CROP REPORT PLUS *Series*

COUNTY OF Placer®

Economic Contributions of Placer County Agriculture

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Commissioner's Letter

I am pleased to share the **Economic Contributions of Placer County Agriculture**. This report takes an important step beyond the Placer County Crop Report that we publish every year. 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.

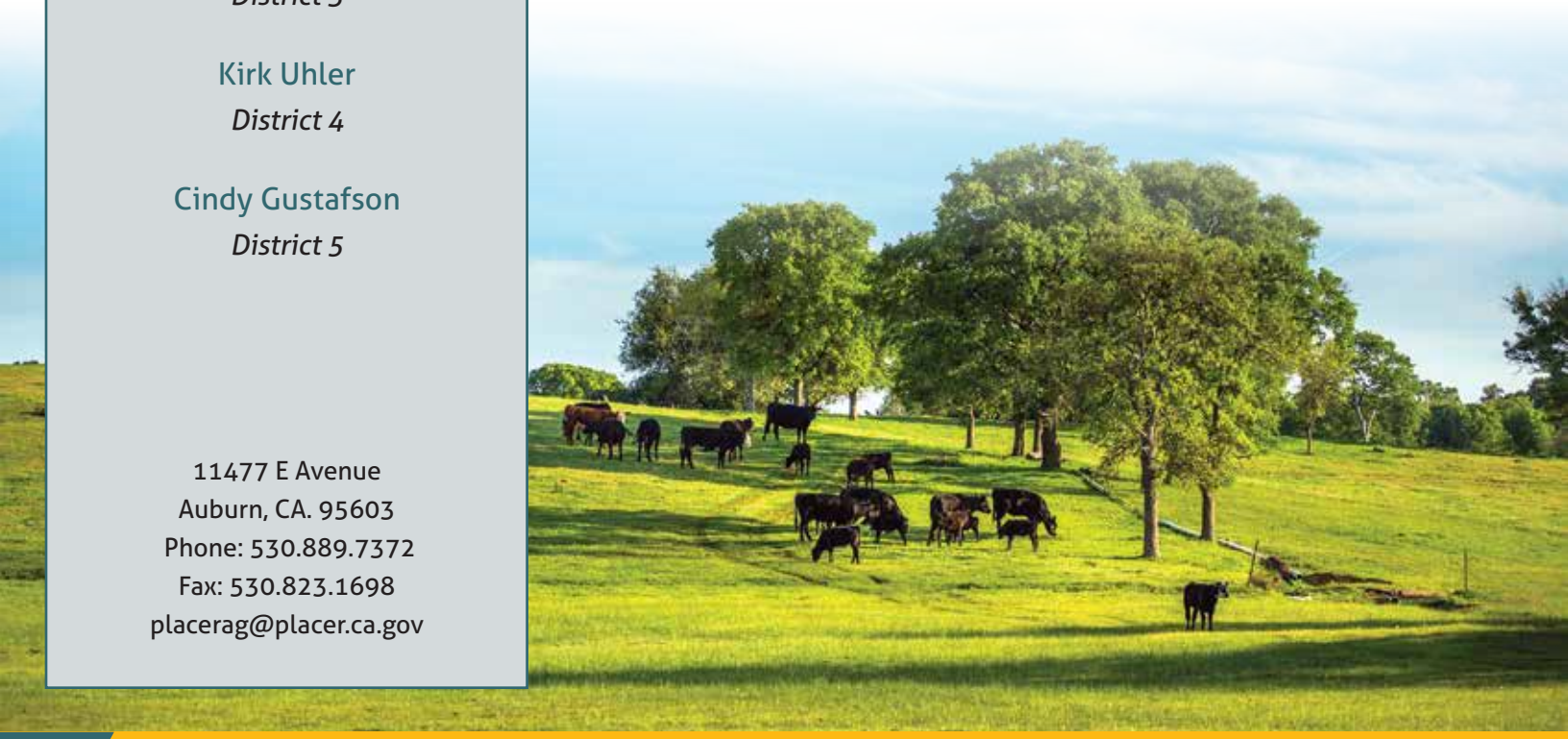
In short, this report uses twenty-first century economic tools to document agriculture's broader role in sustaining a thriving local economy.

