Special Issue: Implications of the Coronavirus Pandemic on California Food, Agriculture, and the Environment

Although the coronavirus pandemic continues to afflict most parts of the world, states and countries are attempting to reopen their economies and assess the damage that has been wrought. In this special, expanded issue of ARE Update, we look at impacts of the pandemic on California agricultural industries and the implications of these impacts for the environment and for consumers, especially the most vulnerable among us.

The issue features three articles and seven profiles of key California agricultural commodities. No state relies upon agricultural labor more than California, where crop and support employment peaks seasonally in June. In our lead article, Tim Beatty, Ali Hill, Phil Martin, and Zach Rutledge examine farm labor supply conditions facing California amidst the pandemic. They analyze the challenges faced by employers in finding sufficient workers to meet the June peak and assess risks due to potential outbreaks among workers. The authors conclude that disruptions caused by the pandemic are likely to hasten the pace of mechanization and the use of H-2A guest workers.

Processing plant closures, consumer stockpiling of key staple foods, and other supply chain disruptions have raised serious questions about food security in the United States. Prominent economists such as Nobel Laureate Joseph Stiglitz have warned that the safety net will not survive the pandemic. Charlotte Ambrozek and Tim Beatty examine U.S. food assistance programs and their ability to respond to the pandemic. They report that SNAP (CalFresh) enrollments are up 60–80% in the state relative to a year ago, and address ongoing legislative efforts to expand benefits and reduce red tape associated with enrollment in the program. The authors also address the roles that the National School Lunch program, the Women, Infants, and Children (WIC) program, and food banks can play in meeting these food-insecurity challenges.

Michael Anderson shows how “near real-time data” can give us key insights into how the pandemic and economic shutdown have impacted behavior in California. He uses Caltrans traffic sensor data and Apple data on route requests to show that travel in California dropped precipitously when the stay-at-home orders were issued—down 40–80% depending on the data source. However, the rate of decline varied considerably by regions within California, and travel began increasing around the beginning of April, long before any restrictions on the stay-at-home order were lifted. While many commentators have noted that shuttering of economies would produce environmental benefits, Anderson finds no effect of the shutdown on one key pollutant, fine particulate concentrations (PM2.5).

The issue concludes with profiles of seven leading California agricultural industries: Brittney Goodrich on tree nuts, Dan Sumner on milk and dairy, Julian Alston on grapes and wine, Tina Saitone on cattle and beef, Rachael Goodhue and colleagues on strawberries, Kristin Kiesel on lettuce and other produce items, and Ellen Bruno and Mark Evans on tomatoes. The profiles create a fascinating mosaic of the different ways the pandemic has impacted California agriculture. Industries like dairy, beef, and produce have scrambled to repurpose products from foodservice to retail. Produce and dairy have seen farm product go unsold amidst retail shortages, while tree nuts, a storable commodity, saw a temporary spike in sales, as they were among the products panicked consumers hoarded at the onset of the shutdown. Each of the expert authors gives his/her assessment of what the future holds for these essential California industries.

ARE Update Co-editors
Ellen Bruno
Richard Sexton
David Zilberman

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COVID-19 and Farm Workers: Challenges Facing California Agriculture

Timothy Beatty, Alexandra Hill, Philip Martin, and Zachariah Rutledge

When stay-at-home orders were issued in March 2020 to slow the spread of COVID-19, farm workers were deemed essential and expected to continue working. As California’s farm employment climbs toward its June peak, sick farm workers, closed schools, and uncertainties surrounding the H-2A guest worker program could reduce the supply of farm workers, accelerating trends already underway such as mechanization.

The coronavirus in March 2020 changed work and personal lives in California and around the world. Most workplaces and schools closed, and people were asked to stay home to avoid catching and spreading the virus.

Many employers developed remote working arrangements, but essential employees such as farm and food system workers continued to report to work. California farm employers are required to have Injury and Illness Prevention Programs (IIPPs), and in April 2020, the state’s Division of Occupational Safety and Health (Cal/OSHA) instructed farm employers to update their IIPPs to prevent the spread of COVID-19. IIPPs must spell out who is responsible for training employees about the virus and who assesses and mitigates hazards, investigates illnesses and keeps records.

