



**Sonoma County Ag + Open Space
Economic Impacts from COVID-19 on Agricultural Community**

August 2020

**Economic Forensics and Analytics, Inc.
Petaluma, CA
eyler@econforensics.com**

Contents

Executive Summary	3
1. Introduction	5
2. The Effects of COVID-19 on Food-Based Agriculture Production in Sonoma County.....	6
The Macro Environment with COVID-19	7
Summary on Macroeconomic Factors and Economic Impact on Sonoma County Food Producers.....	8
Interviews with Local Farmers and Agricultural Advocates.....	9
Counting the Labor Force in Sonoma County Agriculture	10
Crop Values.....	12
3. Industry Issues and Recent Price Data.....	16
Dairies	16
Poultry and Eggs	16
Beef Cattle	17
Vegetables, Fruit other than Apples, Legumes.....	17
Lamb and Wool.....	18
Nursery Products and Flowers.....	19
Hay and Silage.....	20
Apples	20
Summary: Risks in Local Agriculture	21
4. Concerns and Alternatives for Sonoma County Food Farmers.....	21
Local Processing: Closing the Final Supply Chain Link	22
Carbon sequestration and land use.....	23
Land leases versus purchase.....	24
Succession Planning and Farm Labor.....	25
Reality Check: Winegrapes, Cannabis and Equine as considerations for farmers	26
5. Scenario Analysis	28
Scenarios to 2023	28
The Median Scenario, Back to 2019 Levels of Ag Value in 2024	28
Better Scenario: Fiscal Stimulus and Lower Interest Rates Accelerate Post-Vaccine Economy	29
Worse Scenario: No Vaccine until late 2021 and Relapse of COVID-19 in Fall 2020/Winter 2021	30
6. Conclusions: Challenges and Opportunities	32
References	33

Executive Summary

Sonoma County food producers are likely to see recovery in the value of their products by 2022 back to 2019 values. Projected economic recovery for the national and state economies, as well as slow but positive global recovery help stabilize demand and pricing for food products. This study examines the effects of COVID-19 on food-producing agricultural businesses in Sonoma County from 2020 to 2023. This study was commissioned by Sonoma County Agricultural Preservation and Open Space District (Ag + Open Space).

The economic impact of COVID-19 on total agricultural values, following the crops and livestock used to calculate annual Crop Reports by the Sonoma County Agricultural Commissioner, range between lost value of 9.7 percent and 19.2 percent based on projected risks for the major agricultural products in Sonoma County and statewide/national job losses projected for restaurants, retail, distribution, processing, and agriculture to the end of 2020. Job losses have started to recover in California and Sonoma County food production as of August 2020, but that trend depends on general economic recovery for California and the United States.

- For 2020, this is a range of approximately \$32,363,500 to \$63,923,500 in lost agricultural value in 2020; for 2021 to 2023, all three scenarios show recovery without a second reduction to 2023.
 - In the best scenario provided, agricultural values recover by 2022;
 - The median and most likely scenario with what is known as of August 2020, there is recovery by 2023 after inflation adjustments;
 - These estimates should be seen as preliminary and depend on a generalized end of the COVID-19 crisis by 2021, with subsequent economic recovery that helps increase food demand for Sonoma County food farmers;
 - Winegrape and cannabis production were not considered in this report.

COVID-19's effects on Sonoma County food producers were not due initially to harvest or production problems at the farm level, but were the result of problems in retail and restaurant markets changing other parts of agricultural supply chains. Those effects then began to affect farmers and supply conditions. As processing and packaging plants closed or delayed production, feed lots, storage facilities, buyers for distributors, and ultimately farmers were delayed in terms of moving products, hence these factors reduced agricultural values. Farmers' markets were also not open, due to public health decrees, closing off a local option; in some cases, home delivery and quick adjustments provided Sonoma County food producers with revenue while the economy and local communities continued to wait for public health orders to recede.

Interviews with local farmers and agricultural advocates provided a deeper look at challenges and opportunities for Sonoma County food producers. Major issues stood out to consider as economic recovery, challenges and opportunities all await local farmers:

- Lack of regional processing for both crops and livestock, reducing local food resiliency;
- Diversity in agriculture depends on return on investment (ROI);
- Longer-term issues may challenge level of food production in Sonoma County;
- Farmers face rising costs of doing business; and

- Land, when owned outright (no mortgage), represents a large advantage to financial sustainability.

Recent price dynamics and forecasts for farm products can provide insight to how supply and demand and moving with respect to one another and also the potential of diversification in providing returns for Sonoma County farmers. COVID-19 is likely to be remembered as a time of volatile price dynamics; beef prices are a standout example. Because many of the products harvested in Sonoma County are commodities in global markets, regardless of where our local farmers sell their harvests, market disruptions can affect final prices and revenues for Sonoma County food producers and ultimately upset financial sustainability for the County's farmers and ranchers.

Risks to specific agricultural products currently important to food production in Sonoma County are considered; some of the larger challenges and opportunities to diversify income lead to specific issues facing Sonoma County food producers in the coming years, where COVID-19 may have provided additional challenges; here are some factors for Ag + Open Space to consider in implementing their programs going forward:

- **Local processing:**
 - Investing in and advocating for more local processing options;
 - Enhanced crop and livestock processing regionally provide more food availability and resilience in Sonoma County;
 - Local processing reduces transportation needs and potentially generates more business opportunities for community-supported agriculture (CSA), storage, distribution, and delivery options to increase profit for farmers.
- **Carbon sequestration and land use;**
 - Increasing the use (perhaps through financial incentives) for carbon farm plans;
 - Increased use of programs (wool certification, for example) that can help farmers reduce costs, widen their product market and reduce their own carbon footprints;
 - Local processing, packaging, storage, and delivery to customers can reduce emissions;
- **Land leases versus purchase;**
 - Lower interest rates may provide some financing opportunities for farmers to consider either expansion or diversification through low-interest loans or federal aid that may be available;
 - Connecting potential land users who would lease areas of current landowners in agriculture in a way that reduced search costs and mitigated risk;
- **Alternative crops or livestock: Winegrapes, Cannabis and Equine;**
 - Facilitating matches of landowners and farmers that would like to use land for grazing, including equine animals, could drive more revenue for farmers;
 - Facilitating a strategy for farmers to consider cannabis as a complement to crops and livestock if cannabis becomes legal nationwide, potentially drawing in a new generation of farmers.
- **Succession Planning and Farm Labor:**
 - Engaging family farmers in a transition plan that includes alternative revenues and also cost-control measures, including carbon farm plans and land-lease options;
 - Educating on alternative revenue sources may attract a new batch of farmers, which may include some non-food options.

1. Introduction

This study examines the effects of COVID-19 on food-producing, agricultural businesses in Sonoma County from 2020 to 2023. This study was commissioned by Ag + Open Space. For food producing farmers, there are three shocks that happened simultaneously:

- Supply-chain problems started with retail and restaurants and other final customers, creating problems in distribution and processing and were felt by local farmers;
- Regional farmers' markets could not remain open, and then took on extra costs for farmers to re-open; and
- Tourism has been relatively slow in Sonoma County and California for 2020, reducing overall demand for farm products to restaurants and other retail outside grocery chains.

In February 2020, economists and politicians in the United States began to become concerned about the worldwide spread of COVID-19, a novel (new) coronavirus that is a relative of influenza and also the SARS virus. By March 1, 2020, it became apparent that the United States would need to follow similar measures as other countries to control possible overloading of healthcare systems and also reduce the number of potential deaths. By the end of March, much of the American economy, California's and Sonoma County's economies ceased to function per normal because of social measures meant to constrain the spread of COVID-19 with the opportunity cost of reducing economic activity. As of August 2020, national and state economic recovery signs are becoming more apparent; current, consensus forecasts do not see a full economic recovery until 2023.

There have been some positives for Sonoma County farmers: grocery sales have increased and farmers' markets have started again, provided some revenue shifts for local food producers, but not necessarily enough to offset the closure of other retail and restaurant markets. As of August 2020, details on these sales are emerging; interviews with local farmers and agricultural advocates provided anecdotal data from the front lines. Concerns over regulation, lack of local processing, profitability of farmers' markets after COVID-19, water availability, opportunity costs of crop or livestock expansion, all lead to medium-to long-term concerns of local farmers.

This study has the following sections. First is a general overview of the Sonoma County agricultural community and the potential effects from COVID-19. The second section concerns the economic effects of COVID-19 to August 2020 and looking forward. The third section discusses specific food products, concentrating on the main products for Sonoma County per the Agricultural Commissioner's annual valuations. The fourth section looks at specific concerns for land use and food production as a result of COVID-19, but also long-term concerns and opportunities. For example, processing concerns remain a major concern affecting farmers' ability retain more markets, diversify locally and also increase revenues. Carbon farming and succession planning are others. The fifth section considers the economic impact of COVID-19 on food-producing agriculture on Sonoma County's economy, using a return to 2019 estimated agricultural values as a recovery benchmark. Conclusions and recommendations end the study, and we do not consider winegrapes or cannabis in this study directly.

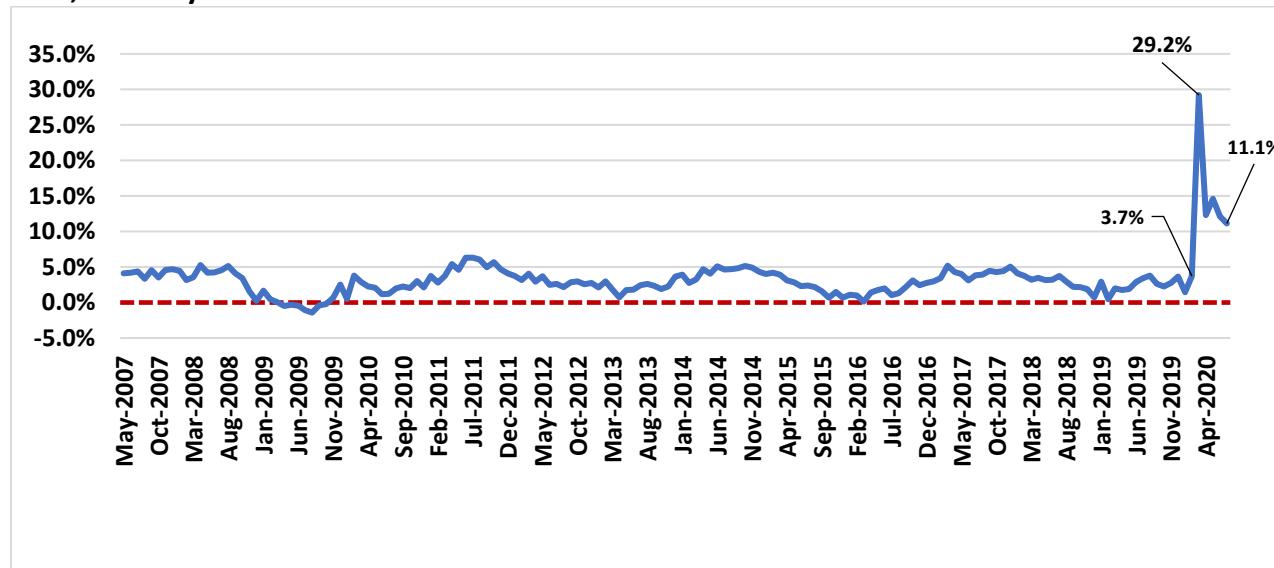
2. The Effects of COVID-19 on Food-Based Agriculture Production in Sonoma County

After interviewing leaders in Sonoma County agriculture, COVID-19's impacts on local farmers come from these sources:

1. Disruption of supply chains, specifically shifts at the retail end (grocery and restaurant sales);
2. Reduced demand at the distributor level due to uncertainty in retail sales; but
3. Rising demand for e-commerce solutions, farmer's markets and community-supported agriculture using home delivery, creating some structural changes in production.