This new study shows that in 2018, agriculture contributed a total of $182.9 million to the county economy. This far exceeded the $72.7 million figure from our 2018 Placer County Crop Report. Agriculture directly supported 2,046 employees, plus another 72 from multiplier effects. This report also examines economic diversification within agriculture, which has implications for countywide economic resiliency.

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

Respectfully submitted,

Joshua P. Huntsinger
Agricultural Commissioner/
Sealer of Weights & Measures



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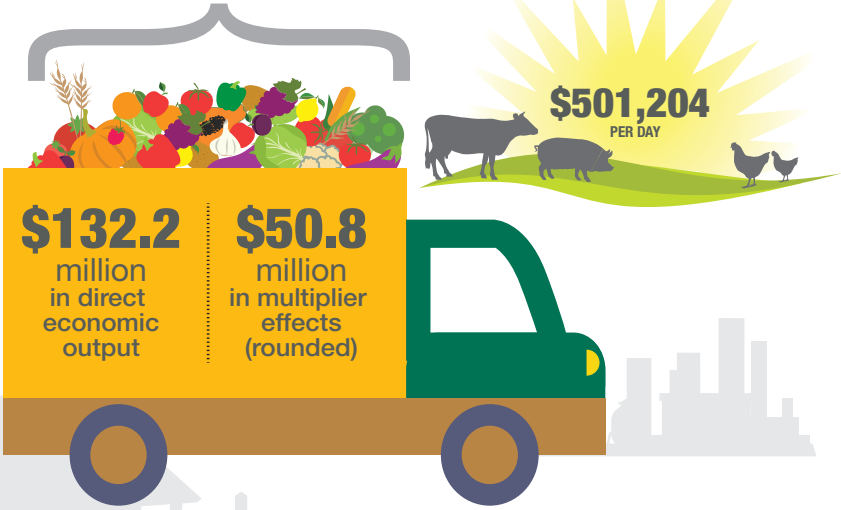
of the Agricultural Industry

FOR 2019

$182.9 million

Placer County Agriculture's total contribution to the local economy



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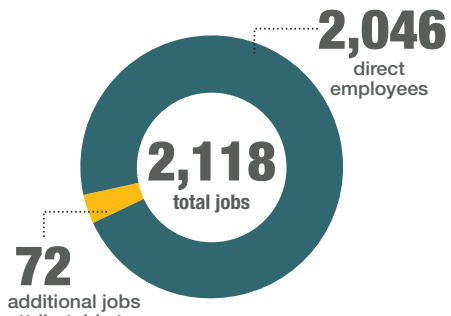


Introduction

Residents and visitors alike know and value the contributions agriculture makes to Placer County. Rice fields stretch for miles. Cattle and calves dot the hillsides and valleys. Walnuts, timber, and many other crops grow in fertile soils while farmers' markets nurture local food and community pride. It is not difficult to see that agriculture plays a vital role in sustaining a healthy economy in Placer County.

What's not so apparent, 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 Placer 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 Placer County economy. The report also examines agricultural diversification and its role in supporting economic resilience, including a quantitative measure. Overall, the findings offer important information for policy makers, the public, and anyone who values a thriving local economy.

Our Approach

A *basic industry* is one that 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 Placer 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 pages 5-6 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 Placer County Crop Report produced by the office of 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 recent 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 the year 2018, the most recent IMPLAN dataset available. Where appropriate, we adjusted sector names for clarity and applied coefficients to IMPLAN values to reflect unique Placer County conditions. Please contact the authors for additional details on the methods used.

Direct Effects of Placer 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 Placer County's farm production value. At $27.1 million, Field Crops was the single largest production category by dollar value, comprising 37.3% of the county total.

Rice dominated this category with $20.0 million, followed by irrigated pasture ($2.7 million), other pasture ($2.6 million), and hay ($1.5 million).