Most farm employers encouraged and required sick employees to stay home, installed more handwashing facilities and reminded workers to use them, and implemented physical distancing while working and during breaks. Some growers already require their employees to wear hair nets to enhance food safety, and some provided personal protective equipment to prevent the spread of the virus. Transportation providers often made several trips with their buses and vans in order to allow riders to spread out.

California requires employers who pay $100 or more in quarterly wages to pay unemployment insurance taxes on the first $7,000 of their workers’ annual wages, including unauthorized and H-2A guest workers, making the Quarterly Census of Employment and Wages the best estimate of agricultural employment. Figure 1 shows that monthly crop and support employment in 2018, the most recent data available, peaked at 485,000 in June, fell to a low of 345,000 in January, and averaged 423,000 during the year.

Over 90% of average employment in California agriculture is in crops. Farmers have been hiring fewer workers directly and more via crop support services, such as labor contractors who bring workers to farms. Crop farmers employed 45,000 more workers directly in June than they did in March 2018, and support services employed 93,000 more workers in June than in March.

Will agriculture retain the workers who are typically employed in March and recruit an additional 140,000 in spring 2020? Over three million Californians filed for unemployment benefits between mid-March and mid-April 2020, including two-thirds of those employed in the leisure and hospitality industry, including restaurants.

However, few jobless nonfarm workers are expected to seek seasonal farm jobs for several reasons. First, unemployed workers in cities have few links to the labor contractors and crew bosses who match most farm workers with jobs. Unless unemployed construction and service workers know farm workers and crew bosses, they may not learn about vacant farm jobs.

Second, unemployment benefits may exceed agricultural earnings. A construction or service worker who was earning $3,000 a month would receive $350 a week in unemployment benefits, plus $600 a week in federal pandemic unemployment benefits through July 31, 2020, making benefits of $950 a week—more than the $500 a week average earnings of employees of labor contractors in 2018.

Third, most farm workers have low incomes and need to work. Many are unauthorized and ineligible for unemployment and other benefits, so they will likely stay in or return to seasonal farm jobs. These experienced farm workers live in areas with farm jobs and know the crew bosses who hire farm workers.
On the other hand, jobless nonfarm workers would have to make contacts with employers, find housing in agricultural areas, and adapt to a new type of work before they would be a significant addition to the farm workforce. Such nonfarm-to-farm employment shifts are rare.

### Schools, Visas, and Overtime

Three factors could affect the number of experienced farm workers and the hours they work in 2020. First, with schools closed, some people who would normally do farm work may have to care for children, which could reduce the supply of farm workers. Table 1 shows that California crop workers are mostly unauthorized Mexican-born workers who have less than a high-school education and do not speak English well. Most are married parents who are settled in one place, explaining why few migrate.

The share of women among crop workers has been rising—now at 30%—but far less than the 50% share of women among all California workers. Nonetheless, closed schools in 2020 are likely to slow the gradual increase in the share of female crop workers.

One alternative to settled, aging, and unauthorized resident workers are legal H-2A guest workers, over 90% of whom are Mexicans. Employers must be certified by the U.S. Department of Labor (DOL) as in need of guest workers, and these workers must receive H-2A visas from U.S. consulates abroad to work legally in the U.S. for up to 10 months. The U.S. Department of State (DOS) in March 2020 stopped conducting the mandatory in-person interviews of applicants for H-2A and other visas but, after farm employer protests, DOS agreed to waive interviews for returning and later all H-2A visa applicants.

H-2A guest workers fill about 10% of the million year-round equivalent jobs in U.S. crop agriculture and account for 5% of California’s average employment on crop farms. The H-2A program has been expanding rapidly in California, and H-2A workers are core components of berry, vegetable, and other workforces despite their higher costs. Employers must pay H-2A worker travel costs, provide housing at no cost, and pay an adverse effect wage rate (AEWR) of $14.77 an hour, almost 14% more than California’s $13 minimum wage for employers with 26 or more employees.

