Economic Contributions of LAKE County AGRICULTURE

COUNTY OF LAKE
STATE OF CALIFORNIA

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Commissioner's Letter

I am pleased to share the **Economic Contributions of Lake County Agriculture**. This report takes an important step beyond the Lake County Crop & Livestock Report that we have published every year for nearly a century. Instead of stopping at crop production values and acreage, it quantifies agriculture's total economic contributions through production, local processing, employment and economic multiplier effects.

In short, this report uses twenty-first century economic tools to document agriculture's broader role in sustaining a thriving local economy.

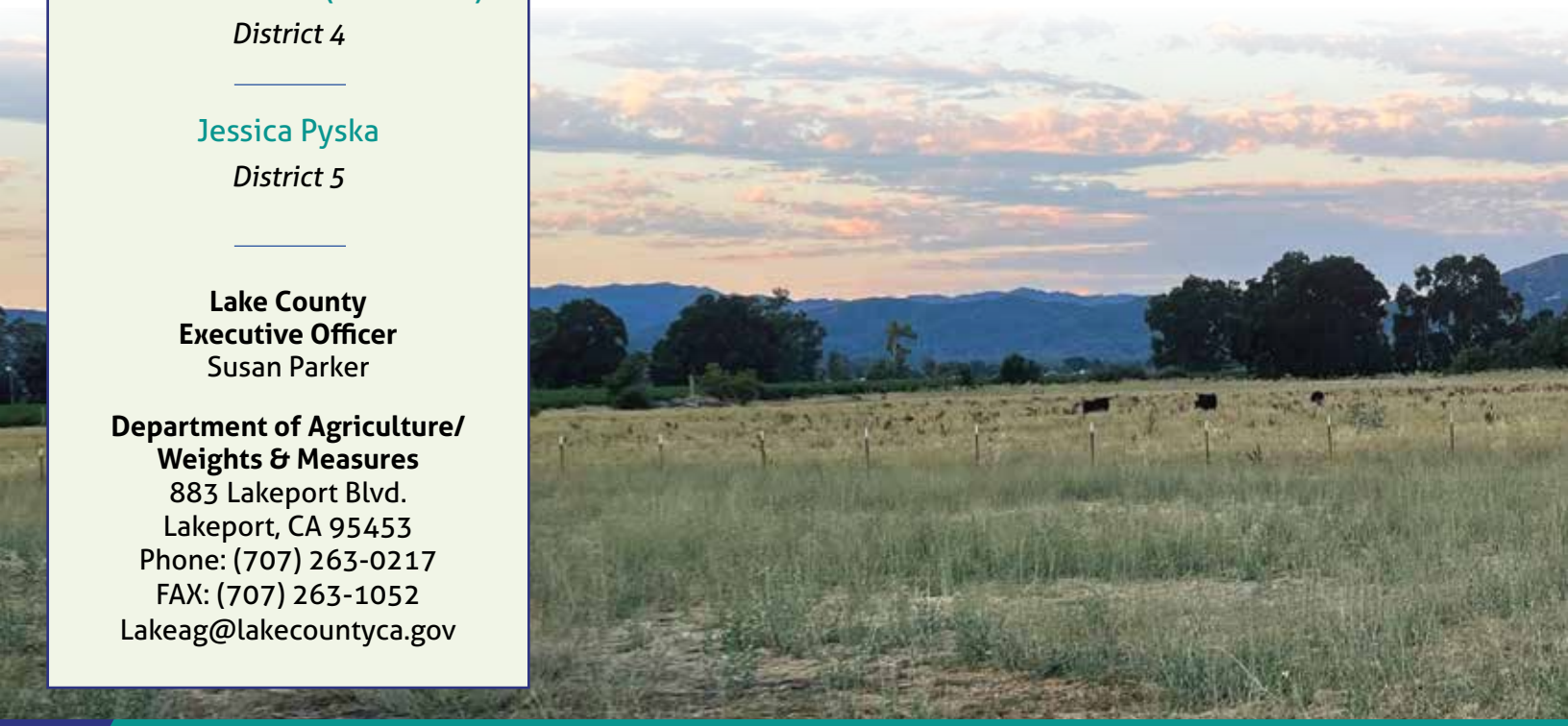
This new study shows that in 2023, agriculture contributed a total of $300,175,932 to the county economy. This far exceeds the $140,366,720 value from our 2023 Lake County Crop & Livestock Report. Agricultural production and processing also directly supported 1,460 jobs, plus another 647 employees from multiplier effects.

In addition, this report documents the level of economic diversification within agriculture, which has important implications for agriculture and the greater county economy.

Agriculture has a long tradition in Lake County. For more than a century, it has been a pillar of our economy and culture. With this report, we deepen our understanding of that tradition and renew our commitment to sustaining it well into the future.

Respectfully submitted,

Katherine VanDerWall
Agricultural Commissioner / Sealer of Weights & Measures



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Published August 2025

Lake County Agriculture at a Glance

Economic Contributions
of the Agricultural Industry for 2023

$300.2 MILLION | Lake County Agriculture's total contributions to the local economy

$224.3
MILLION in direct economic output

$75.9
MILLION in multiplier effects

$822,400
per day

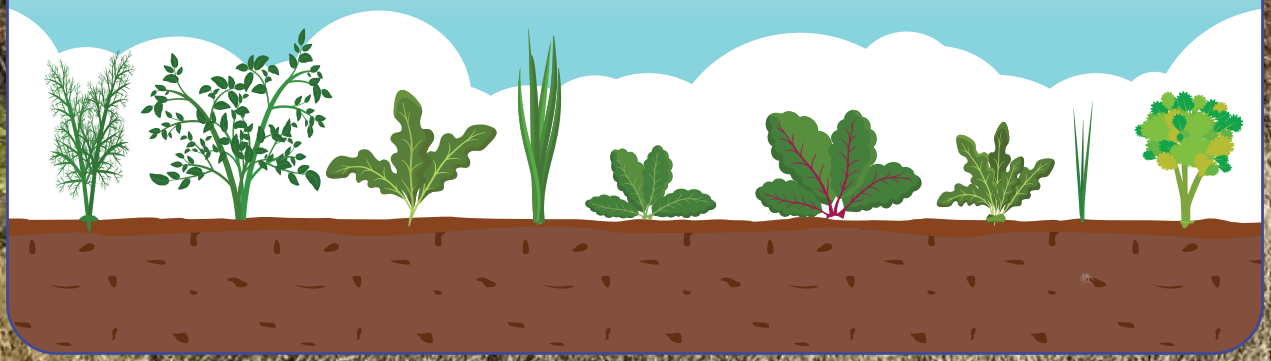
Employment Effects
of the Agricultural Industry