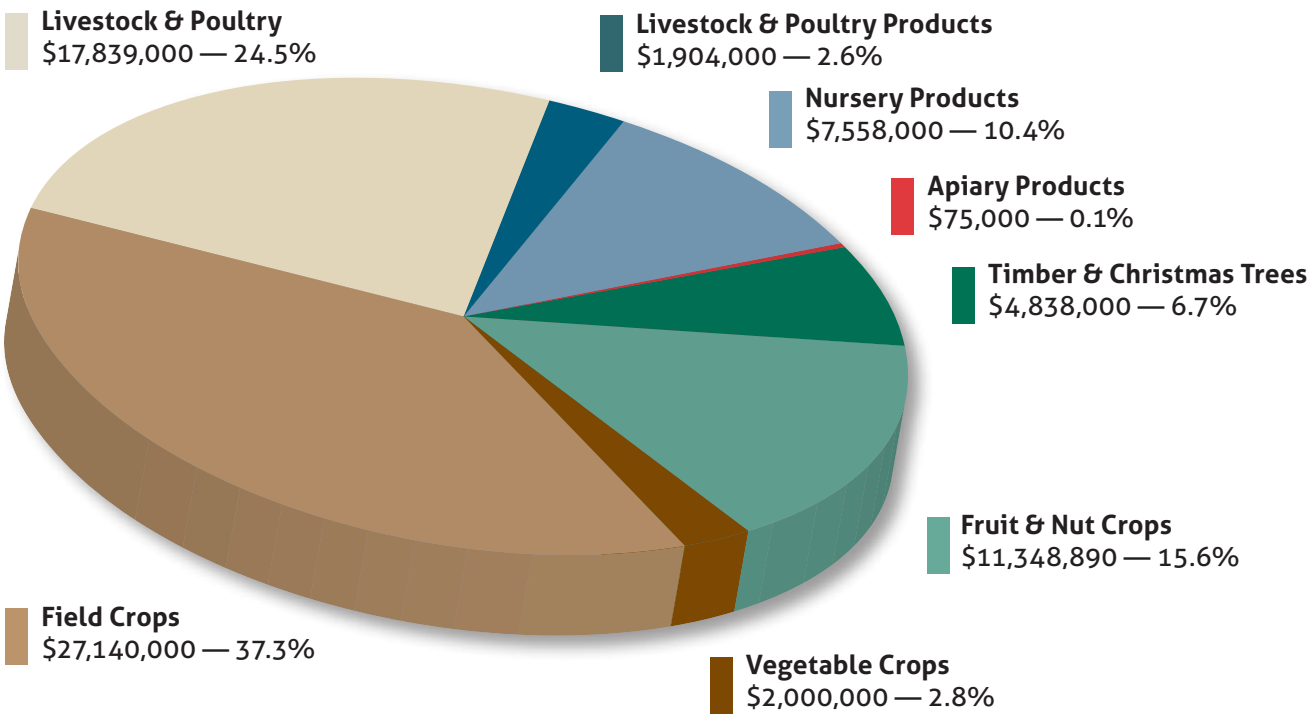
At 24.5%, Livestock & Poultry represented the second largest category ($17.8 million), consisting mostly of cattle & calves ($14.7 million). Fruit & Nut Crops were next at $11.4 million (15.6%).

The combined, total dollar value for all products rose $5.4 million over the previous decade, from $67.3 million in 2009 to $72.7 million in 2018. Inflation totaled 19.5% during this period, averaging just under 2% per year. Thus, agricultural production declined after adjusting for inflation.

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 county's 2018 Crop Report for additional details on specific products and their value.

Figure 1. Distribution of Placer County Farm Production

Source: 2018 Annual Crop Report, Placer County, Department of Agriculture Weights & Measures



EMPLOYMENT

How many people work in agricultural production? In 2018, IMPLAN data indicate that agricultural production directly employed 1,904 people in Placer 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 pages 8-9. Nor did it include Placer County's public sector jobs in agriculture, across a range of local, state, and federal agencies.

