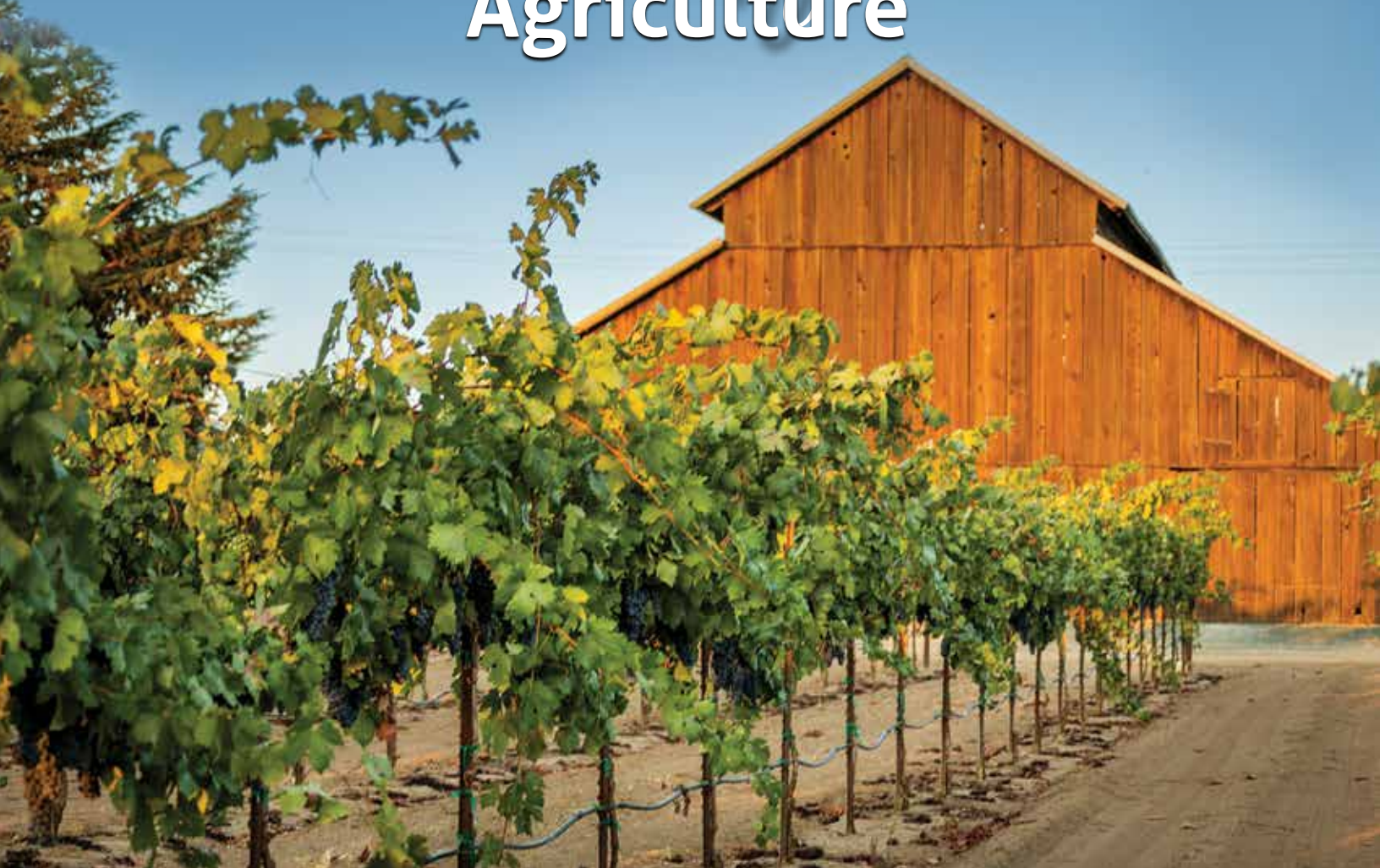




Economic Contributions of San Joaquin *County* Agriculture





**The Honorable
Board of Supervisors,
County of San Joaquin**



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District 1

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Agricultural Commissioner's Letter

I am pleased to share the **Economic Contributions of San Joaquin County Agriculture**, a comprehensive analysis that reveals the true scope of agriculture's impact on our local economy.

This report takes an important step beyond the San Joaquin County Crop Report that we have published since 1934. 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 2024, the latest year for which we have complete data, agriculture contributed a total of \$7,491,579,886 to the county economy. This total far exceeds the \$3,146,586,502 value from our 2024 San Joaquin County Crop Report and marks a 30.7% increase from a previous study based on 2018 data. Agricultural production and processing also directly supported 24,025 jobs, plus another 11,933 jobs from multiplier effects, for a total of 35,958 jobs—up 6.8% from the previous study.

This report also documents the high level of economic diversification within agriculture, which has strengthened resilience across the agricultural industry and the broader county economy.

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

Respectfully submitted,

Kamaljit Bagri

Agricultural Commissioner/Sealer of Weights & Measures

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San Joaquin County Agriculture at a Glance

Economic Contributions

of the Agricultural Industry for 2024



\$7.492
BILLION

San Joaquin County Agriculture's total
contributions to the local economy



\$5.513

BILLION in direct
economic output



\$1.979

BILLION in
multiplier effects



\$20,525,000

per day

Employment Effects

of the Agricultural Industry



35,958

total jobs



24,025

direct employees
across production
& processing



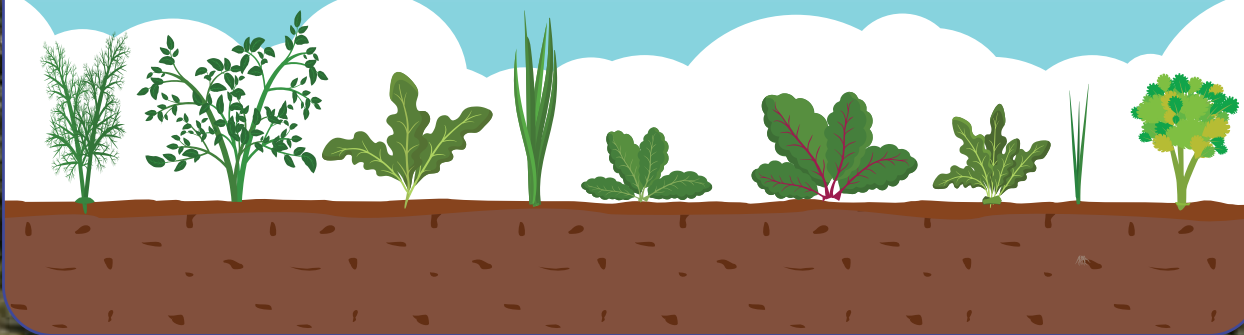
11,933

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



1 in 17

jobs in San Joaquin
County attributable to the
agricultural industry





About This Report

In 2020, we produced a research report that examined not just agricultural production values, but also agriculture's wider economic contributions through local food processing, employment, and multiplier effects. The publication generated widespread positive responses, providing detailed assessments of agriculture's role in sustaining a healthy local economy. This document updates and expands upon that original report.