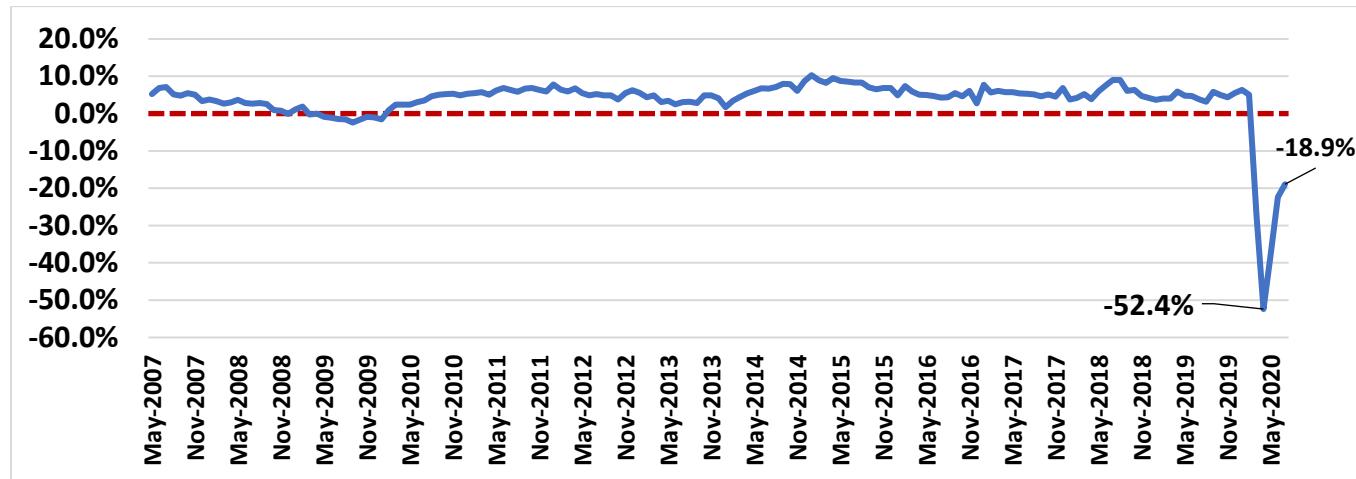
Many Sonoma County farmers sell their products in multiple ways. Some sell through community-supported agriculture (CSA) organizations, farmers' markets, and other direct retail channels. Farmers also sell to larger processing centers, linking to retail and restaurants outside Sonoma County through distribution. Others sell to a channel mix, but all depend somewhat on larger distribution and retail channels for pricing considerations and potential sales. Grocery store and restaurant demand stability are important for local farmers to sell their products easily and on time. There are national level data available on food retail, and emerging data on California and local restaurant sales based on taxable sales. Figures 1 and 2 show data since 2007 and how dramatic the changes and contrasts in sales have been for these retail outlets in 2020 versus 2019.

Figure 1: Food and Beverage Store Sales, May 2007 to July 2020, US, % Change from Previous Year, Monthly Data



Source: FRED Database, Federal Reserve and EFA

Figure 2: Restaurant Sales, May 2007 to July 2020, US, % Change from Previous Year, Monthly Data

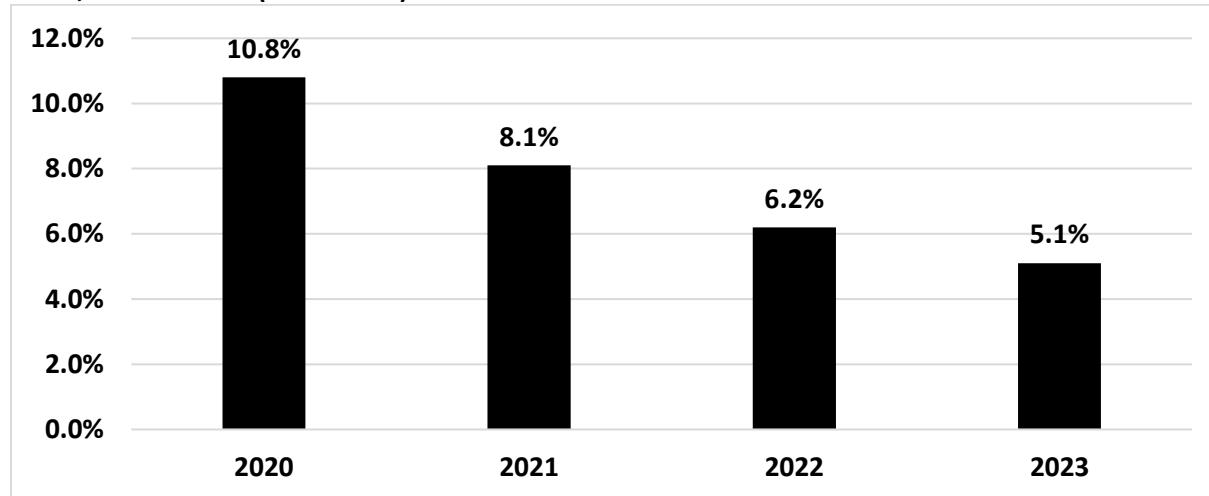


Sources: FRED Database, Federal Reserve and EFA

The Macro Environment with COVID-19

As of August 2020, forecasts for the national economy through 2023 suggest the national economic recovery may take until 2023 minimum. To forecast much further than 2023 (approximately 3.5 years) is folly at this time given the remaining uncertainty from COVID-19.

Figure 3: Forecasts of National Unemployment Rates as of August 2020, Year End Percent of Labor Force, 2019 to 2023 (Forecasted)



Sources: Philadelphia Federal Reserve Branch and EFA.

The depth and duration of the COVID-19 economic downturn depends greatly on how we remove the restrictive conditions on local businesses to remain in business, and also how federal stimulus and expansions of unemployment insurance help households, as well as lower interest rates help both households and businesses to remain confident in the economy's future. Equity market confidence, on a roller-coaster ride since March 1, 2020, is now betting almost daily on the announcement of a viable

vaccine. Because stock markets provide changes in wealth for investors, that loss of wealth may not be a loss of current income, but changes household net worth such that those households want to substitute consumption for saving. Such changes can have widespread effects, as stock markets help set expectations for both business and consumer spending.

Federal-stimulus spending to address economic distress caused by COVID-19 have been historically large. As in 2009 during the Great Recession, when the American Recovery and Reinvestment Act (ARRA) stimulus attempted to provide growth for a struggling American economy, acronyms such as PPP and EIDL have not become part of our daily news feeds. Households also received direct stimulus payments at home from the US Treasury under the CARES Act.¹

For businesses, Paycheck Protection Plan (PPP) lending through the Small Business Administration (SBA) came with the promise of becoming a grant (basically a tax refund) to a business that meets specific criteria of having workers in place before February 15, 2020 and keeping those workers employed to a future date. Economic Injury Disaster Loan (EIDL) funds became available also, similar to times of natural disasters; SBA also supported these moving to businesses. As of June 30, 2020, there are 31 food-producing businesses in Sonoma County that took PPP loans over \$150,000 and 157 loans were provided to Sonoma County food producers for less than \$150,000.

Summary on Macroeconomic Factors and Economic Impact on Sonoma County Food Producers

For Sonoma County food-producing farmers and ranchers, economic recovery from the social policies and subsequent recession in 2020 is critical to re-opening sales channels and supply chain links within and outside Sonoma County. Key things to watch going forward for Sonoma County agriculture include:

- Jobs and consumer spending rising, such that demand for restaurants and tourism remain supported;
- Interest rates remaining low to help the cost of refinancing mortgages, lines of credit, and business loans otherwise, or new loans to expand breadth and volume of food produced;
- More fiscal stimulus that helps local food producers directly;
- Labor remains regionally available and at costs that allow for harvests of all types of crops and livestock;
- There are no other, general shelter-in-place orders that may disrupt supply chains again or the demand for final users of food (schools, restaurants, tourism-related food manufacturing, etc.); and
- International trade agreements provide protection for regional food producers, as interviews with local farmers suggested that expansion into other foods may not be economically viable due to international competition.

Let's now look at a summary of discussions with Sonoma County food producers and advocates.

¹ See <https://home.treasury.gov/policy-issues/cares> for more on the effects of legislation passed by the US Congress in 2020.

Interviews with Local Farmers and Agricultural Advocates

During the course of this study, local food producers and advocates were asked their opinion on the local effects of COVID-19 on food producing farmers. Many themes are similar, especially what concerns were present that did not allow flexibility for farmers and ranchers regionally when that may have been a way to provide more agricultural revenue and more regional food resilience simultaneously. Several major topics emerged:

- Lack of regional processing, crops and animal proteins:
 - A restrictive regulatory environment is the key issue in processing, for crops but especially for livestock;
 - Reliance on processing and distribution outside Sonoma County an issue;
 - Consumers want more local control of food sources;
 - Cost of doing business subject to increases, as well as environmental concerns of constantly trucking or commuting to sell at multiple farmers' markets versus more efficient models;
- Diversity in agriculture depends on return on investment (ROI):
 - Wine and cannabis, especially wine if a land owner, is difficult to resist as ROI exists for selling or using land for these purposes;
 - Need a labor force to provide workers, concerns include:
 - Reliance on external workers means higher costs and productivity problems;
 - Small to medium-sized farms: lack of space to diversify makes considering new crops or livestock production choices not economically viable;
 - Carbon farming a possibility, to help increase efficiency and perhaps provide additional income.
- Longer-term issues may challenge level of food production in Sonoma County:
 - Succession planning and land values and use;
 - Aging producers means supply challenges coming;
 - Water concerns and ROI of changes to crops or livestock that may be more water intensive;
 - Regulatory environment on processing that undermines cost control
 - Storage and distribution regionally also an issue;
 - Food resilience is possible in a region where regional income levels provide demand to support spending on local goods at marginally higher prices than lower-priced goods produced outside Sonoma County;
 - Farmers' markets a big part of the supply chain for many, local farmers.
- Farmers face rising costs of doing business:
 - Wage pressures in a competitive environment;
 - Equipment and fuel and repair costs;
 - Moving to an online platform/community-supported agriculture needs to have small up-front cost and immediate revenue possibilities;
 - Insurance costs or there is an explicit lack of crop insurance;
- Land, when owned outright (no mortgage), creates financial sustainability;
 - When a mortgage remains, additional costs and uncertainty exists for farmers, especially during recession when those costs are fixed and remain;
 - Agri-tourism possibilities there if land, amenities, and economics all work together;

- Need parking, facilities, water and wastewater infrastructure, insurance (all new costs); and
 - Revenues need to provide offset, but easier if land owned outright;
- Carbon farming needs to be financially viable to have widespread use, and is easier to do when land is owned outright;

These interviews suggested that farmers had challenges that are structural in scope and evident before COVID-19, including labor-market concerns. Agricultural labor markets are difficult to track precisely in real time, as there are many self-employed farmers; for Sonoma County, as many as 500 self-employed farmers from 5,360 total workers (approximately 9.3 percent). California has approximately 12 percent of employment in agriculture as self-employed. Approximately 3,460 people work on food-producing farms in Sonoma County as January 2020, including self-employed farmers.