Multiplier Effects of Placer 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 that occur within Placer 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 Placer County has an *indirect effects* multiplier of 0.1642 and an *induced effects* multiplier of 0.2741. This means that for 2018, each dollar's worth of direct output from walnuts and almonds generated an extra 16 cents in supplier purchases, plus 27 more cents in consumption spending by agricultural company owners and employees. Multipliers change every year, for each sector and county in the entire nation, reflecting where companies and employees spend their money.

Note that category names and production values in **Figure 2** differ from the county's 2018 Crop 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.

Also, because NAICS and IMPLAN uses a different methodology than the county's annual agriculture survey, the $78.2 million direct production value in **Figure 2** differs slightly from the $72.7 million total in the 2018 Crop Report.

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

- **Grain Farming:** Rice, Wheat, Corn (for fodder), Oats;
- **Beef Cattle Ranching & Farming:** Cattle & Calves;
- **All Other Crop Farming:** Hay (alfalfa & other), Pasture (irrigated & other);
- **Greenhouse, Nursery & Floriculture Production:** Nursery Stock;
- **Fruit Farming:** Apples, Grapes, Mandarins, Peaches, Pears, Plums, Strawberries, Misc. Fruits;
- **Support Activities for Agriculture & Forestry:** Pollination, Soil Preparation, Planting, Cultivating, Harvesting;
- **Forestry & Forest Products:** Timber, Christmas Trees;
- **Tree Nut Farming:** Walnuts, Almonds;
- **Other Animal Production & Products (non-cattle):** Eggs, Milk, Sheep, Wool, Fish, Goats, Turkeys, Swine;
- **Vegetable & Melon Farming:** Lettuce, Melons, Peppers, Pumpkins, Squash, Tomatoes, Miscellaneous.

Figure 2. Economic Effects of Placer County Farm Production

Dollar values are in $ millions. Figures are for 2018 and come from IMPLAN and U.S. Bureau of Economic Analysis, with adjustments for local conditions. Not all columns and rows add exactly due to rounding.

FARM PRODUCTION SECTOR	Output Effects ($ Millions)			TOTAL
	Direct	Indirect	Induced	
Grain Farming	$20.2	$3.3	$2.5	$26.1
Beef Cattle Ranching & Farming	$14.7	$3.8	$1.2	$19.6
All Other Crop Farming	$7.2	$2.5	$1.1	$10.8
Greenhouse, Nursery & Floriculture Production	$7.6	$1.7	$0.7	$10.0
Fruit Farming	$6.5	$1.3	$0.7	$8.5
Support Activities for Agriculture & Forestry	$5.4	$0.5	$2.1	$8.1
Forestry & Forest Products	$4.8	$1.0	$1.6	$7.4
Tree Nut Farming	$5.0	$0.8	$1.4	$7.2
Other Animal Production & Products (non-cattle)	$4.8	$0.7	$0.5	$5.9
Vegetable & Melon Farming	$2.0	$0.6	$0.2	$2.8
TOTAL ECONOMIC OUTPUT	$78.2	$16.3	$12.1	$106.5
	Employment Effects (# Jobs)			TOTAL
	Direct	Indirect	Induced	
TOTAL EMPLOYMENT	1,904	13	7	1,924

Production
KEY POINTS

1,904
DIRECT JOBS

plus an additional 20 jobs from **multiplier effects**, for a total of 1,924

$106.5
MILLION

in **total** economic output from Farm Production

$78.2
MILLION

in **direct** output from Farm Production

$28.3
MILLION

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 Placer 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., Placer County's abundant supply of 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.

The largest category in **Figure 3**, "**Miscellaneous Other Food Manufacturing**," combines multiple, niche activities. Many growers, for example, produce honey and then sell it retail or wholesale. Other growers produce olive oils, which, as with the local honey, they flavor with local fruit. Several operations add value to persimmons by using the traditional Japanese drying method known as "Hoshigaki" that preserves quality and enhances flavor.

Mandarins offer a noteworthy example of a raw product with significant added value. Growers add value to mandarins through sorting, cleaning, bagging, boxing, and labeling. They sell retail and wholesale. At the time of writing, the county had over 60 mandarin growers (see www.placerGROWN.org).