Consistent with the previous study, we used multiple data sources and advanced economic modeling techniques to analyze agriculture's total contribution to the San Joaquin County economy. We also measured economic diversification within agriculture, which has implications for economic resilience.

Overall, 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 San Joaquin County. Calculating a reasonable range of economic contributions by a basic industry requires 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 the owners and employees of agricultural businesses and their suppliers. The **Multiplier Effects** section on page 9 explains this further.

This study focuses exclusively on economic contributions and does not attempt to quantify total impacts, whether positive or negative (e.g., ecosystem services, open space preservation, pollution). A comprehensive impact assessment would require separate analysis beyond this report's scope.

Our calculations draw from local and national data sources. The local sources include industry experts and a decade of the San Joaquin County Crop Reports (2015 through 2024) produced by the Office of the Agricultural Commissioner/Sealer of Weights & Measures. The main national data source is IMPLAN, a widely used economic dataset and 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 528 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 IMPLAN company website: <http://bit.ly/4e0if2Z>. Except where otherwise noted, all figures are from 2024, the most recent IMPLAN dataset available. Where appropriate, we adjusted sector names for clarity and applied coefficients to IMPLAN values to reflect unique San Joaquin County conditions. Please contact the authors for additional details on the methods used.



Direct Effects of San Joaquin 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

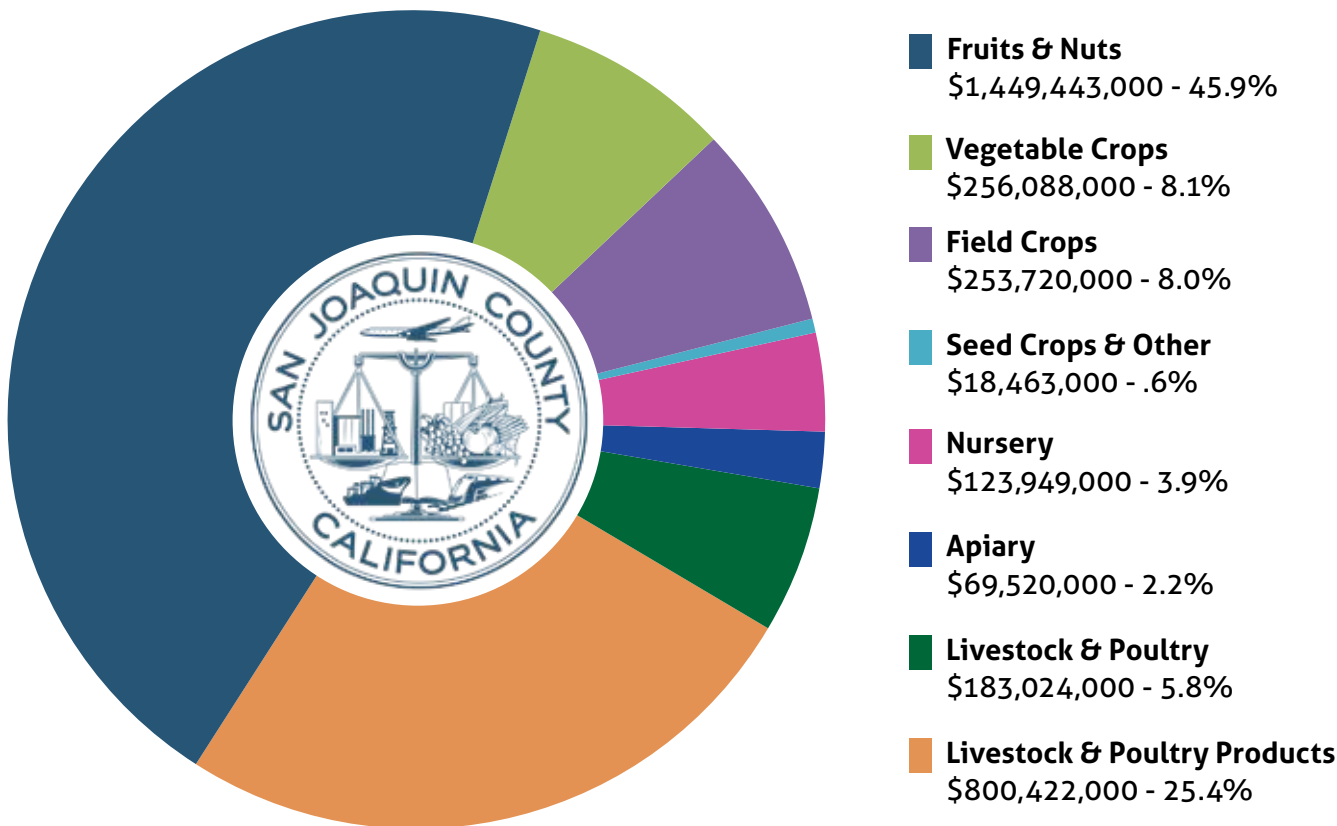
Figure 1 shows the various categories that made up San Joaquin County’s farm production value. Valued at \$1.449 billion, Fruits & Nuts was the single largest production category by dollar value, comprising 45.9% of the county total. Almond meats dominated this category at \$492.3 million. Grapes followed (\$319.3 million), then walnuts (\$240.1 million), cherries (\$240.0 million), and blueberries (\$77.6 million).

At 25.4%, Livestock & Poultry Products represented the second-largest category (\$800.4 million). Milk led this group with \$536.9 million, followed by chicken eggs at \$261.6 million. These two categories, Fruits & Nuts and Livestock & Poultry Products, accounted for 71.3% of all production value.

