much more diverse. Thus, we could expect County “B” to be much more resilient to economic shocks than County “A”.

FIGURE 6. AGRICULTURAL ECONOMIC DIVERSITY IS MORE THAN JUST THE NUMBER OF CROPS



Because economic diversity is so important, economists have developed sophisticated tools for measuring it. The most popular one is a summary statistic called the Shannon-Weaver Index. The index is based on the Shannon-Weaver entropy function, which was created in 1949 and is widely used in both ecology and economics. Economists and ecologists alike use the same formula to calculate the Shannon-Weaver Index.

The lowest possible index score is 0.00. Zero represents an extreme case where all economic output occurs in only one sector. In ecology, this would be a rain forest with only one species. In agriculture, it would be a county with just one commercial crop. The other extreme – an open system where potential diversity is unlimited – would have a much higher score. The higher the score, the greater the diversity.

To measure agricultural diversity in San Luis Obispo County, we started by creating a list of specific crops mentioned in the County's annual crop reports. We only used crops for which production values were provided, even though the total number of commercial crops grown in the county is probably much larger. For example, broccoli had \$46.2 million in revenues for 2011 and avocados had \$17.3 million. Careful lumping and splitting resulted in 38 different crop categories consistently reported over the past decade. Next, we applied the list of crops and production values to the formula above. This resulted in a 2011 Shannon-Weaver Diversity Index score of 2.92.

By itself, the index score says little. Where it comes in handy is making external and internal comparisons. Internally, the agricultural community can track the score over time to ensure that overall agricultural economic diversity remains high. Maintaining high economic diversity in agriculture will minimize the risk of significant economic shocks, kind of like an insurance policy against economic earthquakes.