USDA created a website that allows farm employers who are certified to employ H-2A workers to locate H-2A workers already in the U.S. who are finishing their contracts. In April 2020, DHS allowed employers to offer these H-2A workers new contracts, saving employers recruitment and travel costs.

California farm employers in 2020 must pay overtime wages to farm workers after they work nine hours a day or 50 hours a week. Many farmers aim to avoid overtime pay by hiring more workers or making other adjustments, but a diminished supply of workers due to closed schools and costly H-2A workers may make it hard to find additional workers.

Two-thirds of crop workers interviewed by the NAWS in California in 2015–16 reported working more than 40 hours a week, including a third who worked more than 50 hours a week. If farm employers cannot recruit additional workers and instead pay overtime wages to a third of their workers for five to 10 hours a week, labor costs will rise.

### Legislative Responses

The federal government’s $2.2 trillion Coronavirus Aid, Relief, and Economic Security Act (CARES) aims to cushion the effects of the economic shutdown prompted by COVID-19. The program is designed to send $1,200 checks to Americans with adjusted gross incomes of less than $75,000, and support the industries most severely impacted by stay-at-home orders. CARES provides forgivable loans to small businesses that keep their employees on the payroll.

CARES is likely to have limited impacts on California agriculture because farming is an essential industry. The closure of restaurants reduced the demand for fresh produce, but increased sales at supermarkets mean that most farmers are hiring the same number of farm workers in 2020 as in previous years. Half of farm workers are unauthorized and lack valid Social Security numbers, which limits their access to safety net programs, including the $1,200 per adult and $500 per child payments that CARES makes to legal residents and children in households with legal parents.

In April 2020, California announced a $125 million Disaster Relief Fund to provide payments of $500 per unauthorized adult, and $1,000 per unauthorized household, to 150,000 unauthorized foreigners. These funds, which

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Table 1. Characteristics of California Crop Workers, 1989–2016 (Percent)

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<tbody>
<tr>
<td>Unauthorized</td>
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<td>67</td>
<td>60</td>
<td>55</td>
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</tr>
<tr>
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<td>Male</td>
<td>76</td>
<td>78</td>
<td>76</td>
<td>73</td>
<td>74</td>
<td>71</td>
</tr>
<tr>
<td>Age 20-34</td>
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<td>57</td>
<td>47</td>
<td>44</td>
<td>38</td>
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<tr>
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<td>93</td>
<td>90</td>
<td>82</td>
<td>77</td>
<td>73</td>
</tr>
<tr>
<td>Speak English Well</td>
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<td>5</td>
<td>4</td>
<td>9</td>
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<td>17</td>
</tr>
<tr>
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<td>45</td>
<td>49</td>
<td>56</td>
<td>53</td>
<td>47</td>
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include $75 million in state funds and $50 million expected from foundations, are to be distributed by nonprofits that serve the unauthorized.

Paid sick leave is one exception to the ban on government services for the unauthorized. The Families First Coronavirus Response Act (HR 6201) requires private-sector employers with fewer than 500 employees to provide up to two weeks of fully or partially paid sick leave for COVID-19 related reasons between April 1 and December 31, 2020. Full-time employees who have been employed at least 30 days and are subject to quarantine orders due to COVID-19, who have been advised to self-quarantine by a health care provider, or who are experiencing COVID-19 symptoms and are seeking a diagnosis, are eligible for 80 hours of paid sick leave at their regular wage, up to $511 a day or $5,110 in total. No waiting period is required, and H-2A and unauthorized farm workers are eligible.

Employees are eligible for two-thirds of their regular pay, up to $200 a day or $2,000 total, if they cannot work because they must care for someone with COVID-19 or a child under 18 whose child care facility or school is closed. Employers will receive credits for their COVID-19 sick-leave payments against their Social Security payroll taxes owed. For example, if the employer owes $10,000 in federal social security taxes but made $7,000 in employee sick leave payments, the employer would owe only $3,000 in social security taxes.