Different from how other forecasts are made, food production is very seasonal due to harvests and livestock birthing cycles. The figures below show national, state and Sonoma County agriculture jobs since 2010 and their seasonally-adjusted changes. By removing seasonality, we can focus more on agricultural employment and also remove winegrapes, a major agricultural employer in Sonoma County.

[Counting the Labor Force in Sonoma County Agriculture](#)

Using the official data on local agriculture can undercount the number of workers for two main reasons:

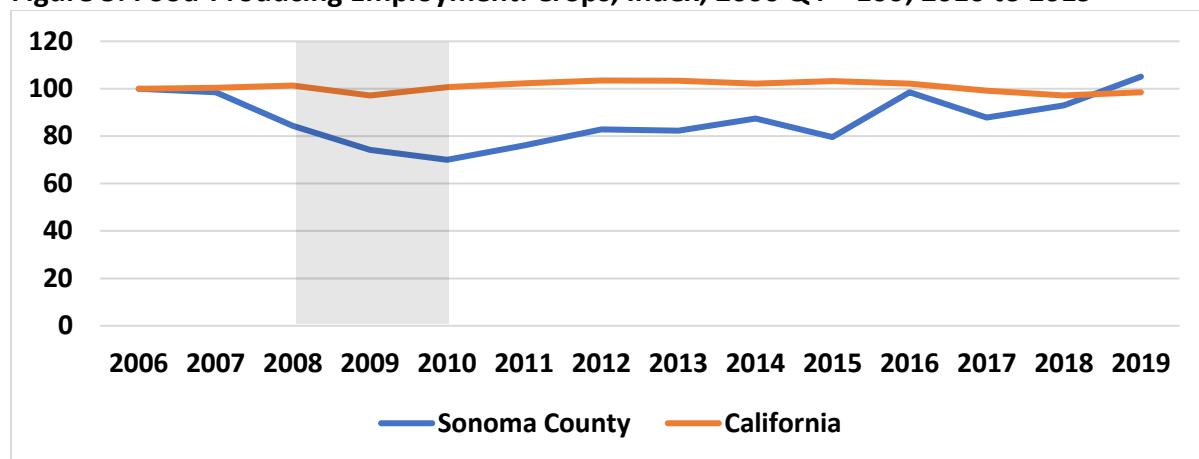
- Many farmers are self-proprietors and do not submit payroll taxes or data as other businesses might;
- Some of the workers in agriculture are paid by cash or are undocumented or both, making the trail of labor payments difficult.

Farm employment has remained steady throughout the state and Sonoma County during the COVID-19 crisis. As agriculture generally was deemed “essential”, this kept food production continuing forward by having labor able to work on-site, and likely set up more speedy recovery conditions for local food production in the months and years ahead.

What Figures 5 to 7 show is that Sonoma County saw growth in crop farming jobs versus the state; livestock farming had employment at 2007 levels by the end of 2019. The growth is in agricultural support services where most of the growth has taken place. Part of that is an increase in the use of specialty firms (fencing, pump and well, feed distributors, etc.) solving problems where ranchers may have done so before. The Great Recession is easy to see in these figures; however, with more equipment use and smaller herds, the employment levels for food producers in Sonoma County may have settled into a level that allows expansion of harvest yields without more workers.

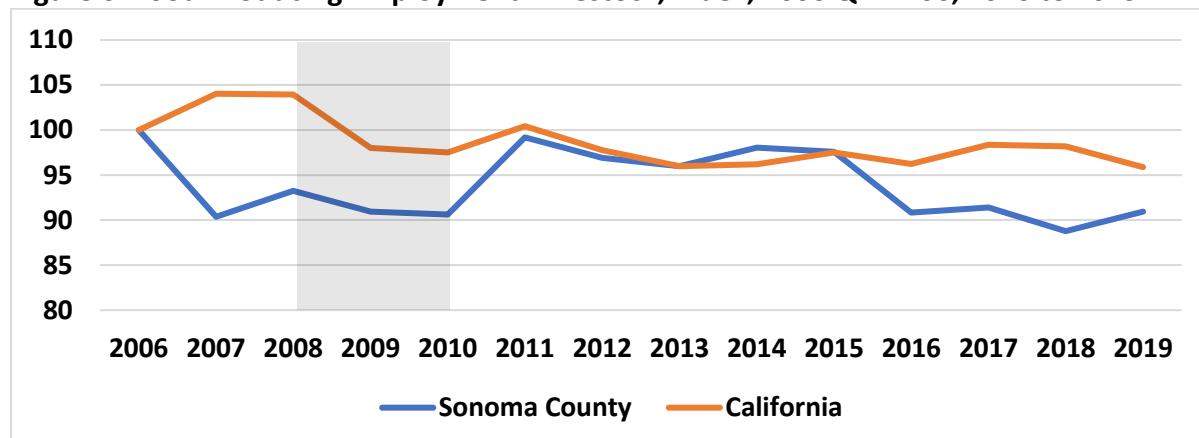
The forecasts for the American and California economies dictate much of the fate for Sonoma County food producers in terms of the macroeconomic environment. Even if there is more local processing, storage, distribution and retail sales (both grocery and restaurant possible), reduced demand in retail channels reduces ROI on local investment in the other supply-chain components.

Figure 5: Food-Producing Employment: Crops, Index, 2006 Q4 = 100, 2016 to 2019



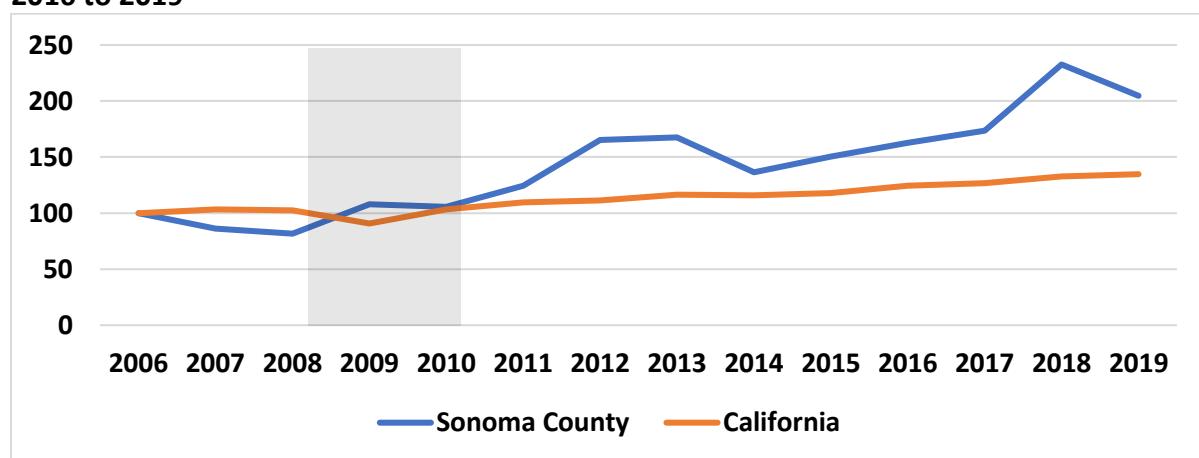
Source: California EDD and EFA, Shaded Area = Recession

Figure 6: Food-Producing Employment: Livestock, Index, 2006 Q4 = 100, 2016 to 2019



Source: California EDD and EFA, Shaded Area = Recession

Figure 7: Agricultural Support Services Employment, Food Production, Index, 2006 Q4 = 100, 2016 to 2019



Source: California EDD and EFA, Shaded Area = Recession

The macroeconomic environment to 2023 creates many challenges and some opportunities for local food producers and policy advocates, but is more difficult to control. We see in the scenarios below that the links to the 2020-2023 forecasts are critical in order to forecast consumer and restaurant demand for food produced in Sonoma County.

Some Realities to be Tested

One of the unspoken issues for local farmers is labor force composition and its availability. While many workers are documented, many are not and there are no records to track those workers well. Further, because there are many self-owned farms and ranches, how much labor is being utilized can be a mysterious data point. In 2014, Public Policy Institute of California estimated that approximately 1 in 11 workers are undocumented in the California economy as an example.²

A concern with COVID-19 is how farmers and ranchers will find workers that may not have enough work (based on a slowdown in the economy) across all potential employers. There may be fewer workers locally-available, as economic circumstances changing leads to movement of workers to other places where jobs (in any industry) exists. Such changes can increase the costs of doing business for farmers, reduce harvests and herds, and also change the ability of the farmer to stay in business.³

For larger employers and those with relatively standard labor needs and tasks, COVID-19 may affect the choices of replacing labor with a machine. In some cases, there may be impracticality in that choice; how crops are aligned in a field may restrict a machine's ability to execute the harvest tasks, for example. Farmers and ranchers may not be where automation becomes more the norm versus other parts of the supply chain. In many cases, Sonoma County food-producers cannot easily produce without labor as the core input after the land. A lack of available labor can easily reduce overall agricultural values in the county economy.

Crop Values

Sonoma County crop values in the aggregate are dominated by winegrape harvests. In this section, we focus on the remaining crop and livestock values. The last ten years of crop report data suggest little change in the variety of major crops grown or animals raised, but there is some rising diversity. This diversity can be the beginning of expanding the breadth of crops and animal proteins available in Sonoma County, adding to regional food resilience. Diversity can also be a reaction to market opportunities and rising consumer demand.

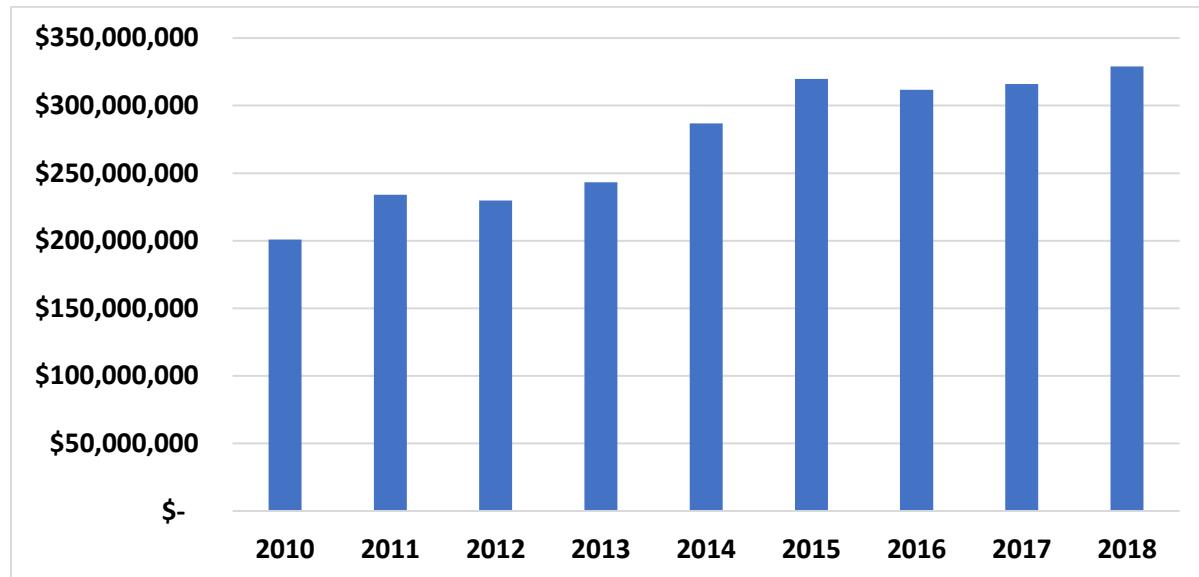
Planning for agricultural diversity has two considerations: filling gaps in local agriculture to provide more regional variety and choice, and also the farmer skills and willingness to experiment versus the potential return on investment. Vegetables may seem like an obvious choice per the first criterion, but are farmers willing to experiment with larger vegetable plots with respect to risk? These are classic tradeoffs in regional agriculture: land use, farmer histories, and regional niche and competition all play a role in determining what is grown

² See PPIC (2014); PPIC suggested approximately 1 in 10 workers was undocumented in 2014, but the estimate is 9 percent of the labor force which is closer to 1 in 11 workers.