The combined total dollar value for all products increased \$413.7 million (15.1%) over the past decade from \$2.733 billion in 2015 to \$3.147 billion in 2024. Inflation totaled 28.6% during the period. These values represent gross output and do not reflect the net profit or loss experienced by individual growers or by the industry as a whole. Interested readers are encouraged to consult the San Joaquin County Crop Report 2024 for additional details on specific products and their value.

Figure 1. Distribution of San Joaquin County Farm Production

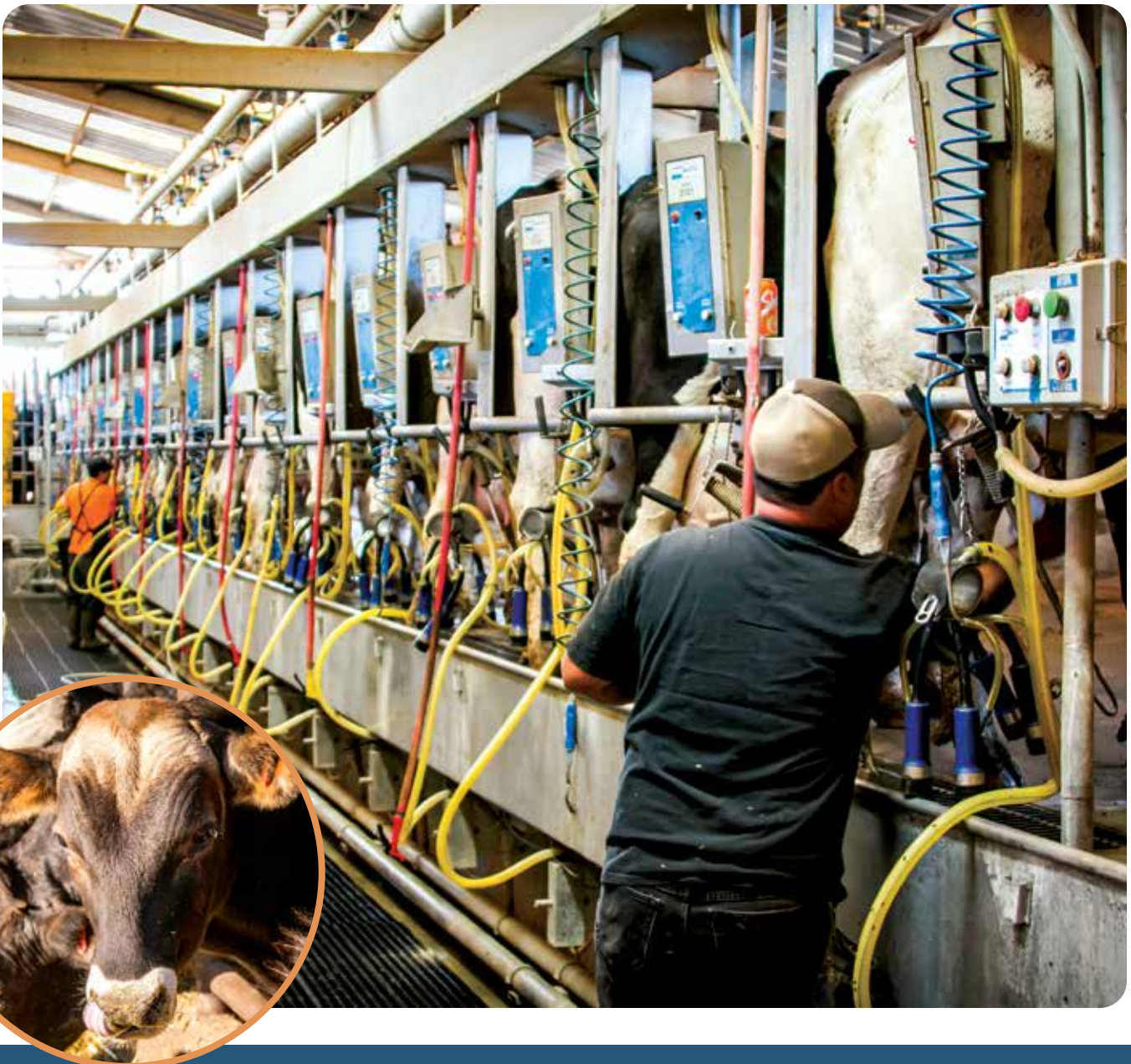
Figures represent gross production value, not net profit. Source: San Joaquin County Crop Report 2024, Office of the Agricultural Commissioner/Sealer of Weights & Measures.



EMPLOYMENT

How many people work in agricultural production? In 2024, IMPLAN data indicate that agricultural production directly employed 13,203 people in San Joaquin 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 12. Nor did it include San Joaquin 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 for Select Industries: Farm, Construction, Railroad, and Government" article referenced earlier. In general, IMPLAN data attempt to correct for omissions and inconsistencies among other sources. For example, IMPLAN counts farm owners (proprietors) even though other sources do not. IMPLAN also adjusts 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. Lastly, IMPLAN counts part-time workers differently than the USDA Census of Agriculture. Consider a farm where six workers each pick fruit for two months. The Census of Agriculture would count that as six jobs rounded up to five months each, for a total of 30 person-months of work, up to 2.5 full-time jobs. IMPLAN, however, would treat those twelve total person-months of work as the equivalent of one full-time, year-round job.



Multiplier Effects of San Joaquin 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 instance, when a San Joaquin County producer buys vehicles, machinery, fertilizer, fuel, chemicals, insurance, banking services, veterinary supplies, and other inputs, the producer creates *indirect effects*.

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 outside San Joaquin County, this study only reflects those expenditures within the 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.

Figure 2. Economic Effects of San Joaquin County Farm Production

Figures are for 2024 and draw from IMPLAN, U.S. Bureau of Economic Analysis, and the San Joaquin County Crop Report 2024. Columns and rows may not compute exactly due to rounding.