DOL may exempt employers with fewer than 50 employees from the Families First paid leave requirements to care for children if granting paid leave would “jeopardize the viability of the business as a going concern.” There are limited data on the distribution of farm workers by size of employer, but many are employed by farms with fewer than 50 employees. It is not clear whether most small farms will request and receive an exemption from paid sick leave mandates.

**Looking Ahead**

Farm worker employment is rapidly approaching its June peak, when there are 150 workers employed for every 100 workers employed in January. A month into the March–April 2020 shutdown associated with COVID-19, there are few reports of farm workers contracting the coronavirus or of farm workplaces shutting down due to outbreaks, unlike the virus clusters in meatpacking plants that prompted plant closures.

COVID-19 poses three major challenges for farm workers and California agriculture. The first is obtaining sufficient workers for the rapidly approaching June employment peak. As the virus spreads, farm workers could get sick and learn about their paid leave options to care for themselves or family members. Workers getting sick and the availability of benefits could reduce the farm labor supply.

The second challenge is containing virus outbreaks. Most farm workers have relatively low incomes, encouraging them to work even when sick. Many live in crowded housing, so any outbreak could spread quickly. A lack of health insurance could discourage those who are sick from seeking care, fueling the spread of the virus.

Third, the virus is likely to speed changes already underway, including the substitution of machines for workers, where possible, and importing more H-2A guest workers from abroad. The average age of the unauthorized workers who dominate among the state’s farm workforce is 42, while the average age of H-2A guest workers is 32, helping to explain why ever more farmers are relying on H-2A workers despite their higher cost.

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**Authors’ Bios**

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We review the three largest nutrition assistance programs in the United States—SNAP, NSLP, and WIC—and discuss how these programs can help address the food security challenge posed by the COVID-19 crisis. We will also provide a summary of policy changes made to date in these programs, and a snapshot of where policy may be headed. We conclude with some considerations for policymakers on effective policy changes particular for this situation.

The social safety net in the United States is a patchwork of programs, including the main nutrition assistance programs—the Supplemental Nutrition Assistance Program (SNAP—formerly Food Stamps—known as CalFresh in California), the National School Lunch Program (NSLP), and the Special Supplemental Nutrition Assistance Program for Women, Infants, and Children (WIC). The COVID-19 pandemic presents particular challenges for these programs—unprecedented job loss and economic hardship leading to a growing risk of food insecurity combined with challenges to the food system, including shortages of staple items at grocery stores. Below, we outline how these programs address food security needs during the pandemic and offer ideas as to how the programs could be improved.

Food insecurity has increased dramatically since the beginning of the pandemic, reaching 150–200% of levels observed at the height of the Great Recession. The Census Household Pulse Survey, collected May 7–12, finds that 12.5% of households with children do not have enough to eat at least some of the time. Estimates using the COVID Impact Survey, collected May 4–10, indicate that 33% of households with children and 22% of all households are currently food insecure. These statistics indicate a need to revisit the food assistance landscape in the U.S. during the COVID-19 crisis.

SNAP
SNAP is the largest U.S. nutrition assistance program. It provides a debit card-like instrument for eligible participants to use to purchase food for home consumption from authorized retailers. Eligible individuals are those that satisfy income requirements (generally, less than 130% of the federal poverty level) and an asset test (generally, less than $2,250 in assets), although the asset test is a more variable requirement across states and categories of participants. In difficult economic times, households turn to SNAP. Figure 1 shows how web searches for food assistance, particularly SNAP, have increased in the current crisis. Google Trends data indicate that searches for “food stamps” and “SNAP” increased at the end of March, meaning that higher participation and issuance of benefits may not be observable until the middle of April or May.

The most up-to-date evidence is that SNAP is responding. CalFresh applications increased by 60% in the third week of March this year relative to the same week last year. Early evidence from Los Angeles County in April indicates that applications increased 84% from March to 126,875. Notably, 70% of March applications were submitted online (compared to 47% in February and 41% the previous March), indicating that individuals are taking advantage of remote technologies to obtain benefits. An open question is if and how legislators will expand SNAP’s safety net.