³ See Richards (2018) for more.

locally, but also the potential profitability of the choice may supersede any other consideration. One part of ROI is pricing. Figure 8 shows the non-winegrape agricultural values for Sonoma County from 2010 to 2018 in current dollars (non-inflation adjusted).

Figure 8: Non-Wine Agricultural Values in Sonoma County, 2010 to 2018 (the latest data), Current Dollars



Sources: Sonoma County Agricultural Commissioner and EFA

In June 2020, ERA Economics released a preliminary study on the economic impacts on agriculture statewide, including winegrapes, as of May 2020.⁴ Their study provided a range of impacts by major agricultural crop or livestock or other farm output to sum up to between \$5.95 billion to \$8.59 billion in statewide losses for calendar-year 2020 just in agricultural value. Sonoma County agriculture, according to California Department of Food and Agriculture, was estimated to be approximately 1.8 percent of statewide agricultural values for our estimates below, giving Sonoma County approximately 0.98 percent growth in overall value from 2018.⁵ These data and estimates create an estimated, baseline for the potential losses in Sonoma County agriculture to get back to 2019 crop values.

One way to assess the risk in specific agricultural commodities is to look at prices. For farmers and ranchers, prices dictate revenue and there is little power to price. As global commodity markets shift supply and demand for raw and processed goods, prices provide a way to consider return on investment and revenue outlooks that help determine decisions for new or expanded crop or livestock in Sonoma County.

⁴ See California Farm Bureau for ERA study: https://www.cfbf.com/wp-content/uploads/2020/06/COVID19_AgImpacts.pdf

⁵ As of August 2020, the 2019 Crop report for Sonoma County was not yet available, and may differ from these results. See <https://www.cdfa.ca.gov/statistics/PDFs/2018-2019AgReportnass.pdf> for the state level study for fiscal year 2018-19.

When crop and livestock prices are rising, demand exceeds supply; when prices fall, supply exceeds demand. On the surface, identifying risk may seem easy: if prices are projected to fall for specific ag products, more income risk exists. It is far from that easy, as there are different reasons why supply or demand may shift. In assessing risk, we need consider viable shocks to either supply or demand may arise and how Sonoma County may or may not easily support specific types of agriculture as a result.

- Supply shocks:
 - Drought and sustained lack of rainfall or water availability;
 - Pests and other crop or livestock health problems;
 - Reduced number of farmers or acres of land available for livestock or planting; and
 - Costs of processing or harvests rising.
- Demand shocks:
 - Reduction in demand for complements: restaurant, school meals, as examples;
 - Tastes and preferences shifting away from Sonoma County food mix;
 - Recession: lower incomes lead to shifting budgets.

Each crop or livestock choice has its own risk exposure during recession. Prices can reflect conditions in which a farmer consider current and future returns on investment, assuming she is in control of how much to supply to the market. The primary shock in agriculture from COVID-19 has been on the demand side; the retail end of supply chains reduced demand, specifically for restaurant meals, where grocery sales increased to help but not fully offset the losses. Export problems (trade policy, port closures and delays, e.g.) and reduced international demand have added to losses also.

The retail and restaurant end of the supply chain has been affected by the COVID-19 crisis in such a way to affect farmers. While there are local cost and labor repercussions also, the loss of consumer outlets and how that affects farmer crop and livestock demand are critical factors to understand general and specific effects on Sonoma County food-producing agriculture.⁶

Figure 9 provides Sonoma County's Agricultural Commissioner's estimates of farmer revenue from the Crop Reports for larger county sectors.⁷ Figure 9's data suggest diversity and growth in some areas of Sonoma County agriculture. For example, nursery products may be something farmers could lease property to local and regional entrepreneurs that simply need space but have broad markets for plants, flowers, and other nursery items. These data also provide the basis by which to estimate the economic effects of COVID-19 on local farmers.

The size of the "Other Food" category suggests diversity is currently available and is possible as Sonoma County considers more food resiliency and an expansion of land use.

⁶ See [Cal Matters](#) story for an early assessment of concerns for agriculture in California.

⁷ See Sonoma County Agricultural Commissioner Crop Reports [here](#).

Figure 9: Ag Commissioner Crop Report Totals, Major Industries

Crop or Livestock or Product	2010	2011	2012	2013	2014
Market Milk	\$77,679,100	\$94,153,400	\$85,063,200	\$88,964,200	\$109,540,900
Misc. Livestock and Poultry Products	\$20,799,800	\$24,311,400	\$25,142,700	\$27,315,400	\$54,198,100
Miscellaneous Livestock and Poultry	\$43,293,300	\$44,612,500	\$46,632,600	\$47,256,400	\$51,393,000
Cattle and Calves	\$11,649,200	\$12,218,200	\$12,327,300	\$11,639,200	\$12,438,000
Nursery - Miscellaneous	\$4,856,400	\$9,221,300	\$20,058,600	\$12,974,800	\$11,770,300
Vegetables	\$8,212,200	\$9,470,800	\$11,018,400	\$12,927,100	\$12,613,200
Nursery - Ornamentals	\$10,853,100	\$9,221,300	\$7,162,300	\$9,127,000	\$7,377,400
Sheep and Lambs	\$2,518,300	\$5,112,100	\$5,199,500	\$6,001,400	\$5,946,900
Nursery - Cut Flowers	\$2,792,100	\$3,126,400	\$2,585,700	\$3,786,600	\$4,187,800
Nursery - Bedding Plants	\$4,184,000	\$4,766,400	\$3,320,000	\$3,593,100	\$1,136,500
Rye and Oat Silage	\$1,517,200	\$1,505,400	\$1,468,000	\$1,822,400	\$1,559,100
Apples - Late Varieties	\$4,169,300	\$5,066,800	\$3,665,400	\$3,269,100	\$2,332,100
Rye and Oat Hay	\$1,025,000	\$1,695,800	\$1,816,400	\$2,654,200	\$1,386,100
Apples - Gravenstein	\$1,692,300	\$2,552,900	\$1,729,500	\$2,559,500	\$1,079,800
Other Food	\$5,532,400	\$6,966,500	\$2,594,400	\$9,364,500	\$9,808,200
Non-Wine Totals, Sonoma County	\$200,773,700	\$234,001,200	\$229,784,000	\$243,254,900	\$286,767,400
Totals Sonoma County	\$591,222,000	\$581,081,500	\$812,726,100	\$848,323,300	\$879,565,400

Crop or Livestock or Product	2015	2016	2017	2018	2019 estimate
Market Milk	\$126,278,200	\$146,475,400	\$137,185,800	\$141,249,300	\$142,633,500
Misc. Livestock and Poultry Products	\$56,387,400	\$31,298,600	\$39,749,200	\$38,930,800	\$39,312,300
Miscellaneous Livestock and Poultry	\$46,124,100	\$40,823,200	\$47,354,900	\$41,027,300	\$41,429,400
Cattle and Calves	\$21,496,600	\$20,561,900	\$20,404,700	\$20,727,500	\$20,930,600
Nursery - Miscellaneous	\$13,067,700	\$13,001,700	\$14,230,800	\$18,121,900	\$18,299,500
Vegetables	\$12,355,200	\$9,961,300	\$8,448,200	\$8,383,100	\$8,465,300
Nursery - Ornamentals	\$10,638,100	\$14,321,700	\$11,717,200	\$20,406,500	\$20,606,500
Sheep and Lambs	\$6,992,900	\$8,480,600	\$9,627,400	\$11,279,700	\$11,390,200
Nursery - Cut Flowers	\$4,548,400	\$3,894,400	\$4,174,900	\$6,145,800	\$6,206,000
Nursery - Bedding Plants	\$4,005,800	\$1,245,300	\$5,078,500	\$5,635,900	\$5,691,100
Rye and Oat Silage	\$3,228,900	\$4,016,500	\$2,995,100	\$1,494,200	\$1,508,800
Apples - Late Varieties	\$2,637,400	\$3,871,800	\$2,244,000	\$2,419,200	\$2,442,900
Rye and Oat Hay	\$1,338,700	\$-	\$1,048,500	\$1,200,200	\$1,212,000
Apples - Gravenstein	\$1,115,000	\$1,595,000	\$1,092,600	\$1,247,900	\$1,260,100
Other Food	\$9,517,700	\$12,060,100	\$10,518,200	\$10,717,500	\$10,822,500
Non-Wine Totals, Sonoma County	\$319,732,100	\$311,607,500	\$315,870,000	\$328,986,800	\$332,210,700
Totals Sonoma County	\$766,271,000	\$898,125,200	\$894,182,900	\$1,106,662,100	\$1,117,507,200

Sources: Sonoma County Agricultural Commissioner and EFA, 2019 values estimated by EFA for use as a baseline for economic impact analysis in Section 5.

The next section looks at concerns by major crop and livestock sectors and some considerations on prices and forecasts for prices as they exist in August 2020. Various reports provide some initial observations on price movements, effects of COVID-19 on specific sectors, and forecasts for sectors.

3. Industry Issues and Recent Price Data

In this section, we use a couple of recent studies on the effects of COVID-19 on food producers throughout California as the basis of looking at risks and forecasts by sector; this section serves two purposes: (1) to provide a sense of specific industry issues in 2020; and (2) the incentives to invest in diversification in Sonoma County agriculture. We focus on major Sonoma County crop and livestock sectors for a deeper dive.

Dairies

Milk continues to be the largest-value, agricultural good produced in Sonoma County after winegrapes. Fluid milk production is just the beginning of many value-add products, including cheese, butter, yogurt, ice cream, dry milk powder, and even personal-care products; fluid milk, as a final product, accounts for approximately 20 percent of the production in California.⁸ Value-add products expand revenue possibilities for farmers; farmers' ability to sell milk in multiple markets or to partner with regional customers, or to diversify their income sources by starting value-add product manufacturing on-site allows higher pricing, branding, and more financial sustainability if demand remains (local cheese and agri-tourism have been a stand-out combination of local processing and additional revenue sources). Fluid milk sales were up initially in April 2020, but settled into normal grocery sales afterward.

However, it is also important to note that packaging lines for milk and associated products are not easily switched between one use and another; because milk is produced continuously and not two times per year harvested crop or livestock, the economics of milk production and potential disruptions are more complex than almost any other farm product. For example, organic milk, the primary type of milk now produced in Sonoma County, is produced facing costs of regulation, certification, consumer tastes and preferences shifting based on competition (lactose free and plant-based products as examples), greenhouse gas (GHG) emission standards becoming more restrictive, and wastewater and land use concerns. COVID-19's reduction of restaurant and non-grocery demand for milk affected local dairies ability to sell to distributors that sell to diverse customers such as school districts and travel and restaurants, leading to loss and waste without additional sources of demand or storage possibilities.

