



TEHAMA *County*

**Economic Contributions of
Tehama County Agriculture**





The Honorable Board of Supervisors of Tehama County



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Commissioner's Letter

I am pleased to share the **Economic Contributions of Tehama County Agriculture**. This report takes an important step beyond the Annual Crop and Livestock Report our department publishes each year. Instead of stopping at crop production values and acreage, it quantifies agriculture's total economic contribution through food production, local food 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 Tehama County economy.

For 2022, agriculture contributed a total of \$511.3 million to the county economy, equal to \$1,400,715 per day and \$58,363 per hour. This total far exceeds the \$226.8 million figure from our 2022 Annual Crop and Livestock Report. Agriculture also supported 6,474 direct employees, or nearly one out of every four jobs in the county (23.5%).

In addition, this report documents a noteworthy increase in economic diversification within the agricultural industry, which has implications for countywide economic resiliency.

Agriculture has a long tradition in Tehama 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,

Doni Rulofson
Agricultural Commissioner/
Sealer of Weights & Measures

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Economic Contributions

of the Agricultural Industry for 2022



\$511.3
MILLION

Tehama County Agriculture's
total contributions to the
local economy



\$404.2
MILLION
in direct economic
output



\$107.1
MILLION
in multiplier
effects



\$1.401
MILLION
per day

Employment Effects

of the Agricultural Industry



6,581
total jobs



6,474
direct employees



107

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



1 in 4

jobs in Tehama County
attributable to the
agricultural industry

Introduction

In mid-2019, we published a research report that examined crop production values and wider economic contributions such as local food processing, employment, and multiplier effects. That document generated a strong positive response, providing detailed assessments of agriculture's role in sustaining a healthy local economy.

This document updates and expands upon that original report. Like before, we used multiple data sources and advanced economic modeling techniques to analyze agriculture's total contribution to the Tehama County economy. As with the 2019 report, which was based on 2017 data, this one also measures economic diversification within agriculture, a topic with significant 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 Tehama 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 6 explains this further.

To understand the furthest economic impacts of agriculture, one would also need to assess agricultural-related costs to society, such as net impacts on water and other natural resources. While important, these impacts lie beyond the scope of this study.

Our calculations draw from local and national data sources. The local sources include industry experts and the annual Tehama County Crop & Livestock Report produced by the Agricultural Commissioner and Sealer of Weights and Measures. 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 USDA Census of Agriculture, its employment and economic output numbers often differ from those reported by individual state and federal agencies.

Except where otherwise noted, all figures are from 2022, the most recent IMPLAN dataset available. Where appropriate, we adjusted sector names for clarity and applied coefficients to IMPLAN values to reflect unique Tehama County conditions. Please contact the authors for additional details on the methods used.

Direct Effects of Tehama 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 Tehama County's 2022 farm production value of \$226.8 million. At \$121.1 million, Fruit & Nut Crops was the single largest production category by dollar value, comprising 53.4% of the county total. Walnuts dominated this category with \$45.3 million, followed by almonds (\$24.0 million), prunes (\$22.6 million), and table olives (\$8.2 million).