2,107
total jobs

1,460
direct employees across production & processing

647
additional jobs attributable to multiplier effects: expenditures by agricultural companies and their employees

1 in 17
jobs in Lake County attributable to the agricultural industry



Introduction

Nestled in California's scenic coastal ranges, Lake County boasts a vibrant agricultural landscape renowned for its premium vineyards and historic pear orchards. The region's Mediterranean climate and rich volcanic soils create ideal conditions for world-class winegrapes, the county's leading crop. Once celebrated as the "Pear Capital of the World," Lake County still produces exceptional mountain pears, especially in the fertile Big Valley. With clean air, abundant water and a welcoming farming community, Lake County offers a unique blend of tradition and innovation in agriculture.

Clearly, agriculture plays a vital role in the Lake County 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 Lake 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 Lake County economy. The report also examines economic diversification in agriculture and its implications for resilience to economic shocks. On the whole, the findings offer important information for policymakers, the public and anyone who values a vibrant and resilient local economy.

Our Approach

A *basic industry* sells most of its products beyond the local area and thus brings outside money into local communities. Agriculture easily qualifies as a basic industry in Lake County. Calculating a reasonable range of economic contributions by a basic industry entails quantifying three economic areas: 1) *direct* economic effects; 2) *indirect* economic effects; and 3) *induced* economic effects. This report covers all three.

Direct economic effects include farm production, local processing and their related employment. *Indirect* effects consist of inter-industry, business-to-business supplier purchases. *Induced* effects reflect consumption spending by employees. The **Multiplier Effects** section on page 8 explains this further.

To understand the furthest economic impacts of agriculture, one would also need to assess agricultural-related costs to society through, for example, net impacts on water and other natural resources. While important, a full assessment of these impacts lies beyond the scope of this study.

Our calculations draw from local and national data sources. The local sources include industry experts and the annual Lake County Crop & Livestock Report produced by the Lake County Department of Agriculture. The main national data source is IMPLAN, a widely used economic modeling program (see www.implan.com).

Originally created for the U.S. Department of Agriculture (USDA), IMPLAN uses econometric modeling to convert data from more than a dozen government sources into local values for every U.S. county and zip code across 546 industry sectors. Because IMPLAN draws from multiple sources, including the most recent USDA Census of Agriculture, its employment and economic output numbers often differ from those reported by individual state and federal agencies. For details, please see "Data Sources for Select Industries: Farm, Construction, Railroad, and Government" on the company website: http://bit.ly/4e0if2Z. Except where otherwise noted, all figures are from 2023, the most recent IMPLAN dataset available. Where appropriate, we adjusted sector names for clarity and applied coefficients to IMPLAN values to reflect unique Lake County conditions. Please contact the authors for additional details on the methods used.

Direct Effects of Lake County Farm Production

This section focuses on the simplest measures of economic activity: production and employment. It describes total farm production and the number of agricultural jobs.

PRODUCTION

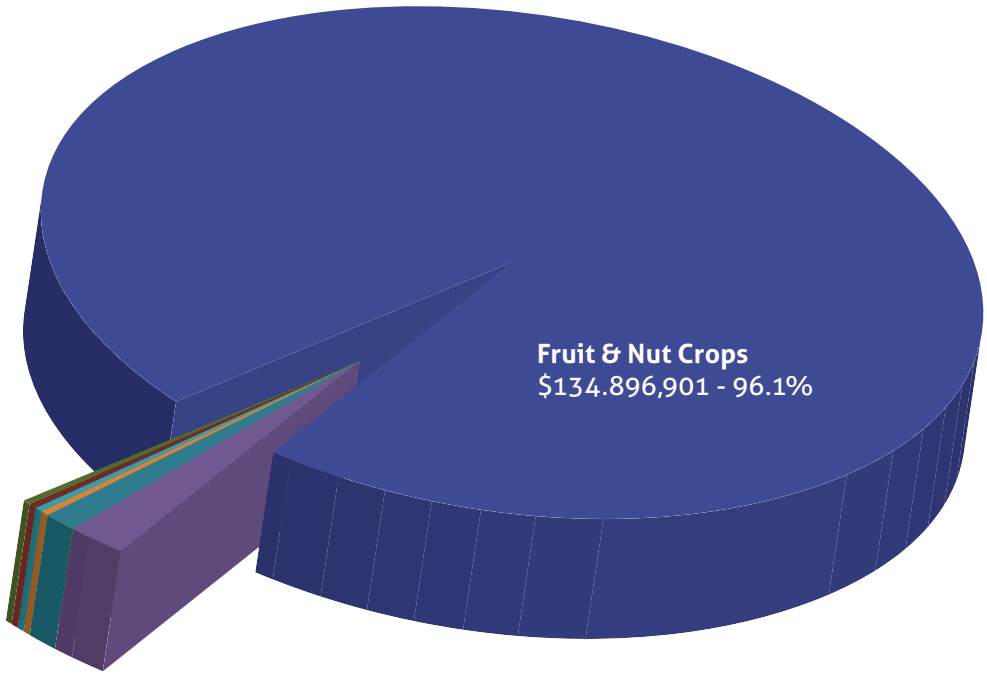
Figure 1 shows the various categories that made up Lake County's farm production value. At $134,896,901, Fruit & Nut Crops was the single largest production category by dollar value, comprising 96.1% of the county total. Wine Grapes dominated this category at $114,621,613. Pears followed at $19,699,538.

At 1.87%, Livestock Production represented the second largest category ($2,625,660). Cattle & Calves topped this grouping ($1,815,025). Field & Seed Crops was the third largest category at $1,688,800 (1.20%), led by rangeland ($1,170,000).

The combined total dollar value for all agricultural products increased $47,270,454 over the previous decade, from $93,096,266 in 2014 to $140,366,720 in 2023. This represents a 50.8% increase, or 23.5% after adjusting for 27.3% inflation that occurred during the period. These values represent gross output and do not reflect the net profit or financial performance of individual growers or the industry as a whole. Interested readers are encouraged to consult the county's 2023 Lake County Crop & Livestock Report for additional details on specific products and their value.