Each November, the annual Mountain Mandarin Festival takes place at the Gold Country Fairgrounds in Auburn, and draws an estimated 30,000 visitors. Then, in December, producers host Mountain Mandarin Orchard Days, a family-fun opportunity for guests to visit the farms. In addition to fresh mandarins, guests also buy lightly processed foods, including fresh fruits and vegetables that have been peeled and cut before serving.

What Placer County's "**Wineries**" sector lacks in size, it makes up for with quality, tradition, and variety. An estimated twenty wineries transform the county's $1.5 million grape crop into quality products. In contrast to many California counties, most Placer County wineries are boutique-scale operations that grow their own grapes. Many also host tastings, weddings, and other events, all of which add value. For details and lists of wineries, see the Placer County Wine & Grape Association (www.pcwga.org) and the Placer County Vintners Association (www.placerwine.com).

"**Breweries**" in **Figure 3** reflects the ongoing boom in Placer County beer brewing operations, estimated at $143.4 million in output for 2018. In most other California counties, beer brewing would not qualify for inclusion in a study like this, because brewers depend on hops imported from the Pacific Northwest and Germany. In Placer County, however, some farm breweries grow their own hops, and thus qualify as truly local beer. The amounts listed in **Figure 3** reflect this, totaling 8% of the total Breweries figure.

A farm brewery in Newcastle, for example, grows an acre of hops on site. A farm near Lincoln also grows an acre of hops, and offers not only hand-crafted beers, but also mead, cider, and wine. A third farm grows thousands of hops plants across twenty varietals. Local beer is well enough established that a Placer County Wine and Ale Trail now exists. As with wine, producers often infuse their beer with fruit grown onsite.

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.
Not all columns and rows add exactly due to rounding.

FOOD PROCESSING SECTOR	Output Effects ($ Millions) Direct	Indirect	Induced	TOTAL
Miscellaneous Other Food Manufacturing	$15.7	$5.0	$2.2	$23.0
Wineries	$14.0	$4.9	$1.5	$20.4
Breweries	$11.5	$3.2	$1.0	$15.7
Animal Products Manufacturing	$8.6	$2.1	$1.0	$11.6
Canned Fruits & Vegetables Manufacturing	$2.7	$0.9	$0.2	$3.7
Nuts & Processing & Products	$1.4	$0.3	$0.2	$1.9
TOTAL ECONOMIC OUTPUT	$54.0	$16.3	$6.1	$76.4
	Employment Effects (# Jobs) Direct	Indirect	Induced	TOTAL
TOTAL EMPLOYMENT	142	37	15	194

"**Animal Products Manufacturing**" captures the portion of the county's cattle that stays local for processing. Most of the county's $14.7 million in cattle & calves departs the county for processing in Nevada, at Harris Ranch, and at other locations. But a small amount goes to local butchers for slaughtering, processing, and packaging. In just one of many examples, a family farm in Penryn processes beef, lamb, and pork, then sells it directly to customers as frozen and vacuum packed cuts, as well as by the half or whole.

In addition to beef, this category also includes a wide range of other animal products. A farm in Loomis, for example, sells naturally-produced beef, poultry, pork, and eggs. An Auburn farm focuses on lamb products, integrated with an orchard and farm stand. A dairy near Lincoln produces butter, yogurt, cheese, ice cream and eggs, and sells them at the Auburn Farmer's Market, online, and delivered locally or picked up.