FARM PRODUCTION SECTOR	Output Effects (\$ Millions)			TOTAL
	Direct	Indirect	Induced	
Fruit Farming	\$691.2	\$189.9	\$114.5	\$995.6
Dairy Cattle & Milk Production	\$686.6	\$198.7	\$50.5	\$935.8
Tree Nut Farming	\$758.2	\$5.4	\$113.8	\$877.4
Vegetable & Melon Farming	\$256.1	\$85.5	\$33.5	\$375.1
Poultry & Egg Production	\$273.2	\$70.3	\$14.5	\$358.0
All Other Crop Farming	\$181.8	\$81.9	\$31.8	\$295.5
Greenhouse, Nursery & Floriculture Production	\$123.9	\$36.1	\$20.3	\$180.3
Miscellaneous Other Production	\$83.3	\$8.7	\$24.5	\$116.4
Grain Farming	\$64.7	\$17.6	\$8.6	\$90.8
Beef Cattle Ranching & Farming	\$16.0	\$2.7	\$0.6	\$19.3
Other Animal Production	\$10.3	\$0.8	\$1.0	\$12.1
Oilseed Farming	\$1.2	\$0.0	\$0.1	\$1.3
TOTAL ECONOMIC OUTPUT:	\$3,146.6	\$697.5	\$413.6	\$4,257.7
	Employment Effects (# of Jobs)			TOTAL
	Direct	Indirect	Induced	
TOTAL EMPLOYMENT:	13,203	5,314	2,340	20,857

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

NAICS and IMPLAN also lump and split familiar products in unfamiliar ways. Commodities that the county reports as "Field Crops," for example, are tracked in distinct categories with names like "Grain Farming" (e.g., beans, rice), "Oilseed Farming" (e.g., safflower), and "All Other Crop Farming" (e.g., alfalfa hay). Dairy cattle combine with milk in "Dairy Cattle & Milk Production." The county's \$49.8 million in pollination fits into a sector called "Support Activities for Agriculture and Forestry," captured in **Figure 2** under "Miscellaneous Other Production."

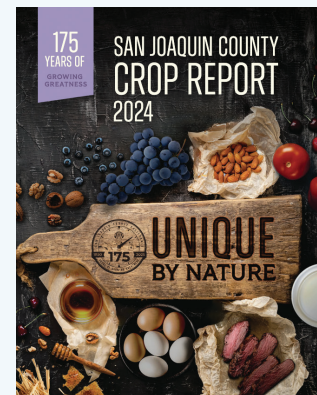
Each sector has distinct multipliers. San Joaquin County "Vegetable & Melon Farming," for example, had a 2024 *indirect effects* multiplier of 0.3340 and an *induced effects* multiplier of 0.1309. This means that each dollar's worth of direct output generated an extra 33 cents in supplier purchases, plus 13 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 each year to reflect the most recent patterns of business and household spending in the local economy. The *indirect effects* multiplier for San Joaquin County "Greenhouse, Nursery & Floriculture Production," for example, was 0.2068 in 2010, but rose to 0.2911 by 2024.

Sectors have unique multipliers not just for economic output but also for employment. San Joaquin County "Fruit Farming," for example, supported 3,287 *direct* jobs plus an additional 1,979 *indirect effects* jobs and 648 more from *induced effects*. The bottom row of **Figure 2** shows combined employment figures across sectors.

The following list details the various commodities that make up each category in **Figure 2**, based on the San Joaquin County Crop Report 2024:

- **Fruit Farming:** Apples, Apricots, Blueberries, Cherries, Grapes, Olives, Peaches, Pears, Miscellaneous Fruits.
- **Dairy Cattle & Milk Production:** Dairy Cattle (e.g., Cull Cows, Bull Calves), Milk (All).
- **Tree Nut Farming:** Almonds (all), Pistachios, Walnuts (English).
- **Vegetable & Melon Farming:** Asparagus, Corn (Sweet), Cucumbers, Melons (All), Onions, Peppers, Potatoes, Pumpkins, Squash, Tomatoes (All), Miscellaneous Vegetables.
- **Poultry & Egg Production:** Broilers, Eggs (All), Turkeys, Miscellaneous Fowl (Squab, Ducks, Etc.).
- **All Other Crop Farming:** Hay (All), Pasture & Rangeland (Irrigated & Other).
- **Greenhouse, Nursery & Floriculture Production:** Fruit & Nut Tree Plants (e.g., Grapevines, Strawberry Plants), Vegetable Plants, Flowering Potted Plants, Foliage Plants, Bedding Plants, Woody Ornamentals, Miscellaneous Nursery (Bulbs, Rhizomes, Turf, Cactus, Etc.).
- **Miscellaneous Other Production:** Honey, Firewood, Pollination.
- **Grain Farming:** Beans (Dry, All), Corn (Grain), Rice, Silage (Corn & Other), Wheat.
- **Beef Cattle Ranching and Farming:** Beef Cattle & Calves.
- **Other Animal Production:** Sheep & Lambs, Miscellaneous Animals (Hogs, Goats).
- **Oilseed Farming:** Safflower.



Production

KEY POINTS

\$4.258
BILLION

in **TOTAL**
economic output
from
Farm Production

20,857
TOTAL JOBS

13,203 **DIRECT** jobs
plus an additional
7,654 jobs from
MULTIPLIER
EFFECTS

\$3.147
BILLION

in **DIRECT**
output from
Farm Production

\$1.111
BILLION

in **MULTIPLIER**
EFFECTS from
Farm Production

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 San Joaquin 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., San Joaquin County's abundant supply of grapes, milk, cherries, almonds, walnuts, tomatoes, 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 \$319.3 million direct dollar value of grapes in its "Fruit Farming" row. We only calculated the value created by converting wine grapes into wine. The same principle applies to other crops that undergo processing into value-added products.

Based on these strict criteria, we excluded several IMPLAN food and beverage sectors that other studies often include. Adding them could overstate the value of local agriculture, including its employment and multiplier effects. For example, we did not include San Joaquin County's \$309.4 million in bread and bakery products because most raw ingredients such as flour and yeast came from outside the county. Nor did we include the county's manufacturing of bottled and canned soft drinks and water (\$218.0 million), mayonnaise, dressings and sauces (\$53.0 million), tortillas (\$26.8 million), and frozen cakes and pastries (\$7.4 million).

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

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

Sources: IMPLAN and U.S. Bureau of Economic Analysis data and various local sources. Columns and rows may not compute exactly due to rounding.