Poultry and Eggs

Chicken, turkey, ducks, and their respective eggs have a long history in Sonoma County and support multiple, value-add products. Eggs, like milk, are essential ingredients for multiple manufactured food products; a contraction of demand for restaurant, school and tourism meals (air travel, hotel breakfasts, etc.) become problems throughout the poultry and egg supply chains (mainly in the chicken markets), affecting feed vendors and ability to produce as many eggs or poultry. USDA forecasts as of August 2020 to the end of 2021 have egg and poultry production rising, but egg prices flat while forecasting a

⁸ See Sumner (2020), "[The Milk Economics of the COVID-19 Pandemic](#)" in UC Davis ARE Update, volume 23, no. 5, May/June 2020. Also see ERA Economics, "[Economic Impacts of the COVID-19 Pandemic on California Agriculture](#)", June 2020.

20 percent increase in chicken to the end of 2021 from 2020 Quarter 2 (June 30). Initial industry estimates have poultry sales, especially chicken, returning to normal levels based on restaurant sales nationally.⁹

Beef Cattle

The beef market is less diverse than milk by far and there are fewer, value-add options. There are also smaller infrastructure costs and employees to produce beef versus dairy. Beef is generally sold to processing or feed lots and then packaged distribution for multiple retail outlets, including restaurants and grocery retail. For beef farmers, there is not a lot of alternatives, especially without local processing and storage to potentially localize markets and engage in local processing and distribution.

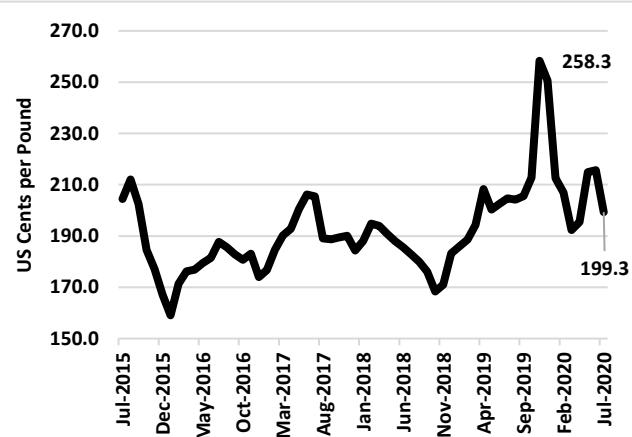
In April 2020, packaged beef volumes at beef processing and packing houses fell by approximately 40 percent from April 2019.¹⁰ Such

a shock can create storage problems in feed lots and create price and revenue volatility across all links in the supply chain otherwise (from distribution to farmers). As California's tourism season has been slow, and restaurants remain under their 2019 demand levels, overall demand for beef remains unstable; we see how prices have moved in the last five years to highlight the 2020 movements in Figure 10. Notice, after September 2019, there was an initial spike in prices (China and COVID-19) and then another after February 2020 (US and COVID-19). USDA forecast available in August 2020 to the end of 2021 suggest increased production and improving conditions for beef (and livestock generally).¹¹

Vegetables, Fruit other than Apples, Legumes

A wide variety of vegetables are grown in Sonoma County. Ranging from lettuce varieties to corn to zucchini, Sonoma County grows many types of vegetables. According to the 2018 Crop Report (the latest data), Sonoma County produces an array of vegetables fruits, other crops, and legumes: squash; melons; mushrooms; potatoes; peppers; tomatoes; sprouts; lettuces; hops; green beans. In many cases, these goods are inputs in other food and beverage products, especially for local restaurants and food/beverage manufacturers. For California, vegetable crops vary from one part of the state to the

Figure 10: Global Price of Beef, US Cents per Pound, July 2015 to July 2020



Sources: FRED Database and EFA

⁹ See ERA Economics, "Economic Impacts of the COVID-19 Pandemic on California Agriculture", June 2020.

¹⁰ See Saitone (2020) for more.

¹¹ See USDA at <https://www.ers.usda.gov/publications/pub-details/?pubid=99168> for more.

other. ERA Economics used onions of various types (leeks, red, yellow, and white) as a proxy for considering the potential impact of COVID-19 on vegetables sales.¹² Two key points stood out:

- Shelf-stable vegetables and legumes (dry beans as an example) have done well as shelter in place lead to more meals at home; and
- Harvests for vegetables from California happen off-season from the onset of the demand contraction, thus likely having a larger effect on import markets and perhaps driving more sales due to import substitution as needed regionally and as available.

Strawberries are the major berry product in California, accounting for \$6 out of every \$7 dollars of agricultural value in berries.¹³ Berries, like vegetables, become “shelf-stable” in frozen form. Like other parts of agriculture, the contraction of restaurant, tourism and school demand for fruit reduced demand at processing and packaging plants, which affect farmers’ plans for yields and revenues. In some cases, crops ready for sale were destroyed due to a lack of potential markets before they rotted.

Cherries are the main tree fruit in California, at about 25 percent of the total in 2019. Like vegetables, tree fruit has large amounts of import competition, providing off-season availability. Packing houses for fruit saw higher costs of operations, and rising costs to continue operations and maintain public health standards. These changes may put pressure on local fruit farmers to reduce price or reduce yields or both. Concerns remain for harvests and upcoming contracts from buyers across all fruit and vegetable markets, but continued economic recovery and an expansion of retail options re-opening should stabilize these markets. Import competition, for both raw and processed fruit remains a structural threat to competing in these markets for Sonoma County farmers.

Lamb and Wool

Sheep have some value-add possibilities. Sheep milk/cheese and wool provide such value-add products without losing the animal, thus are on-going products. USDA’s forecast to the end of 2021 shows lamb prices rising with production, suggesting an increase in demand across the economy.

Like beef producers, processing plants and feed lots not operating means a slowdown in demand and a storage problem (or lower prices if there were processors or feed lots buying lambs) for sheep farmers in spring to summer 2020.¹⁴ Wool also has a long history in Sonoma County and is also an input into value-add products; that market has also fluctuated over time as shown in Figure 11.

¹² See ERA Economics, “[Economic Impacts of the COVID-19 Pandemic on California Agriculture](#)”, June 2020, pp 54-56.

¹³ Ibid., page 28.

¹⁴ See <https://www.agweek.com/business/agriculture/5413667-Sheep-markets-too-rocked-by-virus> for an initial take on the sheep markets.

Figure 11: Wool, Global Price of Wool, January 2000 to June 2020, US Cents per KG.

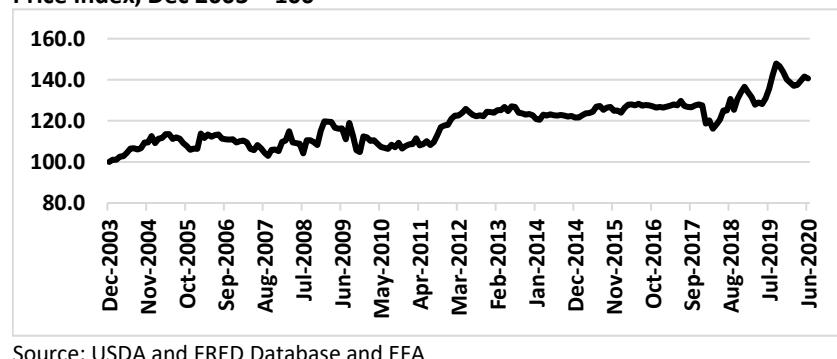


Nursery Products and Flowers

Nursery products, if added together, would be just behind milk and grapes in terms of agricultural value in 2018. While these products are not food, the breadth of products here is attractive in terms of land management strategies and complements to provide new revenue streams for local land owners and farmers. Ornamental plants have doubled in agricultural value since 2015 for Sonoma County, and likely are rising again in 2019 and 2020 data as the crop reports arrive. Cut flowers and bedding plants have also seen increases in value. There are infrastructure needs in nursery products, hence there are specific businesses that focus on providing goods to these markets; farmer's markets and CSA help drive retail pricing for nursery products also.

The timing of the shelter-in-place policies affected seasonal sales of cut flowers and other ornamental products; the Easter holiday and Mother's Day are generally major holidays for these subindustries.¹⁵ Transportation and storage problems that impacted state and nationwide markets (including imported flowers) may have helped some local producers that continue to operate with slightly higher prices and also new markets based on a lack of supply. Grocery stores, due to florists as a retail point of sale being closed, became a more important retail center for this market. Building and garden supply stores remaining open as "essential businesses" helped nursery products demand. Figure 12 provided as way to see how producers benefits from such an exception to the social policies.

Figure 12: Nursery, Garden and Supply Store, Prices at Retailers, Producer Price Index, Dec 2003 = 100



¹⁵ Ibid., pp. 52-54.

[Hay and Silage](#)

Feed for local animals is as important as feed for people in certain respects; supply-chain seizures as with COVID-19 can change other parts of a farmer's supply chain where feed may not be easy to find or prices rise quickly to undermine profitability. Alfalfa, for the state of California, is a large majority of the feed crop agricultural value. Because there is a derived demand for feed crops, related to the demand for a final product such as beef or lamb or dairy, feed crop prices follow demand for final goods.

2020 began with rising feed prices from 2019, and receded in March and April due to the beginning of COVID-19. Prices have been somewhat stable since May 2020 and much depends on how statewide and national demand for livestock and dairy drive demand for feed crops. This category of local food production is unique in that sense to the farmer, acting as an input to food production and as an output for growers (many landowners that are farmers grown their own as a complement to purchases). Hay and silage also have different markets.

Hay and alfalfa are products used across livestock and equine markets throughout the region. Silage is used primarily in dairy feeding. As livestock needs rise, so does feed demand. Range management, where a marketplace allows for ranchers and farmers and equine owners to utilize grazing land more efficiently and reduce fire danger and provide farmers income, can also reduce the demand for hay locally in spring and summer. Storage is also a concern and a potential opportunity.

[Apples](#)

Apples have a long history in Sonoma County also, specifically in the HWY 116 corridor between western Cotati and Forestville, with Sebastopol in the middle moving south to north. Apples, like many other fruits and vegetables, act as intermediary products in processed goods and prepared foods in other markets. Expanding into fruit categories that are viable concerning establishment costs and also market returns on investment may be difficult for Sonoma County landowners or current farmers. For Sonoma County, import competition (especially in foreign juice products, in many cases produced from local apples) is a threat to the ROI from expanding local apple production beyond a lack of local processing options.

In organic apple markets, industry experts claim the effects have been minimal.¹⁶ From outside California, apple farmers have seen "normal" seasonality as much as effects along the supply chain. One farmer interviewed by EFA for this report suggested that the market is not the issue, it is import demand and competition that has an effect; a contraction of that supply may provide more returns in the short term if apples and juice not available locally, but American apple farmers use the Asian market as a

¹⁶ See <https://www.supermarketperimeter.com/articles/5357-covid-19s-impact-on-organic-produce-has-been-minimal> for more.

place to process fruit for importation. Approximately 25 percent of citrus grown in California is destined for juice and frozen products.¹⁷

[Summary: Risks in Local Agriculture](#)

To consider what local food production may be at risk, the following matrix provide one way to summarize how COVID-19 has exposed some additional concerns in specific sectors, as well as concerns that existed before 2020. Risks to local agriculture include:

- Local processing not available for market;
- Carbon emissions relatively large in producing and transporting food;
- Water shortage or drought places crop and livestock at risk;
- Inability to easily sell at retail/direct-to-consumer from farmer (farmer's market, CSA, etc.);
- Storage concerns regionally;
- Competition for labor during harvest with winegrapes, cannabis;
- Initial costs of conversion or pursuing market relatively high;
- Market viability of the food produced; and
- Feed availability in the case of livestock.