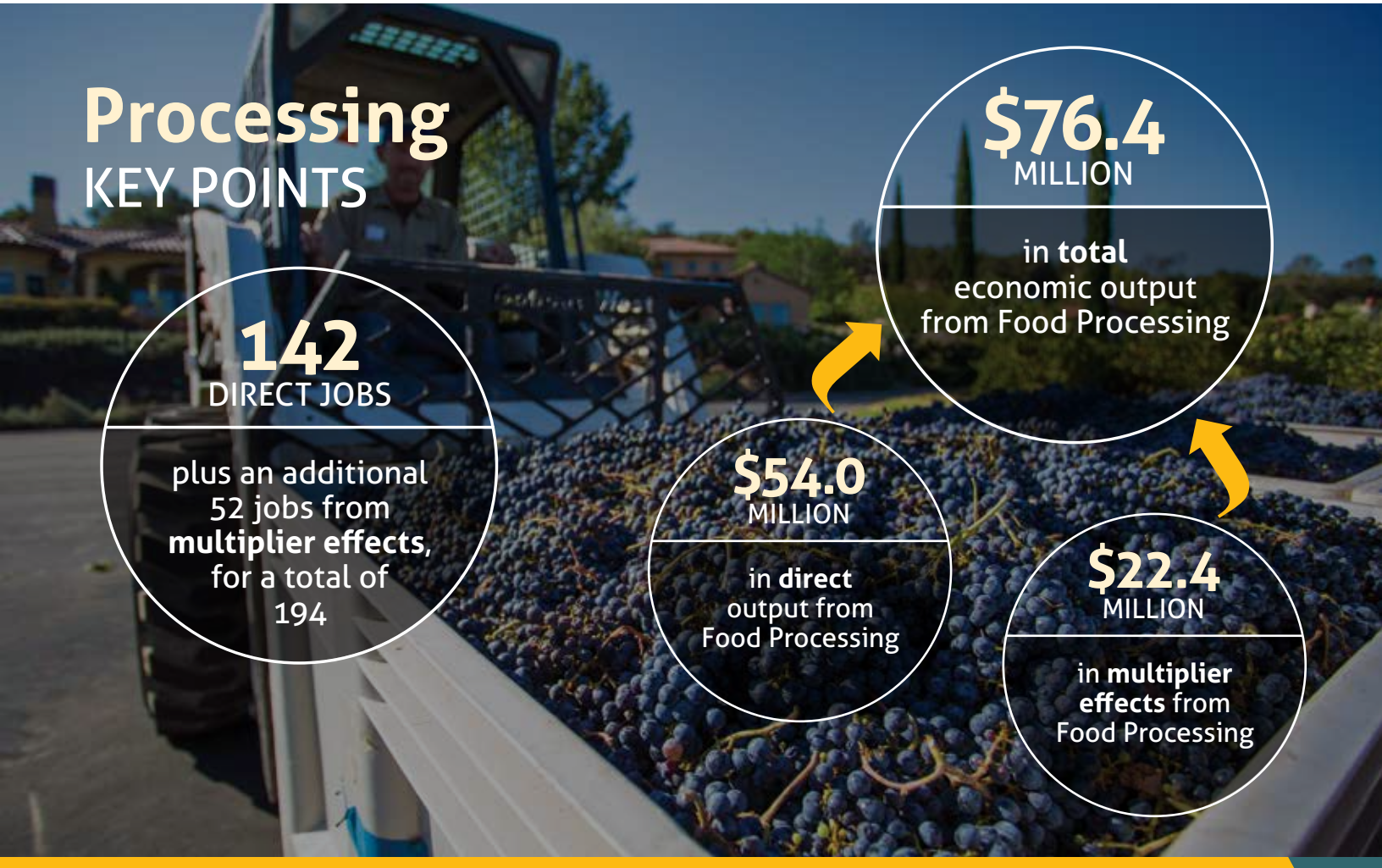
In other examples, a farm by Folsom Lake raises sheep, goats, rabbits, ducks, chickens, and quail. A farm in Foresthill specializes in angora goats, producing raw fiber and spun yarn. A few places focus on alpacas, and sell battings, rovings, rugs, scarves, socks, and yarn. At least two farms add value to alfalfa by compressing it into pellets for animal feed.

In contrast to the fresh fruit and vegetable products mentioned earlier, "**Canned Fruits & Vegetables Manufacturing**" reflects local products that have been canned, jarred, or bottled. They include a dizzying array of jams, jellies, marmalades, sauces, syrups, marinades, and related products. Producers sell many of these products at the two mandarin festivals mentioned earlier, as well as at farmers markets, online, and retail stores. Although the ubiquitous mandarins find their way into these products, growers also use mulberries, apples, strawberries, persimmons, peaches, and other local fruit.