LOCAL FOOD PROCESSING	Output Effects (\$ Millions)			TOTAL
	Direct	Indirect	Induced	
Wineries	\$818.8	\$214.6	\$111.2	\$1,144.6
Dried Food Products Manufacturing	\$482.4	\$81.5	\$110.5	\$674.4
Canned Fruits & Vegetables Manufacturing	\$358.3	\$88.7	\$33.8	\$480.8
Meat, Poultry & Other Animal Products	\$251.6	\$37.4	\$18.6	\$307.7
Light Processing of Fruits & Vegetables	\$213.1	\$0.1	\$84.7	\$297.8
Animal Food Manufacturing	\$85.8	\$25.0	\$5.1	\$115.9
Frozen Fruits, Juices & Vegetables Manufacturing	\$60.5	\$19.3	\$5.3	\$85.0
Miscellaneous Other Food Manufacturing	\$47.5	\$17.0	\$3.3	\$67.8
Dairy Products Manufacturing	\$48.2	\$8.7	\$2.9	\$59.7
TOTAL ECONOMIC OUTPUT:	\$2,366.2	\$492.3	\$375.3	\$3,233.9
	Employment Effects (# of Jobs)			TOTAL
	Direct	Indirect	Induced	
TOTAL EMPLOYMENT:	10,822	2,158	2,121	15,101

"Wineries" is by far the largest sector in **Figure 3**, reflecting transformation of the county's \$319.3 million grape crop into a diverse range of value-added products. After harvest, grapes are crushed and destemmed, then fermented. Following fermentation, producers age wine in stainless steel tanks or oak barrels, then clarify, filter, and bottle for distribution to retail chains, restaurants, and direct-to-consumer markets. Many local wineries add extra value by hosting tastings, weddings, vineyard tours, live music events, and other visitor experiences.

San Joaquin County's wine industry is anchored by the world-renowned Lodi American Viticultural Area (AVA), one of California's largest and most productive wine regions. The Lodi AVA spans roughly 545,000 acres in San Joaquin and Sacramento counties combined, with approximately 85,000 bearing vineyard acres and more than 85 wineries that range from large, nationally distributed labels to small, family-owned estate operations.

Three estate wineries illustrate the range of approaches in San Joaquin County. A fifth-generation, family-owned estate near Acampo farms more than 2,000 acres of certified sustainable vineyards and operates one of the largest solar-powered winery facilities in California. In Lodi proper, a well-known family winery now in its second generation farms estate vineyards and operates an on-site bistro and tasting room that draws visitors from throughout the region. A smaller boutique operation in the Clements Hills sub-AVA near Acampo focuses exclusively on estate-grown Zinfandel, Barbera, and Aglianico from old-vine blocks, sells primarily through a wine club and direct-to-consumer channels, and has earned a devoted following among collectors who prize its terroir-driven, small-lot wines.

"Dried Food Products Manufacturing" in **Figure 3** reflects San Joaquin County's leadership role in processing nuts and other agricultural commodities into dried, shelf-stable products for domestic and export markets. Much of the county's \$240.1 million in walnuts and \$492.3 million in almond meats flow into modern processing and packing facilities throughout the county.

Walnuts undergo a multi-step value-addition process after harvest. Hulling removes the green outer husk, after which nuts are cleaned, dried to safe moisture levels, and sorted by size and quality using optical and electronic equipment. From there, processors may crack and shell the walnuts for kernel packing or send in-shell product to retail and export markets. Almonds follow a similar path: after hulling and shelling, processors may further roast, slice, dice, or grind the kernels into value-added products such as roasted almonds, almond flour, and almond butter.

A large, multi-generational walnut processing operation near Stockton, for example, handles hundreds of millions of pounds of walnuts annually, supplying domestic retail chains, food manufacturers, and export customers in Asia, Europe, and the Middle East. The facility offers both in-shell and shelled kernel products across a wide range of grades. In the Manteca area, a family-owned orchard and packing operation grows and processes its own walnuts, marketing premium in-shell and shelled product through direct channels and specialty retailers. Near Ripon, a third-generation family operation processes both almonds and walnuts, supplies retail and food-ingredient markets, and has invested in certifications for organic and non-GMO product lines that command premium prices.



As the name suggests, **"Canned Fruits & Vegetables Manufacturing"** in **Figure 3** reflects products made from fruits and vegetables that are not destined for the fresh market. On the large end of the scale, a grower-owned cooperative with significant operations in Lodi processes locally grown peaches, pears, and tomatoes into canned fruits and vegetables distributed under private-label and national brand names to major retail chains and foodservice customers nationwide. The cooperative model means that grower-members share in the added value created during processing, aligning farm and factory interests. In Escalon, a specialty food manufacturer focuses on tomato-based products—including premium pizza sauces, pasta sauces, and diced tomatoes—sourcing processing tomatoes from San Joaquin Valley growers and supplying regional and national foodservice and retail markets. Boutique-scale processing complements these industrial operations. Small-batch producers at certified farmers' markets and farm stands throughout the county, for example, convert locally grown tomatoes, stone fruits, and tree fruits into artisanal jams, salsas, preserves, and pickles sold directly to consumers. Similarly, a fourth-generation, certified organic farm in Ripon produces and bottles its own fresh apple juice.

"Meat, Poultry & Other Animal Products" in **Figure 3** draws on San Joaquin County's substantial cattle, poultry, and other animal production. A family-owned meat processing and distribution company near Lockeford, for example, has served the region for several generations, operating a USDA-inspected facility that handles beef, pork, and lamb. The company offers custom cutting and specialty products, including locally made sausages and cured meats, and supplies local restaurants, retailers, and institutions throughout the northern San Joaquin Valley. In the Manteca area, a vertically integrated poultry and egg operation raises laying hens and broilers under both conventional and specialty programs, processes its own birds on-site, and markets fresh eggs and poultry products through a network of regional distributors and retail outlets. A smaller, certified-organic ranch near Ripon raises pasture-based livestock using regenerative practices and markets grass-fed beef and heritage-breed pork directly to consumers through a buying club and on-farm store. The company has built a loyal following among local consumers seeking traceable, humanely raised products.



"Light Processing of Fruits & Vegetables" in **Figure 3** encompasses post-harvest value added to San Joaquin County's abundant fresh produce. This sector captures the sorting, grading, cleaning, and packing of fresh fruits and vegetables, including when those activities occur in the field during harvest. The category also reflects cutting, peeling, and other minimal processing that yields perishable, ready-to-use refrigerated products.

San Joaquin County's \$240.0 million cherry crop is a major driver of this sector. After harvest, cherries are transported rapidly to more than a dozen packing facilities where they are hydro-cooled or forced-air cooled to lock in firmness and sweetness. Fruit is then sized, color-sorted using optical graders, and graded by quality, with top-grade product packed into retail clamshells and bulk cartons destined for grocery chains and export markets, especially in Asia. A large, regional cherry packing cooperative based near Lodi, for example, pools fruit from dozens of member growers across the county and neighboring areas, achieving the volume and consistency needed to supply national retailers and export accounts. The cooperative's integrated cold-chain management system allows product to move from orchard to overseas market within days of harvest. The county's blueberry packing operations and fresh-cut fruit and vegetable lines round out this sector's economic contributions. A Stockton company, for example, converts portions of the county's \$11.7 million apple crop into packaged fresh-cut apple slices, supplying schools and retail markets throughout the United States.