Figure 1. Distribution of Lake County Farm Production

Source: 2023 Lake County Crop & Livestock Report, Office of the Lake County Agricultural Commissioner/Sealer of Weights & Measures



Timber
$1,566 - 0.001%

Livestock & Poultry Products
$461,003 - 0.33%

Field & Seed Crops
$1,688,800 - 1.20%

Vegetable Crops
$186,123 - 0.13%

Nursery Crops
$506,667 - 0.36%

Livestock Production
$2,625,660 - 1.87%

EMPLOYMENT

How many people work in agricultural production? In 2023, IMPLAN data indicate that agricultural production directly employed 1,009 people in Lake County. This figure encompassed a wide range of production-related jobs, including not just growing and harvesting, but also sales, marketing and many other roles. It did not include food processing jobs, which are discussed on page 11. Nor did it include Lake County's public sector jobs in agriculture across a range of local, state and federal agencies.

Readers who want to know more about employment estimates are encouraged to consult IMPLAN's "Data Sources and Procedures Data Sources for Select Industries: Farm, Construction, Railroad, and Government" article referenced earlier. In general, IMPLAN data attempts to correct for omissions and inconsistencies among other sources. For example, IMPLAN counts farm owners (proprietors) even though other sources do not. IMPLAN also corrects for certain crops with low production levels not being reported by other sources due to disclosure laws that protect the privacy of individual producer data. Last, IMPLAN counts part-time workers differently than the USDA Census of Agriculture. Imagine a farm with six people who work two months each, sequentially in a year. The Census of Agriculture would report that as six jobs, whereas IMPLAN would consider it to be just one job – one job that happens to be filled by six different temporary workers.

Multiplier Effects of Lake County Farm Production

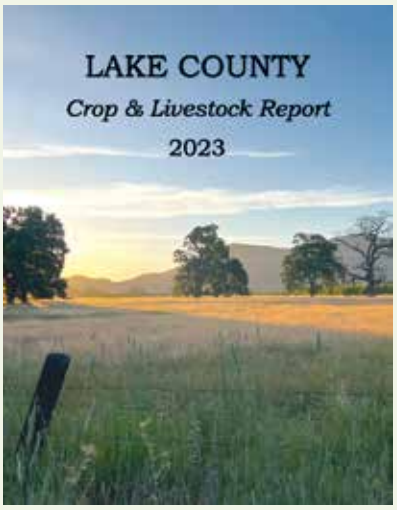
This section quantifies the economic ripples that farm production creates in the local economy. These ripples take two forms: *indirect effects* and *induced effects*. The first consists of business-to-business supplier purchases. For example, when a Lake County producer buys vehicles, machinery, fertilizer, fuel, chemicals, insurance, banking services, veterinary supplies and other inputs, the producer creates *indirect effects*. The Lake County Farm Bureau website lists more than 70 of these businesses by name (Lakecofb.com).

The second ripple type, *induced effects*, consists of consumption spending by the combined owners and employees of agricultural businesses and their suppliers. They pay for groceries, housing, healthcare, leisure activities and other things for their households. All this spending creates ripples in the economy.

Although agricultural companies, suppliers and their combined employees certainly spend money in other counties, this study only reflects those expenditures within Lake County. Quantifying expenditures outside the county would be an expensive, complex effort that lies well beyond our scope here.

Figure 2 shows agriculture's *direct*, *indirect* and *induced* economic effects within the county across major production categories. The numbers reflect IMPLAN multipliers for each sector, which are rooted in the most recent U.S. Bureau of Economic Analysis input-output models.

The following list helps bridge NAICS and IMPLAN sectors in **Figure 2** with familiar commodities listed in the 2023 Lake County Crop & Livestock Report:



- **Fruit Farming:** Wine Grapes (Red), Wine Grapes (White), Pears (Barlett, Others), Misc. Fruit (Apples, Melons, Peaches, Strawberries, Olives).
- **Cattle & Other Animal Products:** Apiary, Cattle & Calves, Eggs, Misc. Livestock (Goats, Sheep, Hogs, Rabbits, Chickens, Other Birds), Wool.
- **Field, Seed & All Other Crop Farming:** Irrigated Pasture, Rangeland, Seed Crops, Misc. Field Crops (Alfalfa, Oat Hay & Grass Hay).
- **Greenhouse, Nursery & Floriculture:** Nursery Production (All).
- **Tree Nut Farming:** Walnuts.
- **Vegetable & Melon Farming:** Misc. Vegetables (e.g., Broccoli, Carrots, Celery, Lettuce, Spinach, Tomatoes), Melons.
- **Forestry & Forest Products:** Timber.

Note that sector names and production values in **Figure 2** differ from the county's annual report. They closely follow a standard classification system used nationwide called the North American Industrial Classification System (NAICS), as adapted by IMPLAN. Each year, agricultural producers in Lake County and nationwide use the NAICS categories on Schedule F of their federal tax returns ("Profit or Loss from Farming"), which requires them to designate the NAICS category that best fits their operation. Producers also use NAICS categories when completing the USDA Census of Agriculture, most recently for 2022.

Figure 2. Economic Effects of Lake County Farm Production

Figures are for 2023 and come from IMPLAN and U.S. Bureau of Economic Analysis, with adjustments for local conditions. Columns and rows may not compute exactly due to rounding.