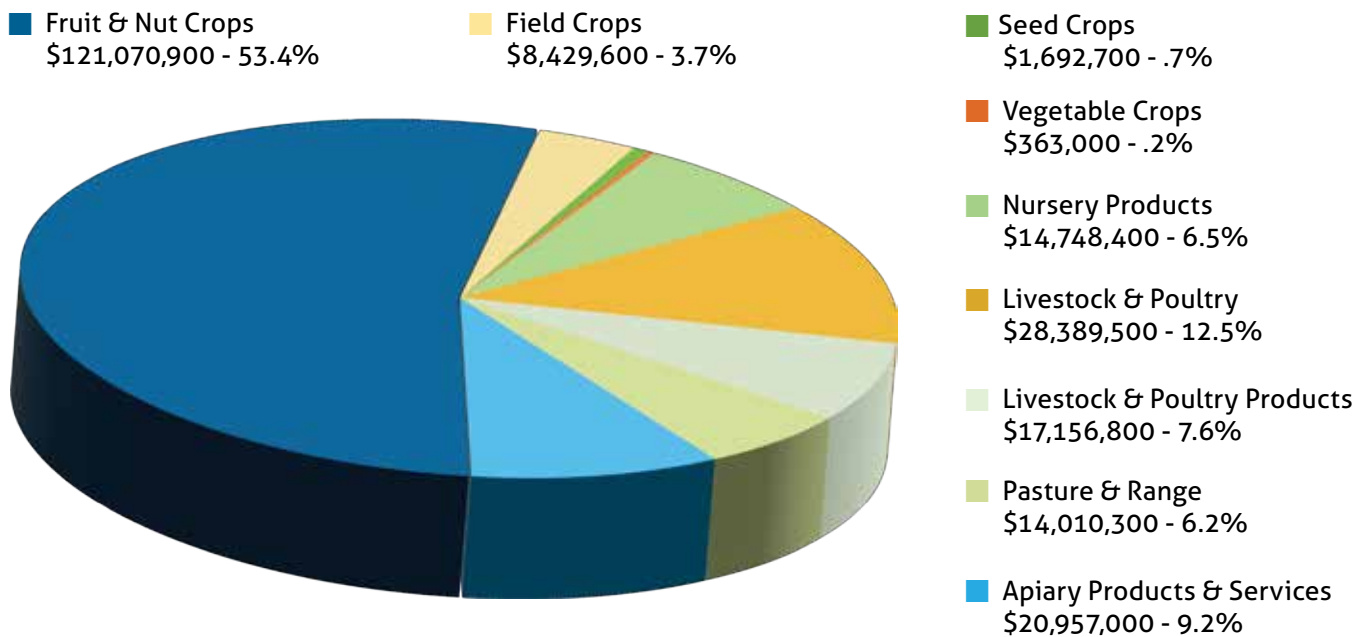
At 12.5%, Livestock & Poultry represented the second largest category (\$28.4 million), consisting mostly of cattle. Apiary Products & Services ranked third at \$20.9 million (9.2%). The category includes apiary products such as honey, queens, wax, and package bees (\$12.7 million) as well as pollination (\$8.2 million). Livestock & Poultry Products was next at \$17.2 million (7.6%), most of it milk (\$15.5 million).

Nursery Products (\$14.7 million, 6.5%) includes several hundred acres of strawberry plants grown and shipped by one of the world’s largest berry companies. Another strawberry plant nursery business bases out of Tehama County, with all the plants they grow processed at their Red Bluff trim shed, then shipped worldwide. It also reflects the recent arrival of a company that produces grapevine nursery stock on over one hundred acres, then sells the vines across California and beyond.

Total values do not reflect net profit or loss experienced by individual growers or by the industry as a whole. Interested readers are encouraged to consult the Department of Agriculture’s 2022 Tehama County Crop & Livestock Report for additional details on specific products and their value.

Figure 1. Distribution of Tehama County Farm Production

Source: 2022 Tehama County Crop & Livestock Report, Tehama County Department of Agriculture



EMPLOYMENT

How many people work in agricultural production? In 2022, IMPLAN data indicate that agricultural production directly employed 5,614 people in Tehama 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 8 . Nor did it include Tehama County’s public sector jobs in agriculture, across a range of local, state, and federal agencies.

"Multiplier Effects" of Tehama 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 fertilizer, pesticides, seed, insurance, banking services, farm equipment, and other inputs, the grower 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 in other counties, this study only reflects those expenditures within Tehama 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 use IMPLAN multipliers for each sector, which are rooted in the most recent U.S. Bureau of Economic Analysis input-output models.

Every sector has its own unique multipliers reflecting where companies and employees spent their money. Each sector also has its own unique multipliers for employment resulting in the combined employment numbers shown in **Figure 2**.