"Animal Food Manufacturing" in **Figure 3** encompasses facilities that convert locally grown grains, alfalfa, agricultural byproducts, and other raw materials into commercial feeds for poultry, dairy cattle, beef cattle, and other animals. San Joaquin County's large and diverse livestock sector—including dairy, beef cattle, and poultry operations—creates sustained local demand for manufactured feed. Animal feed producers are located mostly around Stockton and Lodi. The county's \$120.8 million silage production provides a major food source, especially at dairies, but was already counted in the Farm Production section.

"Frozen Fruits, Juices & Vegetables Manufacturing" encompasses companies that convert locally grown fruits and vegetables into individually quick frozen (IQF) products, frozen juice concentrates, and other shelf-stable frozen ingredients for foodservice, retail, and industrial markets. The overwhelming majority of local fruits and



vegetables go to canning and fresh packing operations, not to freezing. Value-added freezing of San Joaquin County produce mostly occurs at large regional facilities outside the county. Exceptions include the large grower-owned cooperative mentioned above, which sells frozen cherries (whole and half) as ingredients for further processing by industrial customers.

"Miscellaneous Other Food Manufacturing" is a catchall category that combines several NAICS/IMPLAN sectors and reflects a diverse array of value-added activities operating at the margins of San Joaquin County's larger food processing economy. The county's \$18.8 million olive crop features prominently in this category. A vertically integrated olive oil operation near Lodi, for example, farms several hundred acres of olive orchards across multiple varieties, mills its own oil on-site using a modern continuous-extraction system, and produces award-winning extra-virgin olive oils distributed to specialty food stores, restaurants, and direct-to-consumer customers throughout California and nationally. A wide variety of artisanal operations produce jams, hot sauces, almond flour, nut oils, and other specialty food items. Last, this category includes a small portion of the county's \$11.3 million "Breweries" sector. The presence of a 16-acre hops farm in Tracy allows craft brewers to produce beer that is truly local, rather than depending on hops imported from the Pacific Northwest and Germany.

The relatively modest **"Dairy Products Manufacturing"** values in **Figure 3** reflect the fact that nearly all of San Joaquin County's \$536.9 million in raw milk goes to large fluid milk plants, cheese factories, and butter manufacturers located in neighboring counties. The recent closure of the large Leprino Foods facility in Tracy—one of the world's largest mozzarella manufacturing plants—was a major loss to San Joaquin County's dairy processing economy. Remaining processors are boutique scale. A dairy farm and creamery in Escalon, for example, converts its raw milk into Dutch-style cheeses, as well as cheese curds, spreads, and soft-serve ice cream. A farm in Lodi produces small-batch, handcrafted goat cheeses using 100% milk from its own Nubian goat herd.



Processing

KEY POINTS

\$3.234
BILLION

in **TOTAL**
economic output
from local Processing

\$2.366
BILLION

in **DIRECT**
output from
local Processing

\$0.868
BILLION

in **MULTIPLIER**
EFFECTS from
local Processing

15,101
TOTAL JOBS

10,822 **DIRECT** jobs
plus an additional
4,279 jobs from
MULTIPLIER
EFFECTS

Total Economic Contributions of San Joaquin 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 San Joaquin County agriculture.

San Joaquin County agriculture's total 2024 economic contributions were \$7,491,579,886, rounded to \$7.492 billion in **Figure 4**. This consisted of \$5,512,764,610 in combined direct output from production and processing, plus \$1,978,815,276 in multiplier effects.

The combined \$7.492 billion in total 2024 output was 30.7% higher than the \$5.732 billion figure from our 2020 report, which was based on 2018 data.

For perspective, agriculture pumped over *twenty million dollars per day* into the county economy during 2024 (approximately \$20,525,000), compared to \$15,704,000 per day in 2020. The daily figure for 2024 translates to about \$855,000 per hour and \$14,000 per minute.

Total agricultural employment covered in the scope of this study was 35,958. Of these, 24,025 jobs were directly in agricultural production and processing, with the remaining 11,933 from multiplier effects. The 35,958 total jobs attributable to agriculture represented a 6.6% rise over the 2018 level of 33,737.

Figure 4. Overall Economic Effects of San Joaquin County Agriculture

Columns and rows may not compute exactly due to rounding.

Type of Effect	Direct	Indirect	Induced	TOTAL
FARM PRODUCTION				
Output Effects (# Dollars)	\$3,146.6	\$697.5	\$413.6	\$4,257.7
Employment Effects (# Jobs)	13,203	5,314	2,340	20,857
LOCALLY SOURCED, VALUE-ADDED FOOD PROCESSING				
Output Effects (# Dollars)	\$2,366.2	\$492.3	\$375.3	\$3,233.9
Employment Effects (# Jobs)	10,822	2,158	2,121	15,101
TOTAL VALUE OF AGRICULTURAL INDUSTRY				
Output Effects (\$ Millions)	\$5,512.8	\$1,189.8	\$789.0	\$7,491.6
Employment Effects (# Jobs)	24,025	7,472	4,461	35,958

How Resilient is Agriculture to Economic Shocks?

The familiar adage “don’t keep all your eggs in one basket” captures a fundamental principle of economic risk management: if the basket drops, then you might lose everything. This section examines that concept and focuses on three questions: 1) Why is economic diversification important? 2) How economically diversified is San Joaquin 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, San Joaquin 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. Contrast that with San Joaquin—wine grapes dropped 8.5% in value for 2020, but agricultural diversification more than covered for that loss. In fact, agriculture experienced a 15.8% overall increase for 2020, then added another 5.3% gain during the pandemic’s peak in 2021.

HOW DIVERSIFIED IS SAN JOAQUIN COUNTY AGRICULTURE?

If economic diversification is like an “insurance policy” against risks, then that raises the question: how economically diversified is San Joaquin County agriculture?

To answer this question, we calculated the Shannon-Weaver Index for San Joaquin County agriculture. Originally developed for information theory in 1948, 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, species in a rainforest, or crops grown in a county—but also their relative *evenness* or *abundance*.