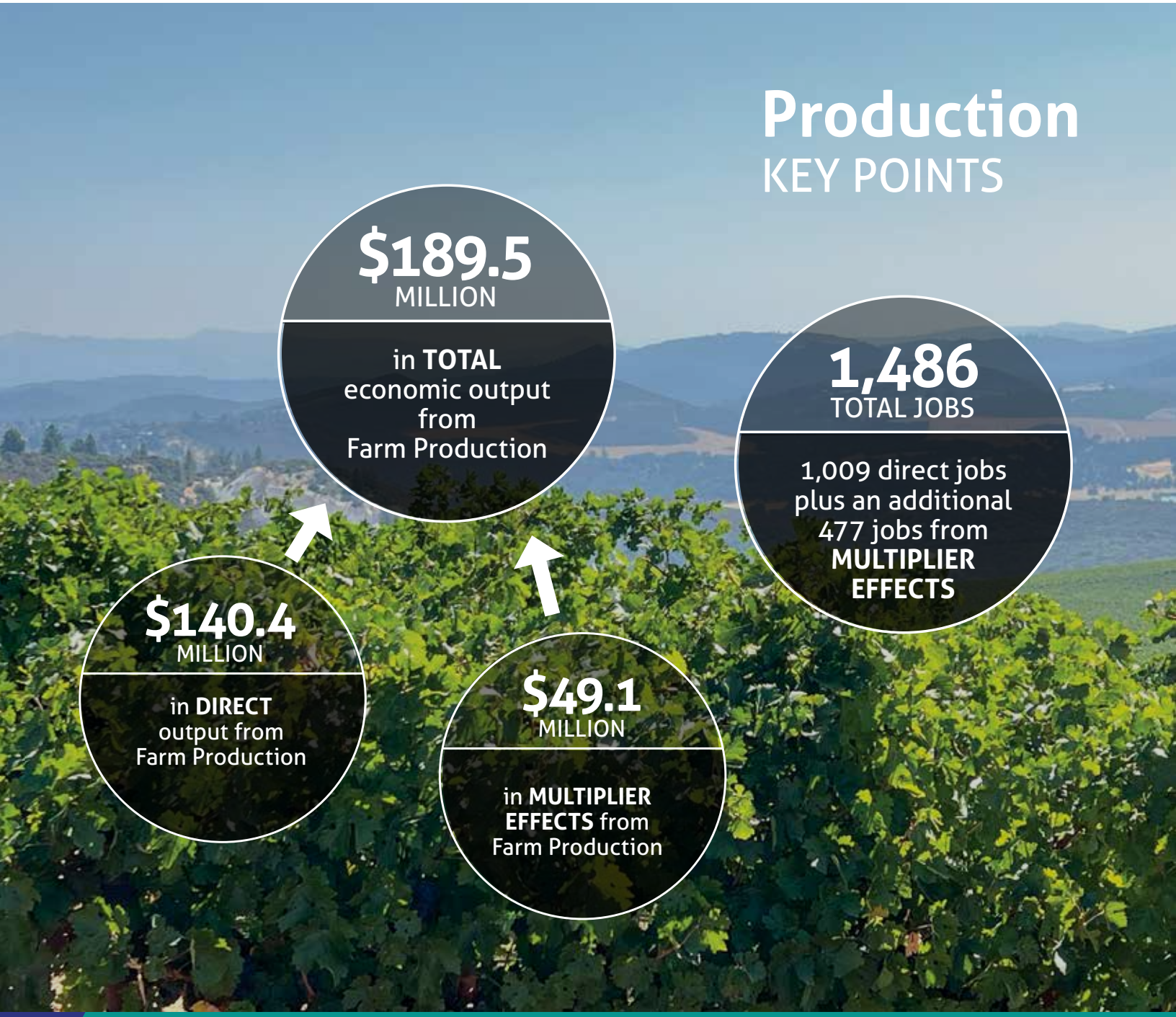
FARM PRODUCTION SECTOR	Output Effects ($ Millions)			TOTAL
	Direct	Indirect	Induced	
Fruit Farming	$134,573,017	$31,199,543	$15,240,932	$181,013,492
Cattle & Other Animal Products	$3,088,326	$1,296,869	$291,728	$4,676,924
Field, Seed & All Other Crop Farming	$1,688,775	$758,527	$151,446	$2,598,747
Greenhouse, Nursery & Floriculture	$506,667	$67,026	$21,900	$595,593
Tree Nut Farming	$323,867	$7,593	$43,199	$374,658
Vegetable & Melon Farming	$186,145	$39,173	$13,704	$239,023
Forestry & Forest Products	$1,566	$64	$254	$1,885
TOTAL ECONOMIC OUTPUT	$140,368,362	$33,368,795	$15,763,164	$189,500,322
	Employment Effects (# of Jobs)			TOTAL
	Direct	Indirect	Induced	
TOTAL EMPLOYMENT	1,009	385	92	1,486

NAICS/IMPLAN also combines familiar products in unfamiliar ways. For example, the county's annual crop report groups melons into "Fruit & Nut Crops," but NAIC/IMPLAN tracks melons under "Fruit & Melon Farming," which we shorted to "Fruit Farming" (**Figure 2**). The county's $8.1 million in walnuts appear in a standalone category called "Tree Nut Farming." Pollination services fit under the county's $53.3 million "Support Activities for Agriculture" sector, as does the light processing of pears, the drying and hulling of walnuts and many other activities embedded within **Figures 2** and **3**.

Each sector has distinct multipliers. For example, Lake County "Fruit Farming" sector in **Figure 2** had a 2023 *indirect effects* multiplier of 0.2318 and an *induced effects* multiplier of 0.1133. This means that each dollar's worth of direct output generated an extra 23 cents in supplier purchases, plus 11 cents more in consumption spending by the owners and employees of agricultural businesses and their suppliers.

Multipliers change every year for each sector and county nationwide. The multipliers update to reflect where companies and employees spent their money. For example, the *indirect effects* multiplier for Lake County "Vegetable & Melon Farming" was 0.1890 in 2017, then increased to 0.2104 for 2023.

Sectors have unique multipliers not just for economic output but also for employment. For example, Lake County "Fruit Farming" in **Figure 2** supported 977 *direct* jobs plus an additional 368 *indirect effects* jobs and 89 more from *induced effects*. The bottom row of **Figure 2** shows combined employment figures across sectors.



Locally Sourced, Value-Added Food Processing

Farm production tells only part of the story. This section captures the economic value of local food processing, which plays a key role in the Lake County economy. 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 include 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, i.e., Lake County's abundant supply of fruits and other raw agricultural products.

We also took precautions to avoid double-counting. For example, we did not factor wine grape production into this section because **Figure 2** already captured the $114,621,613 direct dollar value of wine grapes in its "Fruit Farming" row. We only calculated the value created by converting wine grapes into wine.

Nor did we include the county's $19,699,538 in pear production, since the "Fruit Farming" row in **Figure 2** already includes that value. We only calculated the value added to pears through processing into various products.

Based on these strict criteria, we excluded several IMPLAN food and beverage sectors that other studies often include. Adding these sectors could overstate the value of local agriculture, including its employment and multiplier effects. For example, we did not include Lake County's $6,775,106 in bread and bakery products output because much of the yeast, salt and other raw ingredients come from outside the county.