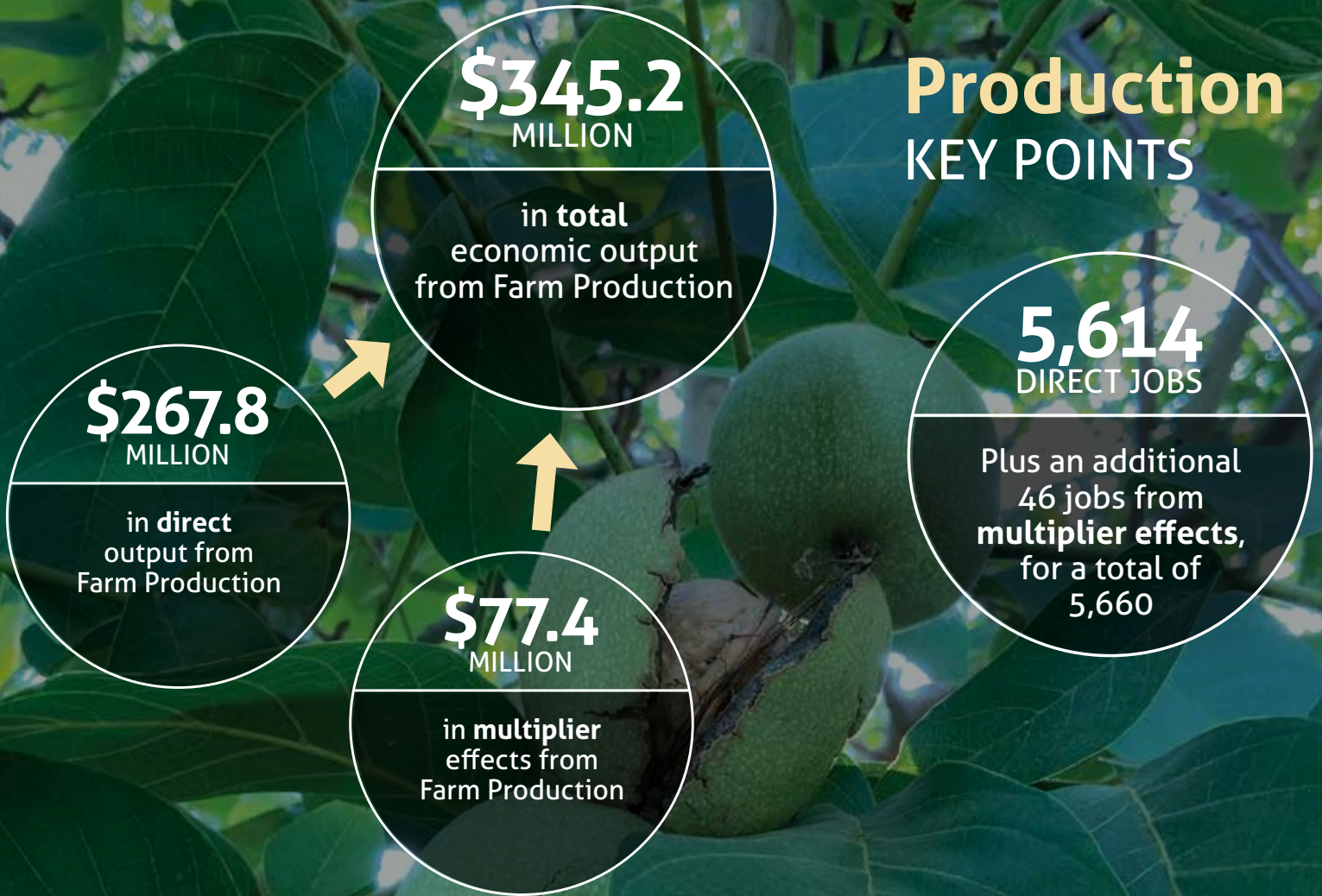
For example, "Tree Nut Farming" in Tehama County has an *indirect effects* multiplier of 0.1156 and an *induced effects* multiplier of 0.1555. This means that for 2022, each dollar's worth of direct output from walnuts, almonds, and pistachios generated an extra 11 cents in supplier purchases, plus about 15 more cents in consumption spending by agricultural company owners and employees.