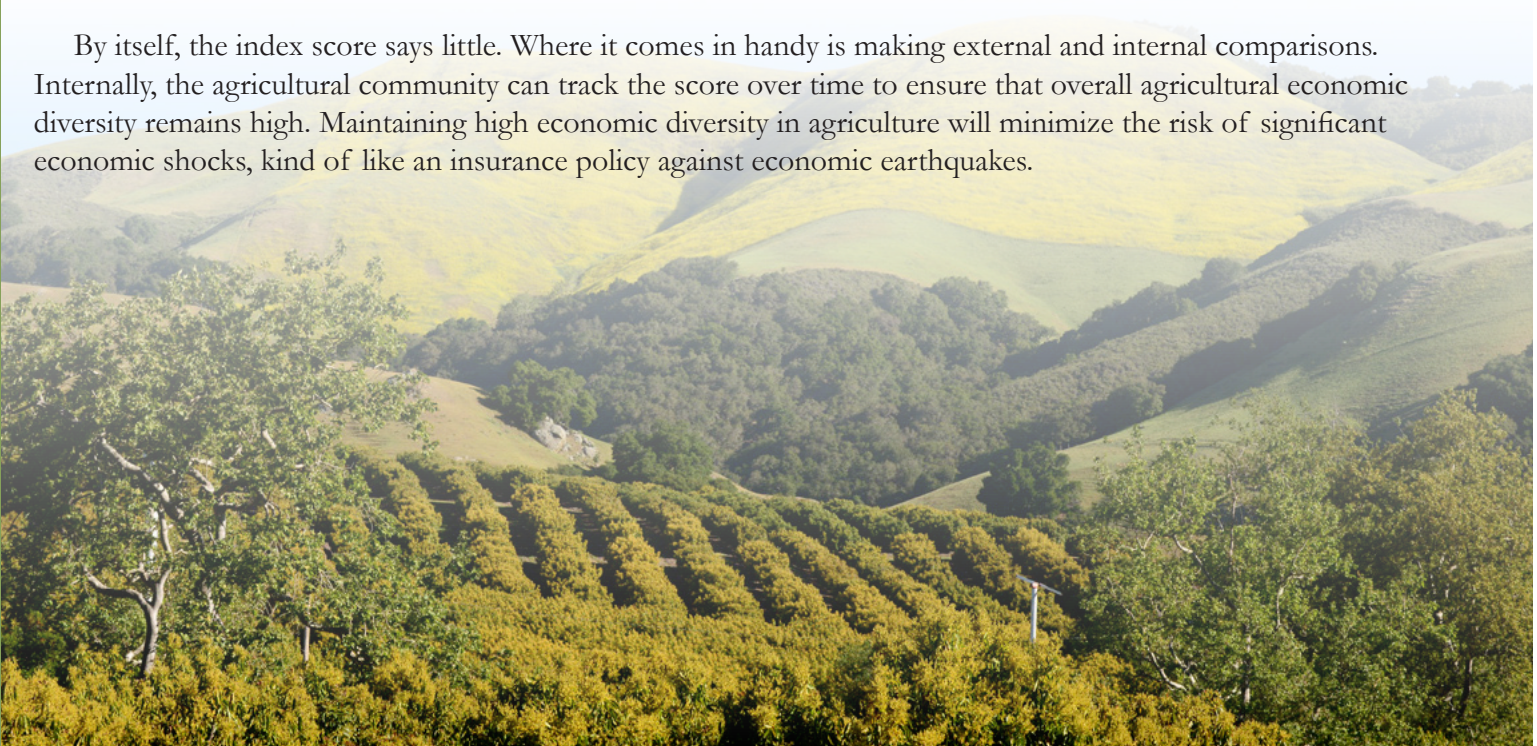
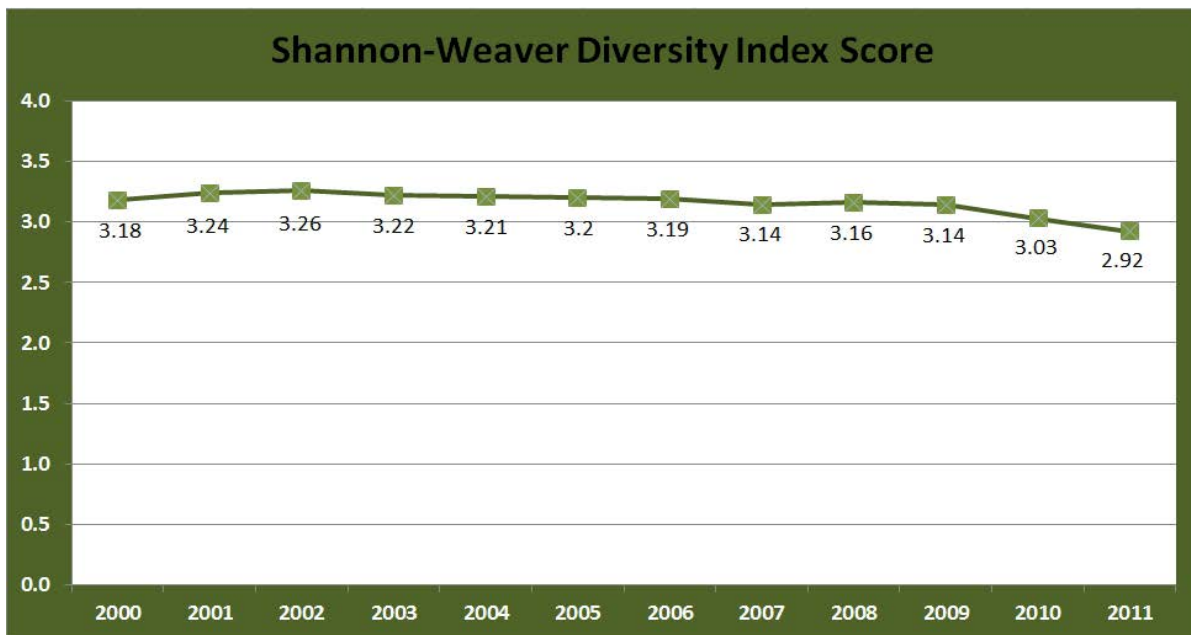


Figure 7 shows how the Shannon-Weaver Diversity Index score has changed over the past decade. Note that the diversity index was 3.18 in 2000. It rose for a couple years then trended downward for the rest of the decade, with a total drop of 12%. This does not mean that fewer crop types are being grown in the county. It means that a small number of crops have grown to represent larger pieces of the economic pie, for example wine grapes and strawberries.