Figure 3 shows the economic effects of locally sourced, value-added food processing. As with **Figure 2**, the sector names borrow from IMPLAN and NAICS, which lump and split products according to a national classification system for tracking economic output.

The largest sector in **Figure 3**, **"Wineries,"** reflects the significant value added to the county's $114,621,613 million wine grape crop. Local grapes, totaling 60,377 tons harvested across 11,094 acres, were converted into a wide range of wines at facilities of various types and sizes. An operation near Clearlake Oaks, for example, crafts wines exclusively from its own vineyards and operates one of North America's biggest wine cave systems. Lake County's largest winery, with over 2,000 acres of high-elevation vineyards, focuses on regenerative agricultural practices and operates a tasting room in Lakeport. A winery north of Clearlake specializes in applying scientific research principles to viticulture, testing yeast strains and other factors to optimize wine quality. Many of the county's nearly thirty wineries add value to grapes not just through wine production, but also by hosting visitors for tastings, outdoor dinners, live music, weddings, corporate retreats, educational seminars and other events.

"Light Processing of Fruit, Nut, Vegetable & Nursery Products" in **Figure 3** encompasses post-harvest value added to the county's abundant fruits and vegetables, and, to a lesser extent, nursery stock. This category captures portions of IMPLAN's "Support Activities for Agriculture" sector that involve the sorting, grading, cleaning and packing of fresh fruits and vegetables. The sector also includes IMPLAN's "All Other Food Manufacturing" which reflects fruits and vegetables that are cut, peeled and turned into perishable foods, including ready-to-use refrigerated products.

The county's $19,699,538 pear crop features prominently in this sector. Many pears go to canneries in other counties for processing into canned pears, fruit cocktails, pear juices and related products. But a significant portion of Lake County pears go to the fresh market, where sophisticated post-harvest operations add value.

One of California's largest pear packing companies operates facilities in Lake County and exemplifies these value-added processes. First, incoming pears are immediately

placed under refrigeration and stored in controlled atmosphere facilities with ethylene monitoring to slow ripening and maintain quality. Second, pears undergo gentle washing to remove field debris and bacteria. Third, inspectors sort and grade pears based on shape, size, color, and defects. Next, pears are hand-packed into various container sizes, often including protective materials and breathable packaging to maintain freshness. Last, each package receives district-specific label identifying its Lake County origin, with complete traceability system for tracking fruit from orchard to consumer.

This comprehensive post-harvest processing system transforms pears into premium, market-ready products that command higher prices than unprocessed fruit.

Figure 3. Economic Effects of Locally Sourced, Value-Added Food Processing

Sources: Adapted from IMPLAN and U.S. Bureau of Economic Analysis data, with input from local sources. Columns and rows may not compute exactly due to rounding.

FOOD PROCESSING	Output Effects ($ Millions) Direct	Indirect	Induced	TOTAL
Wineries	$57,461,894	$12,974,034	$4,699,923	$75,135,851
Light Processing of Fruit, Vegetable & Nursery Products	$18,669,418	$123,461	$6,184,002	$24,976,880
Nuts & Other Dried Food Products Manufacturing	$5,237,947	$430,460	$266,862	$5,935,269
Meat & Other Animal Products Manufacturing	$1,824,951	$1,883,682	$107,475	$3,816,107
Miscellaneous Other Food Manufacturing	$689,493	$76,502	$45,507	$811,502
TOTAL ECONOMIC OUTPUT	$83,883,702	$15,488,138	$11,303,770	$110,675,610
	Employment Effects (# of Jobs) Direct	Indirect	Induced	TOTAL
TOTAL EMPLOYMENT	451	104	66	621

"Nuts & Other Dried Food Products Manufacturing" in **Figure 3** captures local processing of fruits, vegetables, nuts and other crops into value-added dried products for local and regional markets. The county's walnut crop offers a noteworthy example. A company in Kelseyville serves as the region's primary commercial walnut processor, providing walnut shelling and processing services to local growers and external clients in addition to processing its own estate-grown walnuts. The operation provides boxes of in-shell and shelled walnuts (halves, pieces, meal, whole) to wholesale and retail markets.

An artisanal walnut processor with over 1,000 walnut trees near Big Valley and Mt. Konocti offers another example. The operation manages one of the world's last remaining Poe walnut orchards. Hand-picked and hand-cracked walnuts undergo cold-pressing to create premium organic walnut oils, often infused with chili peppers, cannabis, and other flavors. The farm distributes products online and through Lake County farmers' markets. Finally, a 27-acre walnut orchard in Witter Springs emphasizes organic practices. All walnut farming, handling, processing and packaging meet the strict organic certification requirements.

Producers also transform certain fruits and vegetables into dried products. A 110-acre organic farm, for example, grows several items but specializes in dehydrated peppers. A diversified organic farm in Finley offers dried fruit, among many other items.