Figure 2. Economic Effects of Tehama County Farm Production

Dollar values are in \$ millions. Figures are for 2022 and come from IMPLAN and U.S. Bureau of Economic Analysis, with adjustments for local conditions. Due to rounding, the totals may differ slightly from the sum of the components.

FARM PRODUCTION SECTOR	Output Effects (\$ Millions)			TOTAL
	Direct	Indirect	Induced	
Tree Nut farming	\$75.8	\$8.8	\$11.8	\$96.4
Support Activities for Agriculture	\$46.2	\$6.7	\$13.5	\$66.4
Fruit Farming	\$45.3	\$4.5	\$6.4	\$56.2
Miscellaneous Other Crop Farming	\$36.1	\$5.1	\$6.8	\$48.0
Beef Cattle Ranching & Farming	\$25.1	\$3.4	\$1.1	\$29.6
Other Animals & Animal Products (Non-Cattle)	\$20.5	\$3.3	\$1.2	\$25.0
Greenhouse, Nursery, & Floriculture Production	\$14.7	\$1.6	\$1.8	\$18.1
Forestry & Forest Products	\$2.2	\$0.3	\$0.3	\$2.8
Grain Farming	\$2.0	\$0.5	\$0.2	\$2.7
TOTAL ECONOMIC OUTPUT	\$267.8	\$34.2	\$43.2	\$345.2
	Employment Effects (# Jobs)			TOTAL
	Direct	Indirect	Induced	
TOTAL EMPLOYMENT	5,614	28	18	5,660

Production KEY POINTS



Multipliers change every year for each sector and county in the entire nation to reflect where companies and employees spent their money. The *indirect effects* multiplier for "Grain Farming" in Tehama County, for example, was 0.3372 in 2017 and 0.2536 for 2022.

Note that category names and production values in **Figure 2** differ from the 2022 Tehama County Crop & Livestock Report. They follow a standard classification system used nationwide called the North American Industrial Classification System (NAICS), as modified by IMPLAN. Each NAICS/IMPLAN category has an explicit definition. Agricultural producers in Tehama County and nationwide use the NAICS categories on Schedule F of their federal tax return ("Profit or Loss from Farming"), which requires them to designate the NAICS category that best fits their operation.

Also, because NAICS and IMPLAN use a different methodology than the county's annual agriculture survey, the \$267.8 million direct production value in **Figure 2** differs slightly from the \$226.8 million total in the 2022 Tehama County Crop & Livestock Report. Among other things, NAICS and IMPLAN include pollination and other production-related services in a sector called "Support Activities for Agriculture & Forestry."

The following list helps bridge familiar Tehama County commodities with NAICS and IMPLAN sectors:

- **Tree Nut Farming:** Almond (Meats), Walnuts (in Shell), Pistachios, Miscellaneous Nuts (e.g., Pecans, Walnut Shells, Almond Hulls);
- **Support Activities for Agriculture & Forestry:** Pollination, Soil Preparation, Planting, Cultivating, Harvesting, Etc.
- **Fruit Farming:** Grapes, Olives (Table), Olives (Oil), Prunes, Miscellaneous Fruits (Apples, Apricots, Blueberries, Cherries, Mandarins, Oranges, Organic Figs, Peaches, Persimmons, Citrus, Stone Fruit and Pome Fruit);