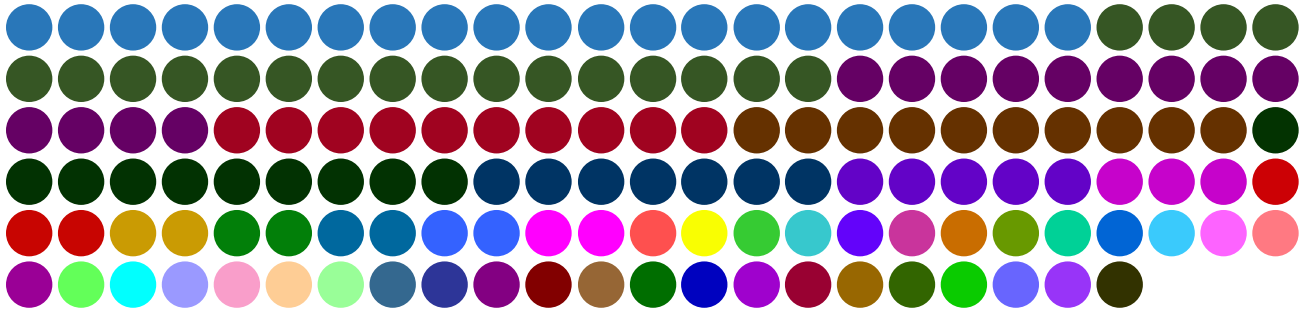
How exactly does one calculate the Shannon-Weaver Index for agriculture? The main steps are: 1) create a list of agricultural products and their production values over the past decade; 2) remove the 20 outlier products that had an average production value of less than 0.25% of the county’s total; 3) 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, San Joaquin County has consistently produced and reported 35 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 22.9% of the county total (almonds in 2020). **Figure 5** shows the most recent relative contributions of all 35 major commodities.



Figure 5. Relative Distribution of San Joaquin County Agricultural Commodities

Each circle below represents approximately \$25 million in gross sales, and each of the 55 colors represents a unique agricultural commodity, including minor ones. Blue circles in the top row, for example, represent milk. Combined, the circles and colors visually portray agricultural commodities' relative contributions to San Joaquin County's total 2024 gross production value. Commodities less than \$25 million in value are depicted 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: San Joaquin County Crop Report 2024).

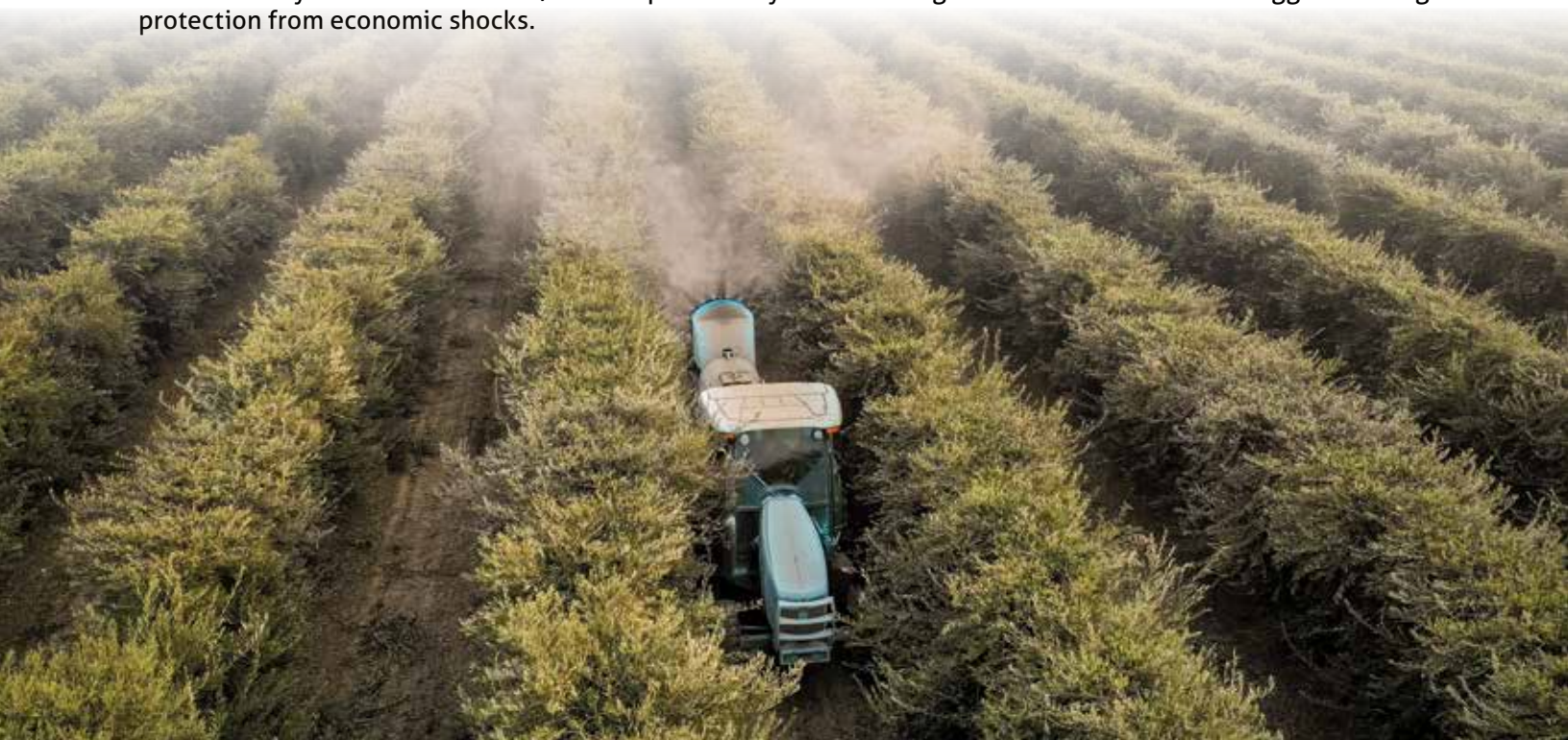


For 2024, the Shannon-Weaver Index for San Joaquin County's agricultural industry was **0.63**.

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 72 of California's major commodities and have gross production values equally distributed across them. No single county could accomplish this.