These concerns help shape the potential recovery for local farmers (if these risks become more acute, the short-term impacts look more like the “worse” scenario versus the “better” scenario), and also the long-term challenges and opportunities.

[4. Concerns and Alternatives for Sonoma County Food Farmers](#)

The following are specific concerns on how COVID-19 may have lingering effects on agriculture, and also where opportunities may exist in agriculture or services to agriculture (processing, distribution and transportation as examples) can support farmers once COVID-19’s grip on the economy ends. The topics include:

- Local processing;
- Carbon sequestration and land use;
- Land leases versus purchase;
- Alternatives: Winegrapes, Cannabis and Equine as considerations for farmers; and
- Succession planning and farm labor.

¹⁷ See ERA Economics, “Economic Impacts of the COVID-19 Pandemic on California Agriculture”, June 2020, page 45.

Local Processing: Closing the Final Supply Chain Link

After interviewing farmers and ranchers in Sonoma County (we did 10 brief interviews with local farmers and agricultural advocates), a lack of local processing was a key concern in terms of long-term economic stability of local farmers but also for food resilience in Sonoma County. There is currently one processor in Sonoma County and that producer has been somewhat unable to match demand, this leaves local farmers with only regional options that may be both costly and also dependent on fuel costs and not matching carbon emission goals for the ranch. The economics of assisting local farmers with mobile/local processing options and where control of costs can help the community have more food options locally by connecting that supply link to local storage, distribution and retail. Scale, the amount to be processed, is a critical factor in the economics of processing crops or livestock.

For the mobile processor, cost concerns center on compliance and regulations.¹⁸ Like any other processor, state and local public-health regulations for animal processing that affect the cost structure of providing this service. A relaxing of regulations and mobile processing helps generate scale by reaching out to farmers rather than transporting to a central processor, but some entity needs to bear that cost also. This is also true for grain and crop processing, where the regulatory concerns are there but not as costly as for animal processing. Connecting to local retail, including community-supported agriculture, may help the economics of local processing. Linking storage, distribution and retail (including last-mile options) as COVID-19 effects continue to emerge and create opportunities for local processing to emerge.

A co-operative strategy may be a start. If local livestock farmers co-owned processing (or grant funding provided some of the up-front costs to offset farmer investment, but farmers then invested in ownership and operations afterward), with the idea of using local inputs to drive scale, selling the operation once at an economic-viable scale may then provide an exit strategy for local farmers. Such local processing also enhances local food resilience, as there is more animal protein potentially available locally, as well as reduced carbon emissions by having fewer vehicle miles of transport and also delivery.

Short-term concerns from COVID-19

- The data during COVID-19 suggests there were problems in state-wide processing, which affected local farmers, and likely continues to do so as costs of processing and packaging rise;
- There are few to no **regional** processing choices to provide competition or potential food resiliency to Sonoma County for crops or livestock; and
- Regulations and compliance costs remain roadblocks to processing more livestock locally and enhancing regional (and specifically Sonoma County) food resilience.

¹⁸ Local rules in Sonoma County add more complex requirements for farmers and potential processors. Sonoma County Farm Bureau also provided EFA with a mobile processing business plan, outlining how this could be done in Sonoma County.

Long-term opportunities from COVID-19 and Structural Concerns

- Crop and livestock processing provide more food availability and resilience in Sonoma County;
- Local processing provides a second option for local farmers and negotiation room with supra-regional processing and distribution; and
- Local processing reduces transportation needs and potentially generates more business opportunities for CSAs, storage, distribution, and delivery options to increase profit for farmers.

Carbon sequestration and land use

Carbon farming is not a new idea.¹⁹ What carbon farming can do is generate carbon credits (in principle, revenue for reducing greenhouse gas (GHG) emissions by a certain number of tons per year), offsetting another business that is emitting GHG. These “buyers” and “sellers” of carbon credit come together in a carbon “market”. Carbon farm plans may involve grazing rotation and increased leaf matter that increase the soil’s ability to capture carbon and “sequester” the carbon. The following are a summary of what a farmer gains from a carbon farm plan:

- Address concerns on the farmer’s property with respect to natural resource protections;
- Land management priorities addressed and determine a timeline to implement priorities;
- Implement land management practices that improve long-term productivity and profitability of land while protecting natural resources; and
- Prepare for opportunities to participate in cost-share programs.²⁰

However, for farmers (as with other businesses) to engage in use of land other than allowing portions to remain fallow while other parts are grazed or to change techniques means economic incentives are needed alongside the environmental or social.²¹

Some financial models to provide incentives include a credit market, almost like a mortgage, where a loan is provided (the use of the word “credit” is interchanged a bit between credits toward emissions released by other businesses that pay for those credits and also taking loans paid in part by the value of carbon sequestered) that pays for the farmer’s needs to upgrade or for their engagement in carbon-farming practices and payback is allowed based on carbon “savings”. There may be an emerging entrepreneurship where captured CO₂ itself becomes a product (see Columbia University’s [Earth Institute](#) for a recent overview of possibilities). Tax credits for farmers may not be enough an incentive, especially if farmers pay little in income tax anyway based on a minimum amount of taxable income.

One possible way of providing incentives in Sonoma County is to engage in one of the following, given the potential effects of COVID-19 on local agriculture:

¹⁹ See <http://landsmart.org/programs-services/landsmart-carbon-farm-plans/> and <https://www.marincarbonproject.org/carbon-farming/carbon-farm-plans> for more details and example carbon farm plans. Also see <https://fas.org/sgp/crs/misc/IF11455.pdf> for more on the basic tax incentives.

²⁰ See <http://landsmart.org/programs-services/landsmart-carbon-farm-plans/> for more.

²¹ See Vongsikeo, et al. (2020) for a recent study on carbon sequestration in Laos and an associated literature review.

- Find ways to aggregate available funding for farmers to engage in a carbon farm plan, especially if the farmer does not need the upfront financial investment for infrastructure;
- Find ways to provide infrastructure at low cost; and
- Combine the methods as a way to expand the incentives for farms to use carbon farm methods and plans.

While COVID-19 may have the effect of providing reduced costs to localizing supply chains, local and regional agriculture advocates need to consider how to reduce the costs of local processing, storage and distribution and retail. Technology may allow some of those relationships to expand. A marketplace for local agriculture, a virtual farmer's market, could provide more incentives and knowledge to purchase and sell locally. For example, grant funding could provide for app development and support, as well as local storage options. Further, grants or in-kind donations could (to solve last-mile problems of delivery) consider electric vehicles as a fleet to provide home or office service for community-supported agriculture (CSA).²²

Short-term concerns from COVID-19

- Increased use of external distribution means more transportation that leads to more carbon emission than a local model or one using technology to optimized distribution;
- Reduced incentives to make infrastructure or operational changes to engage in carbon farming come with costs at a time when costs are rising to comply with COVID-19 health orders in the least.

Long-term opportunities from COVID-19 and Structural Concerns

- Increased carbon farm plans, increased use of carbon programs (wool certification, for example), can help farmers reduce costs of land use over time, increasing marketing opportunities for products considered by consumers as "environmentally-safe" or "environmentally-friendly".

Land leases versus purchase

One revenue alternative for farmers is leasing land to aspiring or expanding farmers that need land. Community grazing, grazing opportunities provided by local ranchers for others to use land otherwise fallow create win-win scenarios for all. For the farmer, the land may not earn income otherwise and now generated lease revenue; for the grazing rancher, there is another food source without entering broader hay or other commodities markets where feed is available at neighboring land. Such arrangements can help the great mission of depth and breadth for Sonoma County animal production and also reduce fuel for regional fires.

The wine industry provides a model on the crop side. A farmer or a business may want to make improvements to land that otherwise would remain underutilized, and provide infrastructure such as irrigation equipment, trellising, fencing, structures, and other capital to grow vegetables or fruit or

²² See Paul (2018) for a survey of CSA effects on communities, including economic.

legumes or other products that would expand the breadth or depth of Sonoma County agriculture. These improvements can augment land values and may be a way to make investments to help provide incentives for such land use and also reduce the start-up costs for entrepreneurial farmers.

For many farmers, the capital costs of purchasing land can undermine an expansion or a new project. Interest rates play a key role in the overall expense and carrying cost of land, as to maintenance (depreciation schedules). When leasing, repairs and interest payments are avoided, but at the opportunity cost of not building wealth from land ownership. Culturally, farmers need to be willing to take risks, and trust the risk and reward are both there.

Short-term concerns from COVID-19

- Rising costs of production otherwise make short-term risk taking a difficult case to make without some external funding;
- Local landowners may not be ready culturally for a shift to the use of their land without some up-front rewards and mitigation of costs.

Long-term opportunities from COVID-19 and Structural Concerns

- Lower interest rates may provide some financing opportunities for farmers to consider either expansion or diversification through low-interest loans or federal aid that may be available²³;
- Connecting potential land users who would lease areas of current landowners in agriculture in a way that reduced search costs and mitigated risk.

Succession Planning and Farm Labor

As family farmers age, Sonoma County (as do other places in California with family farms) face many questions about preserving current crops and livestock variety, but also what may happen to land when pass on to a new generation. Proposition 13 provides (in its current form) a way to transfer land to the next generation of family members at low tax bases and also with no strings attached in terms of having to have some form of agriculture working on the land. There is a nexus between community agriculture resilience, sustainable farming, and economic viability.²⁴

For Ag + Open Space, incentives need to be considered for new generations of land owners to keep some operations or some use of land going. Each case is unique, with a unique family dynamic and also financial means to continue some operations versus just paying the property taxes and minimizing expenditure otherwise. Reactions to COVID-19 can be to speed up some retirement choices in farming, especially if costs rise and demand for products remain relatively low based on continuing social policies or losses of businesses in the retail sector that otherwise would have demanded products from distribution. Planning for such a shift, and maintaining local agriculture is a large challenge that was coming anyway based on an aging demography; for

²³ See <https://www.minneapolisfed.org/article/2020/struggling-district-farmers-buoyed-by-federal-aid-lower-interest-rates> for a recent take from the Midwest on how farmers are facing challenges and also opportunities.

²⁴ See Hooks et al. (2017).

local agricultural advocates, it is important to guide family farms to the next generation in such a way to keep current land producing food products.²⁵

Short-term concerns from COVID-19

- The wave of aging family farmers is cresting faster with the current recession and the outlook for rising costs against uncertain revenues, all happening more quickly due to COVID-19; and
- Many family farmers, once retired, do not have a transition strategy or a viable next generation to continue their family farm, which places current agricultural production at risk of no food production or of transition to non-food farming (winegrapes, cannabis, hemp, etc.).

Long-term opportunities from COVID-19 and Structural Concerns

- Engage family farmers in a transition plan that includes alternative revenues and also cost-control measures, including carbon-farm plans and land-lease options;
- Focus on local processing may help some family farms generate more profit and remain in business, regardless of broader problems in regional/national processing and import competition; and
- Alternative revenue sources may attract a new batch of farmers, which may include some non-food options.

Reality Check: Winegrapes, Cannabis and Equine as considerations for farmers

It is important to recognize that winegrapes, cannabis and equine animals using grazing lands will continue to act as competition and complementary products to local food production in Sonoma County. Sonoma County Ag + Open Space can work with farmers who choose specific types of crops over others. A critical lure of cannabis specifically is dollar value to weight, especially with rising supply concerns and potential nationalization in that market. If similar products, such as hemp, are considered by farmers, the return to growing hemp or other products on a per-acre basis must exceed the value of growing cannabis or another, more valuable option.