Externally, the score can allow useful comparisons to other industries within the county, for example real estate, manufacturing, and tourism. It can also make comparisons possible between San Luis Obispo County agriculture and other counties in California and beyond. For example, Santa Cruz County has a diversity index of 2.01 and Madera County in the Central Valley has an index of 2.41, which at first glance seems similar to San Luis Obispo's index. But Madera County's diversity index represents only 68% of the total possible economic "evenness" across crop types. San Luis Obispo revenues are more widely distributed, representing 80% of the maximum possible evenness. This gives San Luis Obispo agriculture greater economic resiliency.

Because San Luis Obispo is an innovator when it comes to measuring agricultural economic diversity, the number of external comparisons remains limited at this time. Potential comparisons will no doubt grow over time as more counties follow San Luis Obispo's example. In the meantime, San Luis Obispo residents can take pride in having one of the most economically diverse agricultural industries anywhere, with numbers to prove it.

FIGURE 7. HOW ECONOMICALLY DIVERSE IS SAN LUIS OBISPO COUNTY AGRICULTURE?



TOWARD THE FUTURE

This report has documented the powerful role that San Luis Obispo County agriculture plays as a local economic driver. Agriculture contributes \$1.87 billion to the county economy. This far exceeds direct production values reported in the County's annual crop reports, for example the \$736 million figure reported for 2011 and the \$862 million reported for 2012. Agriculture also plays a key role in county employment, directly or indirectly supporting 20,645 jobs. Finally, agriculture's impressive diversity lends critical economic stability to the county. The economic value of this stability is certainly high, albeit hard to quantify.

Agriculture is one of San Luis Obispo County's top economic pillars and represents a vital link to both the county's cultural past and competitive future. Although this report has presented many facts and figures, it has barely begun to fill key information gaps about agriculture's role. The process of developing this report has raised several additional questions that lie beyond the scope of this report but may warrant future research. In the meantime, the findings here provide the clearest picture yet of San Luis Obispo County agriculture's economic role.

ADDITIONAL QUESTIONS TO ANSWER

- How does the impressive agricultural diversity compare internally to diversity of other economic sectors in the county such as real estate, construction, and manufacturing? How does it compare externally to agricultural diversity in other counties? What options exist for reversing the ongoing decline of agricultural economic diversity?
- What is the economic correlation between local agriculture, most notably the wine industry, and tourism? How can we quantify the interconnected impact of these two critical industries?
- What is the dollar value of wildlife habitat, open space, scenic beauty, pollination, and more than 20 other "ecosystem services" that the county's agricultural lands provide to society?
- What is the "net" economic impact of San Luis Obispo County agriculture after subtracting natural resource impacts and other costs to society? (This study has examined just one side of the coin).
- How would "shocks" affect agriculture's economic results, for example significant new regulations, labor policies, or changes in the price of key inputs?

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Researchers met with the full Agricultural Liaison Advisory Board (ALAB) in early 2013 to discuss the project, gather input from local experts, and facilitate ongoing input from ALAB members. ALAB membership at the time of writing included: Mary Bianchi (U.C. Cooperative Extension), Lisen Bonnier (District 2), Jerry Diefenderfer (District 5), Richard Hawley (Environment), Tom Ikeda (District 3), Eric Michielssen (Organic/Direct Marketing), Dick Nock (Cattlemen), Mark Pearce (Agricultural Finance), Charles Pritchard (Resource Conservation District, Upper Salinas / Las Tablas), David Pruitt (Nursery Representative), Neil Roberts (Wine Grape Representative), Cindy Steinbeck (District 1), Bill Struble (District 4), R. Don Warden (Farm Bureau), Claire Wineman (Vegetable Representative), Jean-Pierre Wolff (Resource Conservation District, Coastal San Luis).

NOTES



San Luis Obispo County

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