"**Nuts Processing & Products**" in **Figure 3** mostly reflects the portion of the county's $5.0 million walnut crop that is processed within the county rather than shipped elsewhere. Although most walnuts leave the county for hulling, drying, sorting, and packaging, a few farms package their walnuts for direct sale, either raw or roasted, unflavored or flavored.

Among other nut products, two farms near Auburn and Penryn process and package almonds for direct sale. A third farm, near Roseville, specializes in pistachios. The owners produce pistachios in the shell, as kernels, and with or without flavors, as well as butters and pastes. They sell these pistachio products online, at their Lincoln showroom, and across several other retail outlets.

On a final note, totals in **Figure 3** would increase if we added timber processing. Placer County provides key infrastructure to the greater region's wood products industry, producing lumber, packaging, and related products. Although calculating the exact contribution lies beyond the scope of this study, it likely exceeds 350 jobs and $120 million per year.



Total Economic Contributions of Placer 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 Placer County agriculture.

As **Figure 4** shows, the total 2018 economic contribution of Placer County agriculture was $182.9 million. This consisted of $132.2 million in combined, direct output from production and processing, plus $50.8 million (rounded) in multiplier effects.

For perspective, agriculture pumped over *half a million dollars per day* into the county economy during 2018 ($501,204 to be exact), or $20,884 per hour.

Total agricultural employment covered in the scope of this study was 2,118. Of these, 2,046 were jobs were directly in agriculture, with the remainder from multiplier effects.

Figure 4. Overall Economic Effects of Placer County Agriculture

Not all columns and exactly add due to rounding.

Type of Effect	Direct	Indirect	Induced	TOTAL
FARM PRODUCTION				
Output Effects ($ Millions)	$78.2	$16.3	$12.1	$106.5
Employment Effects (# Jobs)	1,904	13	7	1,924
LOCALLY SOURCED, VALUE-ADDED FOOD PROCESSING				
Output Effects ($ Millions)	$54.0	$16.3	$6.1	$76.4
Employment Effects (# Jobs)	142	37	15	194
TOTAL VALUE OF AGRICULTURAL INDUSTRY				
Output Effects ($ Millions)	$132.2	$32.6	$18.2	$182.9
Employment Effects (# Jobs)	2,046	50	22	2,118

How Resilient is Agriculture to Economic Shocks?

Like growers and ranchers everywhere, Placer County agricultural producers face a long list of risks. Prominent examples include: droughts, floods, disease outbreaks, new regulations, new competitors, labor availability and cost, price drops, untimely freezes, and rising costs for fuel, equipment, 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.

What's the best way to lower these risks? Opinions vary, but most emphasize product diversification. From the old adage, "don't keep all your eggs in one basket" to the advice modern financial planners give, diversity tends to create stability.

A growing body of research supports this conventional wisdom. The more diversified a local economy is, the better it protects economic growth and employment during economic shocks. It is a complex topic, though, with many factors in play and much research yet to be done.

This raises the question: How economically diversified is Placer County agriculture? Does the county have low agricultural diversity, likely increasing its risk to economic shocks? Or is agriculture highly diversified, implying a stronger economic buffer?

To answer this question, we calculated the Shannon-Weaver Index for Placer County agriculture. Created in 1949 for military code breaking, the Shannon-Weaver index is now widely used by economists, ecologists, and others interested in quantifying diversity. 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 rainforest, or crops grown in a county – but also their relative *evenness* or *abundance*.

Figure 5 portrays this relationship. County "A" and County "B" both grow the same number of crops and have the same total value of that production. But County "A" has a low index, near zero, because 91% of production concentrates in a single crop. Any shock to that crop could devastate the agricultural economy.

County "B" depicts the opposite. Production perfectly balances across all crop categories. Each crop type contributes 10% of the total. This gives County "B" a strong buffer against economic shocks.