Winegrapes are a capital-intensive crop to plant and support, but have sustained demand and global branding. There have been incentives for years for those that wanted to and had financial means to convert to grapes to do so, but potential acquisition (if water and other amenities exist for the parcel) is always attractive versus continuing to operate if the price is high enough. An issue with more acreage going to winegrapes is agricultural diversity and food security regionally. It is important to recognize that whatever fate lies ahead for conservation easements for agricultural or environmental protection, farmers (like any other business owners) will be drawn to rising revenues for their assets over time.

²⁵ There are some recent studies and guidance on this. See the Minneapolis FED at <https://www.minneapolisfed.org/article/2020/succession-planning-and-retirement-for-farmers-and-ranchers> and Eggers (2012) for more. .

Equine animals are not raised for food products in Sonoma County, but utilize land and provide another revenue option for local land owners. While not considered “agriculture” in Sonoma County due to husbandry not producing food products and proteins from equine, they are revenue generators from land use as a place to store and exercise and ride horses. Sonoma County has a long history with equine and local feed prices are directly affected by a growing number of equine animals in Sonoma County. For some farmers, with minimal change to current infrastructure, allowing riding or equine storage on site may be another revenue option.

Short-term concerns from COVID-19

- Non-food agriculture is tempting as a transition strategy for retiring farmers to stay on their land and generate revenue without the same labor efforts;
- There is currently more competition for land use than cooperation or planning for a mix of alternatives and recognition of the economic viability of mixed options.

Long-term opportunities from COVID-19 and Structural Concerns

- Farms that have land for grazing could mix herds together, including equine animals;
- If cannabis becomes legal nationwide, and Sonoma County products become nationally branded, farmers should consider a mixed strategy that helps subsidize their current operations and perhaps attracts a new generation of farmers.

Given these considerations and the data above, let's now look at some potential economic impact scenarios to conclude the study.

5. Scenario Analysis

Using national and state level forecasts, as well as recent history for local food production and employment, the scenarios for Sonoma County agricultural values look out to 2023 to estimate the economic impact of COVID-19. Connections to the state economy are critical, given Sonoma County faces state-level policies and regulations. There is also close tracking on jobs growth to the state overall historically. Potential businesses lost from Sonoma County connect to job losses also; estimating the loss of food-producing businesses as entities can be tricky given the lack of true data on self-employed businesses, thus we focus on agricultural value potentially lost due to recent forecasts and current data.

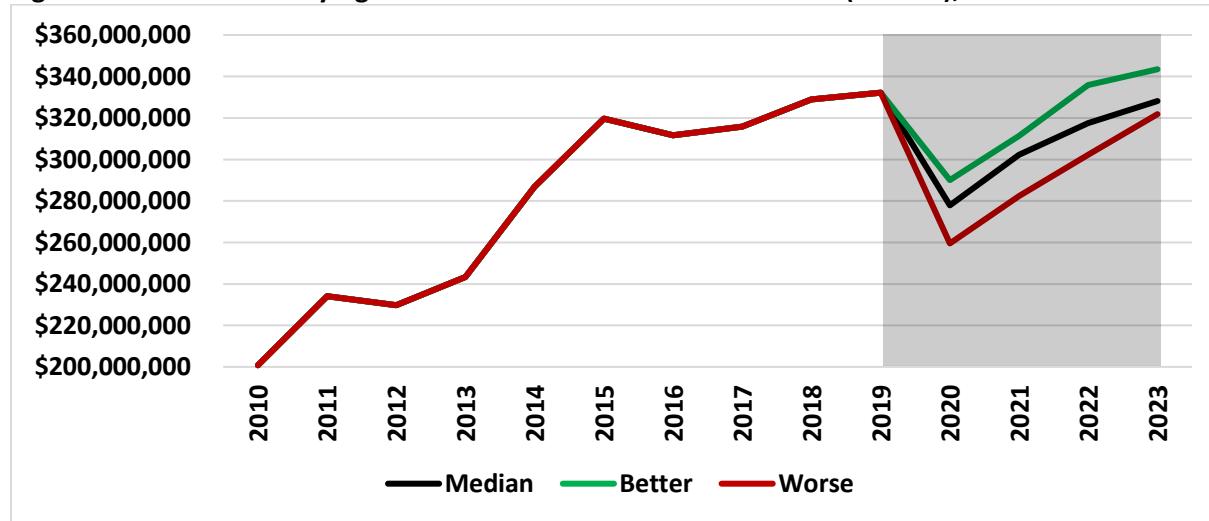
Scenarios to 2023

The contraction of employment and incomes nationally, for both California and Sonoma County, create COVID-19's economic impacts on local farmers. Employment rising or falling suggest rising or falling levels of farmer revenue respectively, and the data's history suggests that forecasts of future employment help shape revenue and agricultural value forecasts. Another driver is lower prices and other risks in crops and livestock, as identified above, that shape local farmer recovery. There are three scenarios provided, where recovery in food-production supply chains and the overall economy help shape each scenario as explained below. We see state and national economic recovery to 2023 shaping how Sonoma County's economy, including food producers, recover from this recession.

The Median Scenario, Back to 2019 Levels of Ag Value in 2024

The median scenario is the main economic impact estimate for this study. Recent forecasts for the American economy suggest unemployment rates and income levels are not going to return to 2019 values until 2024. Recent data on both food sales and forecasts of prices suggest that the economic value of farm products may return sooner than the national economy overall.

Figure 13: Sonoma County Agricultural Values Actuals and Forecasts (Shaded), 2019 Dollars



Sources: California Department of Finance and EFA

Figure 13 shows the aggregate changes estimated to agricultural values in Sonoma County due to COVID-19. To be conservative, given the magnitude of the recent changes, the median scenario has a return to 2019 food-producing agricultural values by 2023. The “better” scenario returns in 2022; the worse is in 2024.

Key Assumptions of Median Forecast:

- Non-Farm employment does not recover until 2024 to 2019 Q4 levels (2020 to 2023 lower employment levels at Sonoma County employers than how 2020 started);
 - California Department of Finance as of May 2020 does not expect the California economy overall to be back at 2019 Q4 employment levels until 2024 or 2025;
- Slow recovery in retail and hospitality (tourism and hotels, bars and restaurants), and other services to drag on the local and statewide economy to 2023;
- Assumes no additional policies that further reduce recovery momentum generally (there may be industry-specific concerns in retail, hospitality and other services from 2020 to 2023); and
- The national and state economies recover at a similar pace to 2023.

Better Scenario: Fiscal Stimulus and Lower Interest Rates Accelerate Post-Vaccine Economy

There were some forecasts for a “V” shaped recovery, a short burst of economic problems followed by economic exuberance and the problem gone within one year. That looks less likely as of August 2020. However, there has been a large amount of fiscal spending throughout the United States and in California by government and interest rates are now back at 2008 Q4 levels. Assuming a vaccine is widely available in early 2021 (think by April 1, 2021), and COVID-19 has no threat of general transmission after Fall 2021, we may see investor, business and consumer confidence blossom as 2021 ends. Such as change can create momentum into 2022 that helps Sonoma County recover to its non-farm employment level at the beginning of 2020 more quickly (before 2023). The three main changes in this scenario from the median scenario are:

- A vaccine is globally available in 2021;
- The national and state economy continue to recover throughout 2021 and no other economic concern slows down momentum;
- There is not a significant relapse of COVID-19 in fall 2020 and Winter 2021 (pre-vaccine), thus there are no reversals of social policy that slowdown recovery momentum.

Worse Scenario: No Vaccine until late 2021 and Relapse of COVID-19 in Fall 2020/Winter 2021

The longer a vaccine is delayed, the more business and investor confidence stagnate and potentially erodes, affecting consumer confidence. The presidential election is likely to have little lingering effects on the economy, but may cause some slower movements until after November 3, 2020. A longer duration of economic problems may come if a slow recovery puts more businesses at risk locally. Hospitality employers are among those most at risk; local fires in August 2020 may provide a dubious boost to hotel occupancy as emergency personnel use local hotels and motels, but may leave a post-fire Fall 2020 with a double problem of visitors concerned about fire coming to Sonoma County, as well as rising concerns of infection rates increasing again. Such problems may be general in the state and national economies if cases levels rise and uncertainty about economic progress remains. The three main changes to the median scenario for the worse scenario are:

- No vaccine until late 2021, thus rising uncertainty and slower economic momentum;
- The national and state economies recover at a slower pace than current forecasts; and
- Caseloads rise in fall 2020 and winter 2021 as to re-instate shelter-in-place orders that linger into the 2021 tourism season in Sonoma County.

Figure 14 shows the change to agricultural values by subsector in 2019 dollars, based on the estimated value of 2019 food-producing crops and livestock in Sonoma County rising from its 2018 values by approximately 0.98 percent after inflation.

The percentage change data shown at the bottom of each scenario's data summarize the assumptions for each year's activity, representing the annual change from the estimated ag values from 2019 in 2020 dollars (inflation-adjusted). These percentage changes can be used as an algorithm when the actual data for 2019 are available to adjust the forecasts: the better the actuals from 2019 are from the forecast, the smaller the drop in agricultural value in dollars for the same percentage change.

Figure 14: Estimated Agricultural Value Impacts, Sonoma County, 2020 to 2023, compared to 2019, 2019 Dollars, by Larger Food-Producing Sector and All Other Food-Producing Sectors