In general, during a recession, one of SNAP’s key benefits is that it is an automatic stabilizer for the economy. Eligibility criteria based on income ensure that the program expands during weak economic times and contracts when the economy is strong. Individuals who lose a job can file for benefits once they can document that they meet gross and net income

![Google Searches for Food Assistance](image-url)
thresholds. In other words, the program will expand without legislators needing to enact changes. Households that have lost income as a result of the pandemic will become SNAP eligible, increasing resources to spend on food. SNAP has well documented success at increasing household food expenditure, improving economic and health outcomes, and reducing food insecurity. Figure 2 shows the countercyclical response of SNAP to unemployment. An additional advantage of an entitlement program like SNAP is that during a severe downturn the program can be expanded or modified relatively quickly to respond to the needs of a particular situation.

Examples of recent and ongoing legislation and legislative proposals to address the economic consequences of the pandemic include changes to reduce bottlenecks, such as loosening of interview requirements for new cases and extended certification periods, which reduce the administrative burden from recertification. Early evidence is that this has helped improve timely application processing. The roll-out of online SNAP shopping has been accelerated and is now live in 37 states (including California), meaning individuals more at risk from COVID-19 can shop safely from home. However, SNAP benefits cannot be used to pay delivery fees and delivery is not available in all areas, meaning that the policy alone may not be enough to facilitate online SNAP shopping.

Ongoing and proposed changes seek to increase the availability and generosity of benefits, with the goal to reduce food insecurity and cushioning the pandemic’s economic impact. Increases in SNAP benefits will not only draw more people into the program, but also increase food expenditure by households that receive higher benefits. SNAP has a high multiplier effect, meaning that a dollar of SNAP benefits generates more than a dollar in GDP (USDA estimates adding $1 billion in SNAP benefits during a recession increases GDP by $1.5 billion).

A major change to increase SNAP coverage is waiving time limits on participation for unemployed, able-bodied adults without dependents (ABAWDs). Under normal circumstances, ABAWDs may only participate in SNAP for 3 out of 36 months unless they are working at least 20 hours per week. The Families First Coronavirus Response Act suspends ABAWD work requirements from April 1 until the end of the national health emergency for all states. This new policy takes a page from the American Reinvestment and Recovery Act of 2009, passed in response to the Great Recession.

Prior to the recent crisis, work requirement waivers have been contentious. April 1 was the intended start date of a proposed rule to limit states’ ability to waive ABAWD work requirements. In normal times, the proposed rule would have disqualified at least 700,000 people from SNAP benefits and would certainly affect more individuals in the present economic situation. The U.S. District Court for Washington DC issued an injunction blocking this rule on March 13; on May 12, the USDA indicated it would appeal this decision.

Other policy changes in response to COVID-19 make SNAP more generous for some households. All 50 states and the District of Columbia have been issued emergency allotments, which increase the household’s benefits received to the maximum level for a household of that size. For the 60% of households who were not already receiving the maximum benefit level (i.e., less disadvantaged households), this will mean an increase in benefits. Reduced administrative burden and higher benefits will likely induce households at the upper end of income eligibility to participate, as the benefit from participating in the program is now higher relative to the costs of entering. However, the 40% of SNAP households who receive the maximum benefit will see no changes in benefits. These are the most disadvantaged households. SNAP researchers and policymakers have called for an increase in SNAP benefits to address this gap.

However, the economic disruptions caused by COVID-19 have some unique features that interact with the SNAP program in unprecedented ways and may call for a rethinking,
of current benefit levels. The first is simply that food prices have increased as food-at-home demand has spiked (see Figure 3). Note that the USDA calibrates SNAP benefit levels to the Thrifty Food Plan (TFP). The TFP is a fixed basket of foods that provides a cost minimizing, nutritionally complete diet. As noted in Bruno, Sexton, and Sumner’s Mar / Apr 2020 ARE Update piece, some food retail prices are rising, and some goods are stocked out. Forty percent of calories in the TFP come from whole grains and legumes—non-perishable staples that media reports suggest have been particularly hard to find.