At first glance, San Joaquin County's index of 0.63 seems near the middle 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 magnitude 7.4 earthquake releases twice the energy of a magnitude 7.2 earthquake, even though the numerical difference appears small. The same principle applies here.

The 0.63 index is extremely high compared to typical U.S. counties, many of which focus on just one or two crops such as corn, soybeans, or wheat. The index is also quite high by California standards, based on the 23 counties analyzed thus far. Overall, San Joaquin County's outstanding economic diversification suggests strong protection from economic shocks.

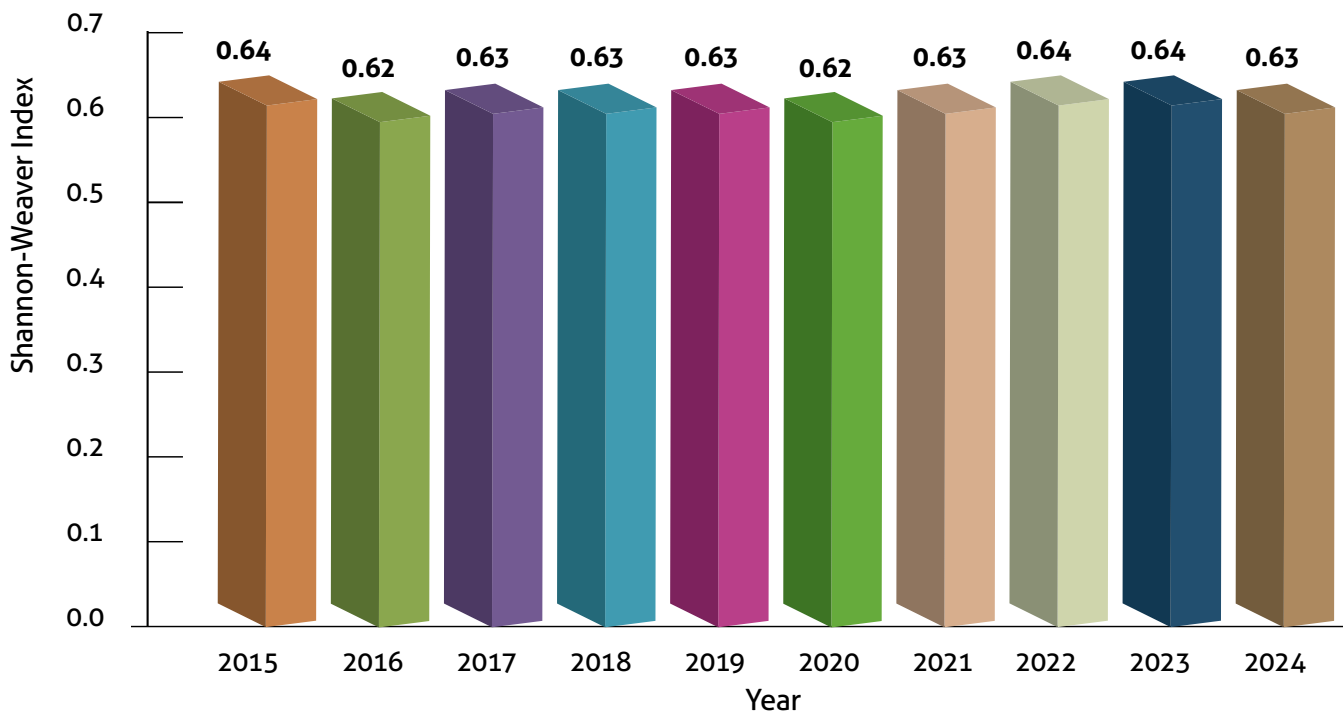


HOW HAS AGRICULTURE'S LEVEL OF ECONOMIC DIVERSIFICATION TRENDED OVER TIME?

Has agriculture become more diversified in San Joaquin County, or less? **Figure 6** shows the Shannon-Weaver Index for the past decade. The main thing to note is consistently high economic diversification across the years. The index has held remarkably steady over time, always between 0.62 and 0.64. This contrasts with the downward trend occurring in many California counties that have become dependent on one or two major products.

Figure 6. Ten-Year Trend in San Joaquin 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 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.

Among 55 San Joaquin County agricultural products reported for 2020, 20 declined in value and one stayed flat. The average one-year decline was minus 22.4%, with a median of -23.8%. Prominent examples included broilers (-83.3%), wheat (-43.8%), peaches (-35.0%), tomatoes (-30.5%), walnuts (-23.6%), and grapes (-8.5%).

But increases in 34 other commodities offset these losses. Gains averaged 57.8%, with a median of 29.1%. Examples include cherries (111.7%), almond meats (54.4%), milk (16.1%), chicken eggs (13.3%), and cattle and calves (6.6%). These gains helped the county's agricultural industry avoid an overall decline for the year. Instead, overall countywide production increased by \$413.5 million (15.8%), then grew by another \$162.0 million (5.3%) in 2021.

BOTTOM LINE

The discussion here supports three points: 1) economic diversification helps buffer against economic shocks such as wildfires, droughts, and even pandemics; 2) San Joaquin County agriculture has an outstanding level of economic diversification across commodities, which almost certainly benefited the industry during the recent COVID-19 pandemic; and 3) agriculture's high level of economic diversification has held steady over time.

All of this bodes well for the future. In an era of rapid change and rising risks, the agricultural community can take pride and comfort in not having "all of its eggs in one basket."

Toward the Future

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

- Including local food production, processing, and multiplier effects, agriculture contributed \$7,491,579,886 to the county economy in 2024—up 30.7% from our previous report based on 2018 data. The total contribution represented over twenty million dollars per day (approximately \$20,525,000) or about \$855,000 per hour and \$14,000 per minute.
- Agricultural production and processing directly supported 24,025 jobs, plus another 11,933 from multiplier effects, for a total of 35,958 jobs. This represents a 6.6% rise over the number of jobs documented in the previous study based on 2018 data.
- With a Shannon-Weaver Index of 0.63, agricultural production had an exceptionally high level of economic diversification, which has provided critical stability and resilience to the agricultural industry and to the larger county economy.

Agriculture is a major pillar of the San Joaquin County economy and represents a vital link to the county's cultural past and competitive future. The industry will certainly face challenges and opportunities in the years ahead. The findings herein provide policymakers, growers, and community leaders with a clearer understanding of agriculture's true economic footprint—more than \$7.4 billion annually and over 35,000 jobs—and the information they need to make informed decisions.

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