- **Miscellaneous Other Crop Farming:** Apiary Products (Honey, Queens, Wax, Package Bees), Hay (Wheat, Alfalfa, Grain, Other), Miscellaneous Field Crops (e.g., Hops, Lavender, Loofah), Pasture and Range (Irrigated Pasture, Range, Stubble), Seed Crops (Sunflower, Squash, Cucumber, Wheat), Vegetable Crops;
- **Beef Cattle Ranching & Farming:** Calves, Cows & Bulls, Dairy Cattle, Feeders, Registered Stock;
- **Other Animal Production & Products (Non-Cattle):** Animal Fiber (Wool, Alpaca Fiber), Eggs, Meat Goats, Milk, Misc. Livestock (Aquaculture, Sheep & Lambs, Hogs & Pigs, Bison, Poultry, Rabbits, Misc. Fowl);
- **Greenhouse, Nursery & Floriculture Production:** Nursery Products (Bamboo, Berries, Grapevines, Figs, Bedding Plants);
- **Forestry & Forest Products:** Timber Harvesting & Transport;
- **Grain Farming:** Barley, Beans, Corn, Oat Silage, Rye Grass, Sorghum Milo, Wild Rice.

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 Tehama 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., Tehama County’s abundant supply of nuts, fruits, animals, and other raw agricultural products.

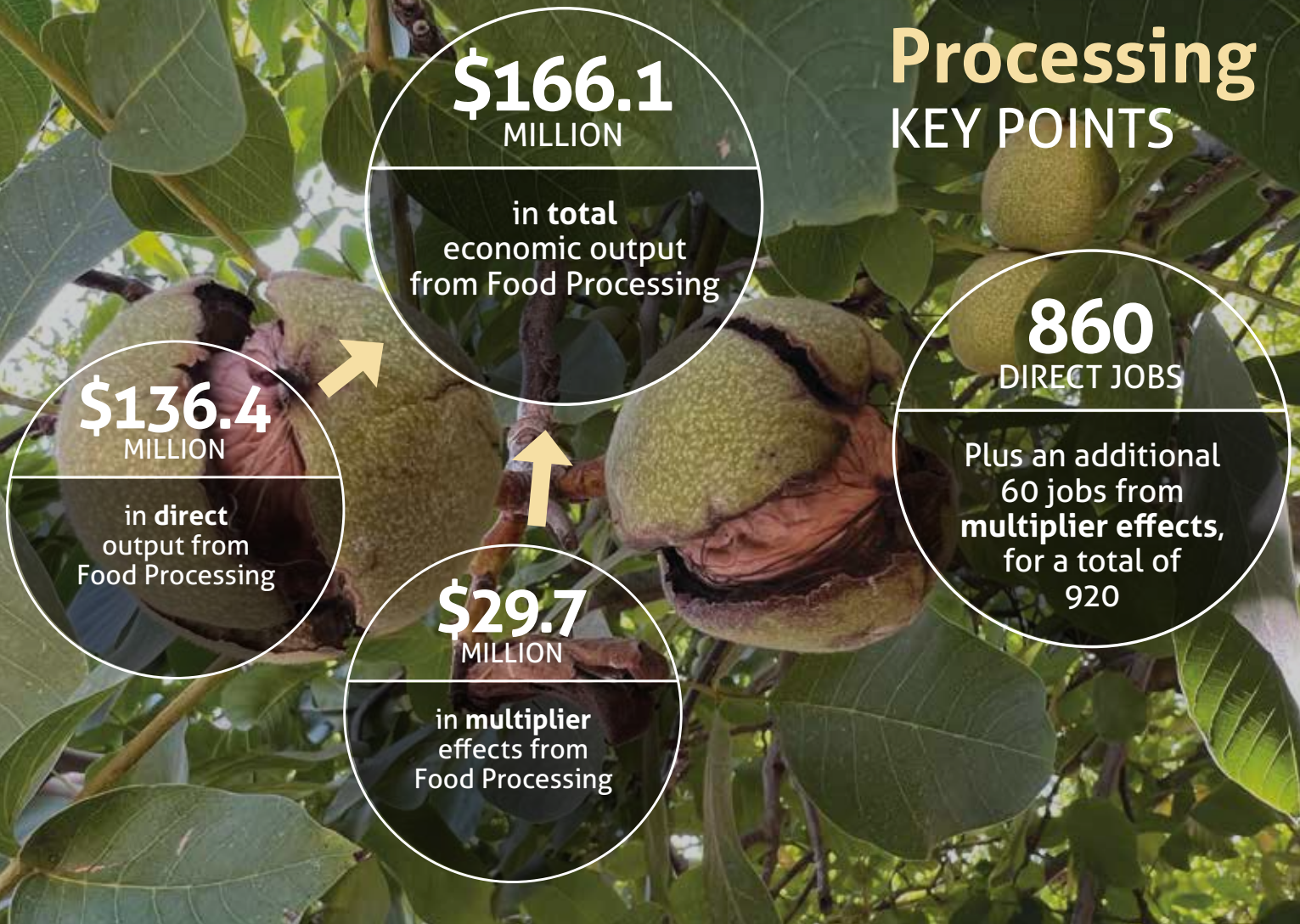
Figure 3 shows the economic effects of locally sourced, value-added food processing. As with **Figure 2**, the sector names draw from IMPLAN and NAICS, which lump and split products according to a national classification system for tracking economic output.