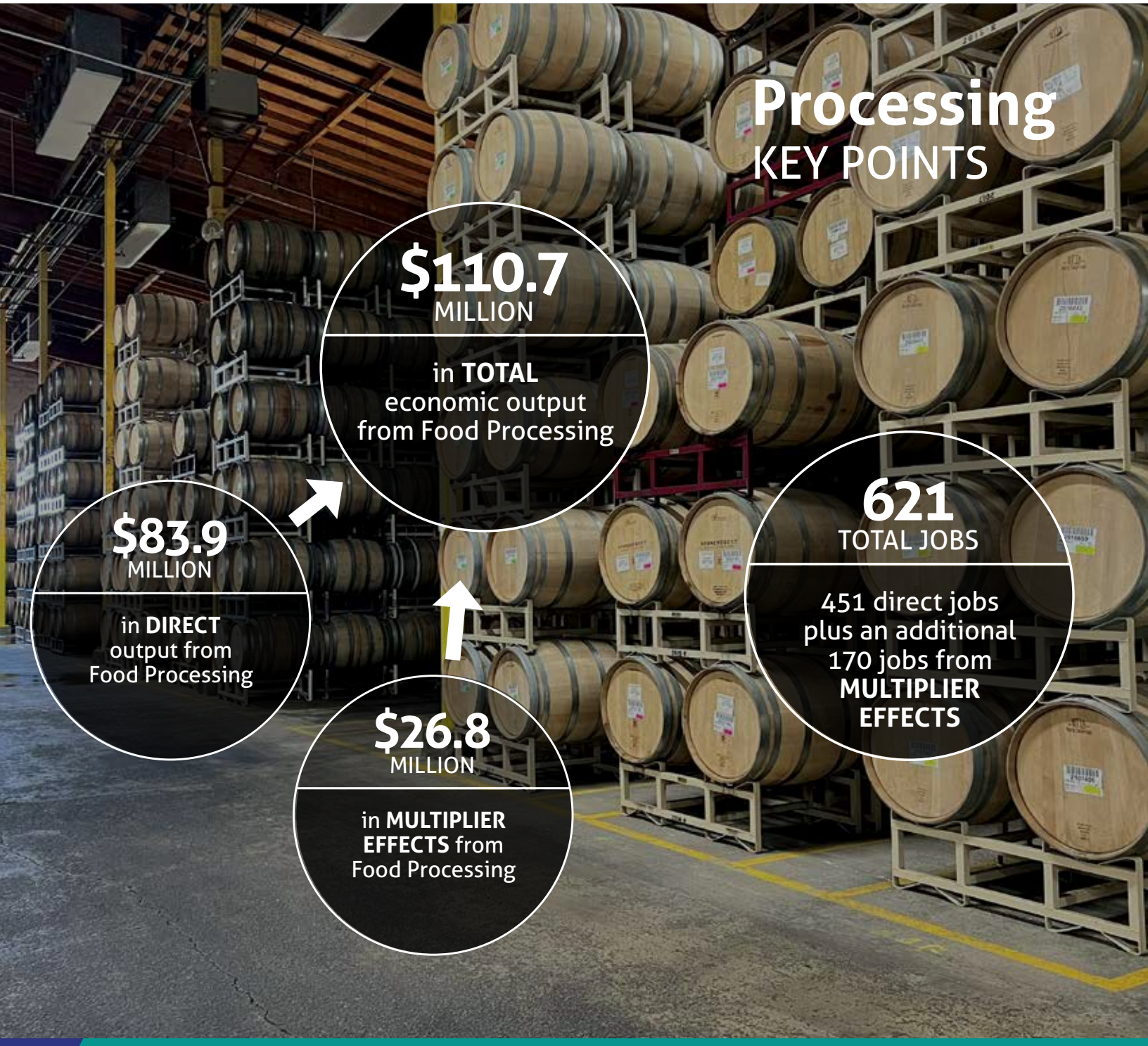
"Meat & Other Animal Products" in **Figure 3** reflects Lake County's processing of cattle, poultry and other animals into a wide range of retail-ready products. Facilities are primarily small custom operations serving local ranchers and consumers with specialized services.

Among livestock, an integrated ranch and winery in Lower Lake finishes cattle on ranch grasslands, then vacuum-packs individual beef cuts and mixed quarters. A ranch near Clearlake Oaks specializes in sheep, processing carcasses into lamb chops and wool products to sell at local restaurants and farmers' markets.

Several Lake County operations produce apiary products, especially honey. A Kelseyville farm infuses raw, chaparral-foraged honey with estate-grown saffron, then jars the honey in retail packs to sell online and in specialty shops. An Upper Lake operation extracts and cold-filters raw wildflower honey, bottles it in various sizes, then pairs the honey with sun-dried local walnuts for roadside and e-commerce sales. Another Kelseyville apiary produces not only varietal honeys, but also beeswax products.

"**Miscellaneous Other Food Manufacturing**" is a catchall category that combines several NAICS/IMPLAN sectors. Prominent among them is "Canned, Jarred and Bottled Fruits & Vegetables Manufacturing." A handful of farms, for example, mill their estate-grown olives into olive oils. At an organic farm in Kelseyville, for example, ripe olives are hand-picked then processed in an on-site commercial olive mill imported from Italy. The farm sells not only premium, award-winning olive oils, but also olive soaps and body lotions.

A few artisanal producers also create small-batch jams, jellies, juices and specialty foods to sell online and at farmers' markets. At least one diversified farm produces hops that supply local craft breweries in Lakeport, Kelseyville and elsewhere. These hops create a true farm-to-glass experience and support the county's $6,894,931 "Breweries" sector.



Total Economic Contributions of Lake 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 effects of Lake County agriculture.

As **Figure 4** shows, the total 2023 economic contribution of Lake County agriculture was $300,175,932. This consisted of $224,252,065 in combined direct output from production and processing, plus $75,923,868 in multiplier effects.

The $224,252,065 in direct output represented approximately 5.0% of Lake County's total 2023 output of $4,472,601,725 across all industries, or about one out of every 19.9 dollars.

For perspective, agriculture pumped over *eight-hundred thousand dollars per day* into the county economy during 2023 ($822,400 to be exact). This translates to $34,267 per hour and $571 per minute.

Total agricultural employment covered in the scope of this study was 2,107. Of these, 1,460 jobs were directly in agricultural production and processing, with the remaining 647 from multiplier effects.

The 1,460 direct agricultural jobs represented approximately 5.7% of Lake County's total employment of 25,536, or about one out of every 17.5 jobs.

Figure 4. Overall Economic Effects of Lake County Agriculture

Columns and rows may not compute exactly due to rounding.

Type of Effect	Direct	Indirect	Induced	TOTAL
FARM PRODUCTION				
Output Effects (# Dollars)	$140,368,362	$33,368,795	$15,763,164	$189,500,322
Employment Effects (# Jobs)	1,009	385	92	1,486
LOCALLY SOURCED, VALUE-ADDED FOOD PROCESSING				
Output Effects (# Dollars)	$83,883,702	$15,488,138	$11,303,770	$110,675,610
Employment Effects (# Jobs)	451	104	66	621
TOTAL VALUE OF AGRICULTURAL INDUSTRY				
Output Effects ($ Millions)	$224,252,065	$48,856,934	$27,066,934	$300,175,932
Employment Effects (# Jobs)	1,460	489	158	2,107

How Resilient is Agriculture to Economic Shocks?

We have all heard the old saying "don't keep all your eggs in one basket." If the basket drops, then you might lose everything. This section takes a deep dive into that concept and focuses on three questions: 1) Why is economic diversification important? 2) How economically diversified is Lake County agriculture? and 3) How has agriculture's level of economic diversification trended over time?

Answers to these questions can shed important light on the agricultural industry's economic resilience, with implications for the wider county economy and beyond.