Median	2020	2021	2022	2023
Market Milk	-\$19,326,845	-\$8,486,696	-\$1,711,603	\$3,030,963
Misc. Livestock and Poultry Products	-\$5,326,820	-\$5,326,820	-\$2,339,083	-\$471,748
Miscellaneous Livestock and Poultry	-\$5,613,679	-\$5,613,679	-\$2,465,047	-\$497,152
Cattle and Calves	-\$2,836,100	-\$1,245,372	-\$251,168	\$444,776
Nursery - Miscellaneous	-\$2,479,582	-\$2,479,582	-\$1,088,820	-\$219,594
Vegetables	-\$1,147,042	-\$503,683	-\$101,583	\$179,887
Nursery - Ornamentals	-\$2,792,179	-\$1,226,086	-\$247,278	\$437,888
Sheep and Lambs	-\$1,543,378	-\$677,719	-\$136,683	\$242,043
Nursery - Cut Flowers	-\$840,917	-\$369,259	-\$74,472	\$131,878
Nursery - Bedding Plants	-\$771,148	-\$771,148	-\$338,622	-\$68,294
Rye and Oat Silage	-\$204,448	-\$89,776	-\$18,106	\$32,063
Apples - Late Varieties	-\$331,014	-\$331,014	-\$145,353	-\$29,315
Rye and Oat Hay	-\$164,221	-\$72,112	-\$14,544	\$25,754
Apples - Gravenstein	-\$170,748	-\$74,978	-\$15,122	\$26,778
All Others	-\$1,439,397	-\$616,884	-\$102,814	\$257,035
Totals	-\$44,987,518	-\$27,884,808	-\$9,050,298	\$3,522,962
Percent Change from 2019 Estimates	-13.5%	-8.4%	-2.7%	1.1%
Better	2020	2021	2022	2023
Market Milk	-\$13,906,770	-\$4,421,640	\$6,418,509	\$9,806,056
Misc. Livestock and Poultry Products	-\$3,832,951	-\$3,832,951	-\$1,218,682	\$1,769,054
Miscellaneous Livestock and Poultry	-\$4,039,363	-\$4,039,363	-\$1,284,310	\$1,864,322
Cattle and Calves	-\$2,040,736	-\$648,850	\$941,878	\$1,438,981
Nursery - Miscellaneous	-\$1,784,201	-\$1,784,201	-\$567,284	\$823,477
Vegetables	-\$825,362	-\$262,423	\$380,936	\$581,986
Nursery - Ornamentals	-\$2,009,132	-\$638,801	\$927,292	\$1,416,696
Sheep and Lambs	-\$1,110,549	-\$353,097	\$512,561	\$783,079
Nursery - Cut Flowers	-\$605,088	-\$192,387	\$279,271	\$426,664
Nursery - Bedding Plants	-\$554,885	-\$554,885	-\$176,425	\$256,101
Rye and Oat Silage	-\$147,112	-\$46,774	\$67,898	\$103,733
Apples - Late Varieties	-\$238,184	-\$238,184	-\$75,730	\$109,931
Rye and Oat Hay	-\$118,166	-\$37,571	\$54,538	\$83,322
Apples - Gravenstein	-\$122,863	-\$39,064	\$56,706	\$86,634
All Others	-\$1,028,140	-\$308,442	\$514,070	\$771,105
Totals	-\$32,363,502	-\$17,398,633	\$6,831,228	\$20,321,141
Percent Change from 2019 Estimates	-9.7%	-5.2%	2.1%	6.1%
Worse	2020	2021	2022	2023
Market Milk	-\$27,456,957	-\$17,294,317	-\$8,486,696	\$221,833
Misc. Livestock and Poultry Products	-\$7,567,622	-\$7,567,622	-\$4,766,619	-\$2,339,083
Miscellaneous Livestock and Poultry	-\$7,975,153	-\$7,975,153	-\$5,023,311	-\$2,465,047
Cattle and Calves	-\$4,029,146	-\$2,537,839	-\$1,245,372	\$32,553
Nursery - Miscellaneous	-\$3,522,653	-\$3,522,653	-\$2,218,814	-\$1,088,820
Vegetables	-\$1,629,561	-\$1,026,412	-\$503,683	\$13,166
Nursery - Ornamentals	-\$3,966,748	-\$2,498,536	-\$1,226,086	\$32,049
Sheep and Lambs	-\$2,192,621	-\$1,381,067	-\$677,719	\$17,715
Nursery - Cut Flowers	-\$1,194,661	-\$752,481	-\$369,259	\$9,652
Nursery - Bedding Plants	-\$1,095,543	-\$1,095,543	-\$690,050	-\$338,622
Rye and Oat Silage	-\$290,452	-\$182,947	-\$89,776	\$2,347
Apples - Late Varieties	-\$470,260	-\$470,260	-\$296,203	-\$145,353
Rye and Oat Hay	-\$233,303	-\$146,950	-\$72,112	\$1,885
Apples - Gravenstein	-\$242,575	-\$152,791	-\$74,978	\$1,960
All Others	-\$2,056,281	-\$1,285,176	-\$616,884	\$43,888
Totals	-\$63,923,536	-\$47,889,747	-\$26,357,562	-\$5,999,877
Percent Change from 2019 Estimates	-19.2%	-14.4%	-7.9%	-1.8%

Sources: IMPLAN®, Bureau of Economic Analysis and EFA

6. Conclusions: Challenges and Opportunities

Sonoma County food producers are likely to see recovery in the value of their products by the end of 2022 back to 2019 values. Projected economic recovery for the national and state economies, as well as slow but positive global recovery help stabilize demand and pricing for food products. This study examines the effects of COVID-19 on food-producing agricultural businesses in Sonoma County from 2020 to 2023. There are opportunities for Ag + Open Space among the challenges facing farmers.

The economic impact of COVID-19 on total agricultural values, similar to the calculations made by the Sonoma County Agricultural Commissioner in the annual Crop Reports, range between lost value of 9.7 percent and 19.2 percent based on projected risks for the major agricultural products in Sonoma County and job losses projected for restaurants, retail, distribution, processing, and agriculture to the end of 2020. Jobs losses have recovered in food production, but support services for agriculture have suffered as farmers have cut back on additional expenses in 2020.

- For 2020, this is a range of \$32,506,000 to \$63,923,000 lost agricultural value in 2020; for 2021 to 2023, all three scenarios show recovery without a second reduction to 2023.
 - In the best scenario provided, agricultural values recover by 2022;
 - The median and most likely scenario, with what is known as of August 2020, is recovery by 2023 after inflation adjustments;
 - These estimates should be seen as preliminary and depend on a generalized end of the COVID-19 crisis by 2021, with continued economic recovery that helps increase food demand for Sonoma County food farmers;
 - Winegrape and cannabis production were not considered in this report.

Major issues stood out to consider as the economy recovery and challenges and opportunities await local farmers. Opportunities for Sonoma County Ag + Open Space to help solve these risks include:

- **Local Processing:**
 - Investing in and advocating for more local processing options;
 - Enhanced crop and livestock processing regionally provide more food availability and resilience in Sonoma County;
 - Local processing reduces transportation needs and potentially generates more business opportunities for CSAs, storage, distribution, and delivery options to increase profit for farmers.
- **Carbon sequestration and land use;**
 - Increasing the use (perhaps through financial incentives) for carbon farm plans;
 - Increased use of programs (wool certification, for example) that can help farmers reduce costs, widen their product market and reduce their own carbon footprints;
 - Local processing, packaging, storage, and delivery to customers can reduce supply-chain emissions;
- **Land leases versus purchase;**
 - Lower interest rates may provide some financing opportunities for farmers to consider either expansion or diversification through low-interest loans or federal aid that may be available;

- Connecting potential land users who would lease areas of current landowners in agriculture in a way that reduced search costs and mitigated risk.
- **Alternative crops or livestock: Winegrapes, Cannabis and Equine; and**
 - Facilitating matches of landowners and farmers that would like to use land for grazing, including equine animals, could drive more revenue for farmers;
 - Facilitating a strategy for farmers to consider cannabis as a complement to crops and livestock if cannabis becomes legal nationwide, potentially drawing in a new generation of farmers.
- **Succession Planning and Farm Labor:**
 - Engaging family farmers in a transition plan that includes alternative revenues and also cost-control measures, including carbon farm plans and land lease options;
 - Educating on alternative revenue sources that may attract a new batch of farmers, which may include some non-food options.

References

- AgWeek (2020), Sheep Markets, too, Rocked by Virus”, April 27, Accessed at
<https://www.agweek.com/business/agriculture/5413667-Sheep-markets-too-rocked-by-virus>
- Bureau of Labor Statistics (2020), “Quarterly Census of Employment at Wages”, Accessed at <https://www.bls.gov/cew/>
- California Department of Finance (2020) “May Revise Forecast (MR)”, Accessed at
http://www.dof.ca.gov/Forecasting/Economics/Eco_Forecasts_Us_Ca/
- California Department of Food and Agriculture (2020) “California Agricultural Statistical Review”, Accessed at
<https://www.cdfa.ca.gov/statistics/PDFs/2018-2019AgReportnass.pdf>
- California Department of Tax and Fee Administration (2020) “Taxable Sales to Q1 2020”, Accessed at
<https://www.cdtfa.ca.gov/dataportal/catalog.htm?category=Taxable%20Sales%20in%20California>
- California Employment Development Department (2020) “Labor Market Information”, Accessed at
<https://www.labormarketinfo.edd.ca.gov/>
- California Farm Bureau (2020) “Economic Impacts of the COVID-19 Pandemic on California Agriculture”, prepared by ERA Economics, Accessed at https://www.cfbf.com/wp-content/uploads/2020/06/COVID19_AgImpacts.pdf
- CalMatters (2020) “How California farms can survive the post-pandemic world”, Accessed at [CalMatters](#)
- Census Bureau (2020) “Building Permit Survey”, Accessed at <https://www.census.gov/construction/bps/>
- Census Bureau LED (2020) “Quarterly Workforce Indicators”, Accessed at <https://ledextract.ces.census.gov/static/data.html>
- Congressional Research Service (2020) “The Tax Credit for Carbon Sequestration (Section 45Q)”, Accessed at
<https://fas.org/sgp/crs/misc/IF11455.pdf>
- Earth Institute, Columbia University (2019) “Capturing Carbon's Potential: These Companies Are Turning CO2 into Profits”, Accessed at <https://blogs.ei.columbia.edu/2019/05/29/co2-utilization-profits/>
- Eggers, Tim (2012) “Retirement Planning for Farm Families”, Iowa State University Extension and Outreach, Ag Decision Maker, Accessed at <https://www.extension.iastate.edu/agdm/wholefarm/html/c4-56.html>
- Federal Reserve Bank of St. Louis (2020) “FRED Database”, Accessed at <https://fred.stlouisfed.org/>

Hayes, Joseph and Laura Hill (2014) "Undocumented Immigrants in California", for Public Policy Institute of California, Accessed at <https://www.ppic.org/publication/undocumented-immigrants-in-california/>

Hooks, Teresa and Aine Macken-Walsh and Olive McCarthy and Carol Power (2017) "Farm-level viability, sustainability and resilience: a focus on cooperative action and values-based supply chains", *Studies in Agricultural Economics*, vol 119, pp. 123-29

IMPLAN (2020) "Economic Impact Model for Sonoma County", Accessed at <https://app.implan.com>

Land Smart (2020) "Carbon Farm Plans", Accessed at <http://landsmart.org/programs-services/landsmart-carbon-farm-plans/>

Marin Carbon Project (2020) "Carbon Farm Plans" Accessed at <https://www.marincarbonproject.org/carbon-farming/carbon-farm-plans>

Minneapolis FED (2020) "Covid-19 and Ominous Feeling about Pandemic", Accessed at <https://www.minneapolisfed.org/article/2020/covid-19-agricultures-ominous-feeling-about-the-pandemic>

Minneapolis FED (2020) "Succession Planning and Retirement for Farmers and Ranchers", Accessed at <https://www.minneapolisfed.org/article/2020/succession-planning-and-retirement-for-farmers-and-ranchers>

Paul, Mark (2018) "Community-supported agriculture in the United States: Social, ecological, and economic benefits to farming", *Journal of Agrarian Change*, June, pp. 1-19.

Philadelphia Federal Reserve Branch (2020), "Survey of Professional Forecasters", Accessed at <https://www.philadelphafed.org/research-and-data/real-time-center/survey-of-professional-forecasters>

Richards, T.J. (2018) "Immigration Reform and Farm Labor Markets", *American Journal of Agricultural Economics*, Vol.100, No. 4, pp. 1050-71

Saitone, Tina (2020) "Cattle Producers Struggle as COVID-19 Reduces Beef Processing Capacity", UC Davis ARE Update, volume 23, no. 5, May/June 2020, Accessed at https://s.giannini.ucop.edu/uploads/giannini_public/9a/dd/9add77d9-5328-45a2-8587-7723e383656e/v23n5_8.pdf

Sonoma County Agricultural Commissioner (2020) "Crop Reports", Accessed at <https://sonomacounty.ca.gov/Agriculture-Weights-and-Measures/Crop-Reports/>

United States Treasury (2020) "The CARES Act Works for All Americans", Accessed at <https://home.treasury.gov/policy-issues/cares>

United States Department of Agriculture (2020) "Livestock, Dairy, and Poultry Monthly Outlook: August 2020", Accessed at <https://www.ers.usda.gov/publications/pub-details/?pubid=99168>

Vongsikeo, Vongdalone and William S. Breffle, Jenny L. Apriesnig and Brian D. Barkdoll (2020) "The Economic Value of Carbon Sequestration through Tree Planting in Laos", *Asian Development Policy Review*, Vol. 8, Issue 2, pp. 102-111.