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

Sources: IMPLAN and U.S. Bureau of Economic Analysis data, with input by local industry experts. Due to rounding, the totals may differ slightly from the sum of the components.

FOOD PROCESSING SECTOR	Output Effects (\$ Millions)			TOTAL
	Direct	Indirect	Induced	
Nuts & Other Dried Products	\$59.0	\$2.7	\$12.2	\$73.8
Canned Fruits Manufacturing	\$35.0	\$4.4	\$1.9	\$41.3
All Other Food Manufacturing	\$13.7	\$2.1	\$0.9	\$16.7
Animal Products Manufacturing	\$12.2	\$1.8	\$0.7	\$14.6
Wineries	\$10.6	\$2.0	\$0.7	\$13.3
Oils Refining & Blending	\$6.0	\$0.4	\$0.1	\$6.4
TOTAL ECONOMIC OUTPUT	\$136.4	\$13.3	\$16.4	\$166.1
TOTAL EMPLOYMENT	Employment Effects (# Jobs)			TOTAL
	Direct	Indirect	Induced	
TOTAL EMPLOYMENT	860	41	19	920

Processing KEY POINTS



The largest category, **“Nuts and Other Dried Products,”** reflects portions of the county’s \$45.3 million walnut crop and \$24.0 million almond crop that are processed within the county rather than shipped elsewhere. For example, an operation near Vina hulls, dries, packages, and ships a wide range of walnut products, including trail mixes, roasted, flavored, and natural nuts. A nationally prominent company with six facilities in California operates one of them in Red Bluff. A producer in Los Molinos sells online and retail, hosts weddings, and even sells a Tehama Sampler Gift Box that contains a microcosm of the county’s agricultural production: walnuts, plums, apricots, pecans, pistachios, and almonds. This category also includes portions of the county’s prune crop that stays local for dehydration, especially at a Red Bluff facility owned by a prominent national brand.

“Canned Fruits Manufacturing” encompasses fresh, canned, and bottled products made from the county’s abundant fruits. This includes, for example, the portion of the county’s \$8.2 million table olive crop that is processed locally into canned products.

“Oils Refining & Blending” in **Figure 3** reflects portions of the county’s \$5.5 million olive crop destined for local oil production, rather than table olives. As with olive canning, much of the oil production occurs near Corning, a nationally-renown center for olive products. A few operations even offer tours and tastings.

“All Other Food Manufacturing” in **Figure 3** combines multiple activities, many of them occupying narrow niches. An aquaculture operation near Paynes Creek supplies trout to restaurants and grocery stores across a wide swath of California. A grower near Corning cleans, sorts, and packages figs for direct shipment to restaurants, grocery chains, and others. A facility in Dairyville makes and sells jams and other products, including local walnuts and almonds covered with chocolate. Many other examples exist, all of them adding value to locally produced raw products.