WHY IS ECONOMIC DIVERSIFICATION IMPORTANT?

Like growers and ranchers everywhere, Lake County's agricultural producers face a long list of risks. Examples include: wildfires, droughts, floods, pandemics, crop pests and diseases, food safety-related outbreaks, new regulations, new competitors, labor availability and cost, price drops, tariffs and other trade policies, and spikes in costs for fuel, equipment, water and other inputs. Any one of these risks can deal a damaging blow. When combined, they can undermine not just an individual operation but an entire industry.

Take Napa County, for example, where wine grapes account for 99% of the annual agricultural value. When wildfires and a pandemic caused a 51% decline in wine grapes for 2020, the county's overall agricultural value declined by that same percent. Lake County production, also dominated by wine grapes though not as much as Napa, dropped by 29% during that same period. Meanwhile, counties with high levels of economic diversification declined little, if at all.

HOW DIVERSIFIED IS LAKE COUNTY AGRICULTURE?

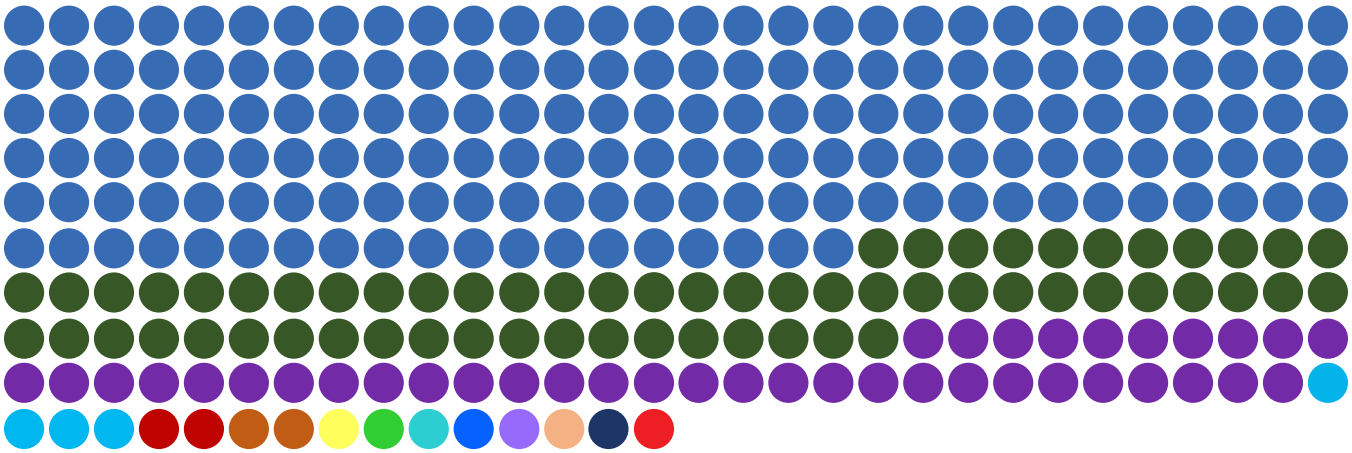
If economic diversification is like an "insurance policy" against risks, then that raises the question: how economically diversified is Lake County agriculture?
To answer this question, we calculated the Shannon-Weaver Index for Lake County agriculture. Created in 1949 for military code breaking, the Shannon-Weaver index is widely used by economists and others interested in quantifying diversification. Different versions of the basic Shannon-Weaver formula exist. What they all have in common, though, is that they quantify not just the number of different items – such as characters in a coded message or crops grown in a county – but also their relative *evenness* or *abundance*.

How exactly does one calculate the Shannon-Weaver Index for agriculture? The main steps are: 1) create a list of agricultural products and their production values over the past decade; 2) remove four outlier products that had an average production value less than one-fourth of one percent (0.25%) of the county's total; 3) enter the data into the Shannon-Weaver formula; and 4) convert to scale from 0.0 to 1.0. For additional details, please contact the authors.

Over the past decade, Lake County has consistently produced and reported ten major commodities. The relative contribution of each major commodity varied during this period from 0.25% of the county's total gross production value (the minimum threshold for this analysis) to 60.0% of the county total (red wine grapes in 2023). **Figure 5** depicts their most recent relative contributions.

Figure 5. Relative Distribution of Lake County Agricultural Commodities

Each circle below represents approximately $500,000 in gross sales, and each of the 14 colors depicts a unique agricultural commodity. Combined, the circles and colors visually portray major agricultural commodities' relative contributions to Lake County's total 2023 gross production value. Commodities less than $500,000 in value are shown with a single dot. The number of commodities produced, and their relative evenness, influences the industry's economic diversification score and its resilience to economic shocks. (Source: 2023 Lake County Crop & Livestock Report)



For 2023, the Shannon-Weaver Index for Lake County's agricultural industry was **0.26.**

What exactly does this number mean? To begin with, getting the highest index, a perfect 1.00 on a scale from 0.00 to 1.00, would require the impossible: produce all seventy-two of California's major commodities and have gross production values equally distributed across them. No single county could accomplish this.

At first glance, Lake County's index of 0.26 seems near the lower quarter of the 0.00 to 1.00 range. But the Shannon-Weaver formula includes a logarithmic function, which complicates interpretation. The logarithm makes the scale exponential, like the Richter Scale that measures earthquakes. Many Californians understand that a 7.4 earthquake releases twice the energy of a 7.2 earthquake even though the numbers are not far apart. The same principle applies here.

The 0.26 index is average compared to typical U.S. counties, many of which focus on a just one or two crops such as corn, soybeans or wheat. The index is quite low by California standards, based on the twenty-two counties analyzed thus far. Overall, Lake County's low economic diversification suggests limited protection from economic shocks.

On the upside, the presence of a livestock sector alongside crops gives Lake County "shock absorbers" when markets or weather swing. California's cattle and specialty-crop sectors have low to negative correlations. Their revenue highs and lows rarely coincide due to different biological clocks, price drivers and weather sensitivities. Lake County's pasture-raised cattle and calf enterprises, therefore, create portfolio-level risk reduction for the county.

HOW HAS AGRICULTURE'S LEVEL OF ECONOMIC DIVERSIFICATION TRENDED OVER TIME?

Has agriculture become more diversified in Lake County, or less? **Figure 6** shows the Shannon-Weaver Index for the past decade.