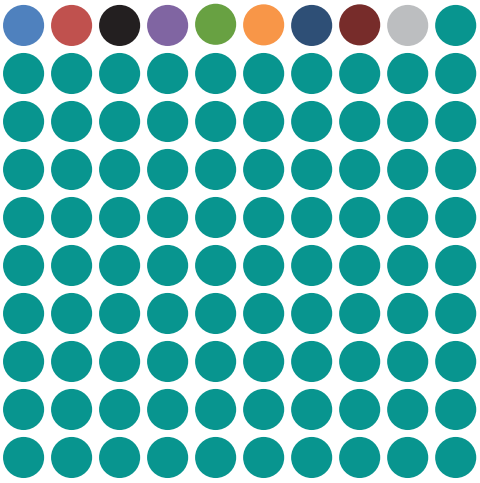
Figure 5. Agricultural Diversification is More Than Just the Number of Products

The two fictitious counties have identical agricultural products and total revenues, but diversification gives County "B" a stronger buffer against economic shocks

County "A"

10 products, $100 million

MINIMUM diversification



County "B"

10 products, $100 million

MAXIMUM diversification

SHANNON-WEAVER INDEX

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; 2) remove minor, outlier products with production values less than 0.25% of the county total, such as apples, almonds, pears, plums, and wheat; 3) enter the data into the Shannon-Weaver formula; and 4) convert to a 1.0 scale. For additional details, please contact the authors.

The 2018 Shannon-Weaver Index for Placer County's agricultural industry was **0.54**.

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. In such a case, the hypothetical county in **Figure 5** would show seventy-two rows instead of ten, each row a different color and identical length. No single county could accomplish this.

At first glance, Placer County's resulting index of **0.54** seems near the middle of 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 **0.54** index is above average compared to other California counties analyzed thus far. It likely suggests solid protection from economic shocks. Validating that resilience would require stress testing that models specific shocks to see how they affect the industry. For now, suffice it to say that Placer County agricultural production is both diverse and well distributed across types.

Toward the Future

This report has documented the role that Placer County agriculture plays as a local economic driver. Including local food processing and multiplier effects, agriculture contributed $182.9 million to the county economy in 2018. Agriculture also played an important role in county employment, directly or indirectly supporting 2,118 jobs. Finally, agriculture's solid diversification has provided critical economic stability not just to the agricultural industry, but to the larger county economy. The economic value of this stability is certainly high, albeit hard to quantify.

Agriculture is an important pillar of the Placer County economy and represents a vital link to both the county's cultural past and competitive future. Although this report has presented many facts and figures, it has barely begun to fill key information gaps about agriculture's role. The process of developing this report has raised several additional questions that lie beyond the scope of this report but may warrant future research **(see below)**. In the meantime, the findings herein provide the clearest picture yet of Placer County agriculture's important economic role.

Additional Questions

- ADDING VALUE LOCALLY. Nearly all of Placer County's two biggest agricultural commodities, rice and cattle, leave the county for processing. Related, several thousand acres of young walnuts and almonds will soon begin to produce. What new policies, programs, and other initiatives, if implemented, could support local processing of these important commodities?
- ECOSYSTEM SERVICES. Many growers strive to produce in ways that are compatible with nature. What is the annual dollar value of wildlife habitat, scenic beauty, carbon sequestration, and more than twenty other ecosystem services that Placer County's agricultural lands contribute to society?
- DIVERSIFICATION. How is economic diversification trending over the past decade? Is agriculture becoming more diversified, and therefore more resilient to economic shocks, or less so?
- ECONOMIC SHOCKS. How would potential shocks affect agriculture's economic results, for example significant new regulations, pests, diseases, labor policies, or changes in the price of key inputs?
- CANNABIS AND HEMP. Commercial cannabis and industrial hemp production are not allowed in Placer County, but continue to gain momentum in California. What economic costs and potential benefits do they pose for Placer County agriculture?

Acknowledgments

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COUNTY OF Placer®

Placer County Department of Agriculture

www.placer.ca.gov/agriculture

(April 2020)

Agricultural Impact Associates