"Animal Products Manufacturing" reflects local slaughtering and processing of beef, lamb, goats, and other animals. A USDA and state-inspected facility near Orland, for example, has served the community for more than thirty years. Only a tiny portion of the county's \$28.5 million in livestock stays within the county for processing.

What Tehama County's **"Wineries"** sector lacks in size, it makes up for with quality, tradition, and variety. A combination of distinct soils, hot days, and cool nights help transform the county's \$996,800 grape crop into quality products. The value of this sector more than doubled since our previous report.

For example, a fifth-generation winemaker and community of Trappist-Cistercian monks near Vina handcraft award-winning wines. Wineries in the federally-recognized Manton Valley American Viticultural Area (AVA) boast a unique combination of elevation, terrain, and volcanic soils. Many wineries add economic value by hosting tastings, weddings, and other events.

Total Economic Contributions of Tehama 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 Tehama County agriculture.

Figure 4 shows the total 2022 economic contribution of Tehama County agriculture was \$511.3 million. This consisted of \$404.2 million in combined, direct output from production and processing, plus \$107.1 million in multiplier effects.

For perspective, agriculture pumped \$1,400,715 per day into the county economy during 2022. This translates to \$58,363 per hour in 2022. The \$404.2 million in direct output represented 7.83% of the county's total economic output of \$5.159 billion. Thus, agriculture accounted for one dollar out of every \$12.77 of the county's direct economic output.

Total employment covered in the scope of this study was 6,581. Of these, 6,474 jobs were directly in agriculture, with the remainder from multiplier effects. The 6,474 direct agricultural jobs represented 23.5% of Tehama County's total employment of 27,497, or nearly one out of every four jobs.

Figure 4. Overall Economic Effects of Tehama County Agriculture

Due to rounding, the totals may differ slightly from the sum of the components.

Type of Effect	Direct	Indirect	Induced	TOTAL
FARM PRODUCTION				
Output Effects (\$ Millions)	\$267.8	\$34.2	\$43.2	\$345.2
Employment Effects (# Jobs)	5,614	28	18	5,660
LOCALLY SOURCED, VALUE-ADDED FOOD PROCESSING				
Output Effects (\$ Millions)	\$136.4	\$13.3	\$16.4	\$166.1
Employment Effects (# Jobs)	860	41	19	920
TOTAL VALUE OF AGRICULTURAL INDUSTRY				
Output Effects (\$ Millions)	\$404.2	\$47.5	\$59.6	\$511.3
Employment Effects (# Jobs)	6,474	70	37	6,581

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 Tehama County agriculture? and 3) How has agriculture’s level of economic diversification changed since our previous study?

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, Tehama County’s agricultural producers face a long list of risks. Examples include: price drops, wildfires, droughts, floods, pandemics, crop pests and diseases, food safety-related outbreaks, new regulations, new competitors, labor availability and cost, and rising 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 in 2020, the county’s overall agricultural value declined by that same percent. Contrast that with Tehama County, which entered the 2020 pandemic and record-setting wildfire season with a “medium” level of economic diversification. Total agricultural output dropped just 12%. Then it increased 26% for 2021 during the pandemic’s peak.

HOW DIVERSIFIED IS TEHAMA COUNTY AGRICULTURE?