The main thing to note is consistent and low economic diversification across the years. The index has held somewhat steady over time, always within the narrow 0.34 to 0.26 range. Further, the slight downward trend over the past decade – from a high of 0.34 in 2014 to a low of 0.26 in 2023 – contrasts with the flat trendline occurring in California counties that are not dependent on one or two major products.

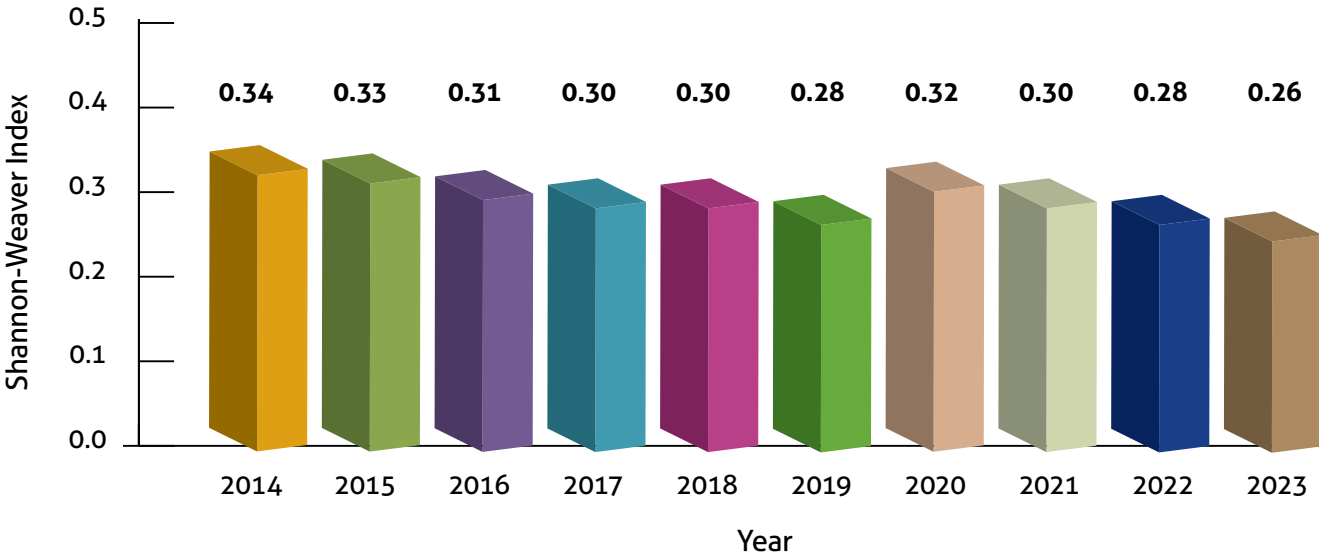
Figure 6. Ten-Year Trend in Lake County Agriculture's Economic Diversification

*An indicator of economic resilience, the **Shannon-Weaver Index** quantifies economic diversification and resilience by combining the number of different commodities produced and their relative economic value.*

The Covid-19 pandemic underscored the importance of a strong, diversified agricultural production base. The pandemic disrupted supply chains, farm labor, production costs, exports, prices and other factors. Many crops went unharvested, and grocery store shelves sat empty across much of the Northern Hemisphere.

Not surprisingly, several Lake County products declined in value when the Covid-19 pandemic hit. Among fourteen commodities consistently tracked over the past decade, nine experienced declines for 2020 and one stayed even. Examples of decliners include walnuts (-49.3%), red wine grapes (-44.2%), white wine grapes (-20.9%) and cattle & calves (-13.6%).

Small gains in four other areas were insufficient to offset these pandemic losses. Pears, for example, increased by 13.4%. But overall, Lake County's total production value declined by $30,966,369 (-29.1%) for the year.



BOTTOM LINE

The discussion here supports three key points: 1) economic diversification helps buffer against economic shocks such as wildfires, droughts, trade policies and even pandemics; 2) Lake County agriculture has a low level of economic diversification across crops, which certainly impaired the industry during the recent Covid-19 pandemic; and 3) agriculture's low level of economic diversification is trending further downward over time.

All of this raises concerns about the future. In an era of rapid change and rising risks, the agricultural community may not have "all of its eggs in one basket" but it does face significant concentration.

Toward the Future

This report has documented the role that Lake County agriculture plays in the county economy. The key points are:

- Including local food production, processing and multiplier effects, agriculture contributed $300,175,932 to the county economy. This represents over eight-hundred thousand dollars per day ($822,400 to be exact), $34,267 per hour and $571 per minute.
- With $224,252,065 in direct economic output from food production and processing, agriculture accounted for approximately 5.0% of Lake County's total 2023 output of $4,472,601,725 across all industries, or about one out of every 19.9 dollars.
- Agriculture directly supported 1,460 employees – approximately one out of every 17.5 jobs in Lake County – plus another 647 attributable to multiplier effects.
- With a Shannon-Weaver Index of 0.26, agricultural production has a low level of economic diversification, which has heightened the industry's vulnerability to economic shocks.

Agriculture is a major pillar of the Lake County economy and represents a vital link to 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. The process of developing this report has raised several additional questions that lie beyond the scope of this report but may warrant future research (see below). In the meantime, the findings herein provide the clearest picture yet of Lake County agriculture's vital economic role.

Additional Questions

- GRAZING LANDS: Lake County's 90,000-plus acres of grazing lands make significant economic contributions by providing open space, scenic beauty, wildlife habitat and more than a dozen other "ecosystem services." Recent research has also documented the critical role these lands play in wildfire risk management and response. What is the estimated annual per-acre value of the many non-market services provided by Lake County's grazing lands?
- CANNABIS. How has growth in the number of licensed cannabis operations and production acres affected other Lake County agricultural producers? For example, to what extent has cannabis production impacted the price and availability of labor, water, land and other key inputs?
- PROCESSING. The overwhelming majority of Lake County's livestock and other raw agricultural products leave the county for processing. What new policies, programs and other initiatives could expand locally sourced, value-added food processing within Lake County, supporting increased vertical integration and economic resilience?
- FUTURE GENERATIONS. Lake County's agricultural producers face critical challenges regarding succession. Successful transfer of their businesses and lands to the next generation requires navigating the high cost of land, extensive capital requirements, family expectations and heavy tax and estate planning burdens, among other issues. What kinds of support could help ensure smooth and successful transitions to future generations?

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