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

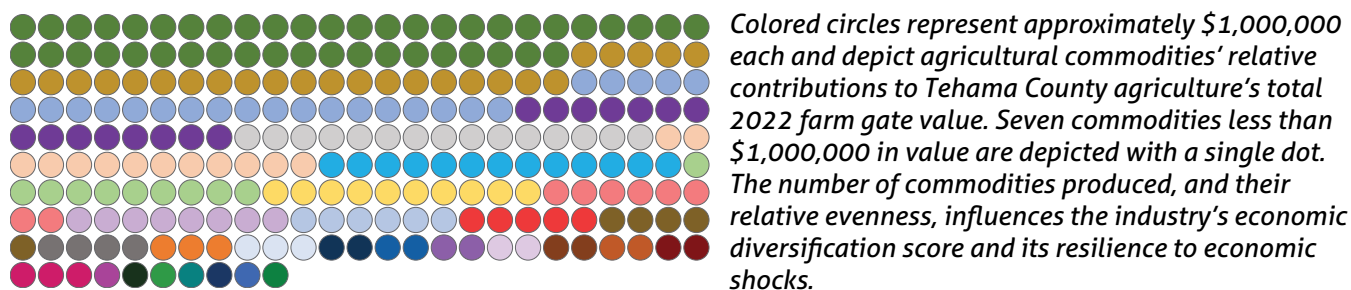
The Office of the Agricultural Commissioner & Sealer of Weights and Measures first answered that question in its 2019 report titled, **Economic Contributions of Tehama County Agriculture**. The study reported agriculture’s Shannon-Weaver Index, a measure of diversification that captures not just the number of different commodities produced, but also their relative abundance. Agricultural officials in more than twenty other California counties have also reported their own index.

How exactly does one calculate the Shannon-Weaver Index for Tehama County agriculture? The main steps are: 1) create a list of agricultural products and their production values; 2) remove minor, outlier products that have production values less than 0.25% of the county total, such as stubble, animal fiber, and miscellaneous vegetables; 3) enter the data into the Shannon-Weaver formula; and 4) convert to a 1.0 scale. For additional details, please contact the authors.



Over the past decade, Tehama County has consistently produced thirty major commodities. The relative contribution of individual commodities varied during this period. **Figure 5** depicts their most recent relative contributions. It includes the three outliers mentioned in the previous paragraph.

Figure 5. Relative Distribution of Tehama County Agricultural Commodities



The 2022 Shannon-Weaver Index for Tehama County's agricultural industry was **0.66**.

What exactly does this number mean? For starters, 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 farm gate values equally distributed across them. No single county could accomplish this.

Of note, 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.

Tehama agriculture's **0.66** index is well above average compared to more than twenty other California counties analyzed thus far. This indicates Tehama County agricultural production is both diverse and well-distributed across categories.

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

The 2022 index of 0.66 marks a noteworthy increase from Tehama agriculture's 2017 index of 0.58. This increase stems from a more balanced contribution by various commodities.

For example, twenty-seven commodities increased their relative contribution since 2017, as a percentage of agriculture's total farm gate value. Eleven of them more than doubled their relative contribution.

These increases do not take the sting out of declines in major products such as walnuts, almonds, and olives. But the more balanced contribution across commodities signals having "fewer eggs in a single basket" and greater economic stability and resilience going forward.

BOTTOM LINE

The discussion here supports three key points: 1) economic diversification helps buffer against economic shocks such as wildfires, price drops, droughts, disease outbreaks, and even pandemics; 2) Tehama County agriculture's average level of economic diversification heading into the recent Covid-19 pandemic and historic wildfires likely benefited the industry on the whole; and 3) agriculture's level of economic diversification increased between 2017 and 2022, reaching a new high that is well above average among California counties.

Toward the Future

This report has documented the fuller contributions that Tehama County agriculture makes to the local economy. Including local food processing and multiplier effects, agriculture contributed \$511.3 million to the county economy in 2022. Agriculture also played an important role in county employment, directly or indirectly supporting 6,581 jobs. Finally, agriculture's above average level of economic diversification likely bodes well for future economic stability and resilience.

Agriculture is an important pillar of the Tehama County economy and represents a vital link to the county's cultural past and competitive future. Agriculture will no doubt face many challenges and opportunities in the coming years. For now, the findings herein provide an important snapshot of Tehama County agriculture's vital economic role.

Acknowledgments

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Tehama County Department of Agriculture

www.co.tehama.ca.us/dep-agriculture

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Agricultural Impact Associates 