Implicit in the TFP is the assumption that households have access to the lowest-cost version of all the products in the plan. SNAP participants are on average thrifty shoppers, paying less per unit for food than other shoppers, and paying less per unit as their benefits become scarcer at the end of the month.

However, the shopping behaviors that allow SNAP households to pay less—choosing lower quality or bargain items and shopping at multiple outlets—are not feasible in the face of stockouts and stay-at-home orders. As with any fixed basket, the TFP does not account for the substitutions that households need to make when facing stockouts. In short, SNAP participants are likely to face higher prices because of a general increase in the price level, and stockouts and stay-at-home orders constrain their choices. This means that SNAP households’ existing benefits will not go as far in the current food environment.

**National School Lunch Program**

Schools are an important source of food for children. With school closures resulting from COVID-19, the 21.9 million children who received free or reduced-price lunches through the National School Lunch Program (NSLP) are not able to access those calories. USDA’s Food and Nutrition Service (FNS) has issued a number of nationwide waivers of standard NSLP policies to provide food to children who are not attending school anymore. Parents and guardians can pick up meals for children (without the child needing to be present), for the duration of the federal public health emergency. Meals may be delivered under the guidelines of the Summer Meals Program. Meals may be served in non-traditional settings and outside of designated mealtimes to allow for increased social distancing. The program will not enforce minimum requirements on nutrients and servings of fruit, vegetables, grains, meat, and milk. Together, these requirements make it easier for children to receive the nutrition from schools that they typically would, even when schools are closed.

That said, these changes to NSLP will not be feasible for all families, and still require families or school representatives to physically move food around, increasing their exposure to COVID-19. Families receiving NSLP will still have to shop for groceries. Providing the cash value of missed school meals on an electronic benefits transfer (EBT) card, which can only be used to purchase food for at-home consumption, reduces excess viral exposure. SNAP uses the same method to dispense benefits. If states can link students receiving free and reduced-price lunches to SNAP recipient households, the household can simply receive the additional value on their SNAP benefits card. Delivering benefits by EBT decreases virus transmission risk relative to pick up or drop off and gives families flexibility in preparing meals together at home. USDA FNS is allowing states to apply to implement this school meal replacement system, known as Pandemic EBT or P-EBT. As of May 21, 34 states have been approved for P-EBT. The HEROES Act recently introduced in the House of Representatives would extend P-EBT until schools reopen.

**WIC**

The last large nutrition assistance program is WIC, the Special Supplemental Nutrition Assistance Program for Women, Infants, and Children. WIC provides infants, children under 5, and pregnant and post-partum women with a bundle of nutritious foods. In general, WIC provides a specific set of foods—for instance, a 16-oz loaf of whole wheat bread of certain brands. Typically, WIC participants cannot use their benefits if the WIC-prescribed item is not available.
For the duration of the COVID-19 crisis, FNS is allowing states to apply for waivers to substitute items in food packages if availability is limited. As of May 21, all state agencies except Kentucky, Mississippi, New York, Oklahoma, and West Virginia have approved food package substitution waivers. Twelve states waived the minimum stocking requirements for WIC-authorized retailers.

WIC operates as a block grant, meaning that a fixed budget is set aside for the program each year so that the program cannot expend more than its block allowance (SNAP’s funding structure allows it to grow without having to authorize additional funds). To fund additional participants, FNS has allocated $500 million of funding for WIC, a 10% increase on FY19 program expenditure. The HEROES Act, as initially proposed, would increase that funding by a further $1.1 billion.

To limit the potential spread of COVID-19 between WIC participants and WIC staff, households can enroll or re-enroll in WIC without visiting a clinic and receive benefits without a clinic visit in all states.

Food Banks

The programs described above do not cover all individuals whose food security has been impacted by the 2019 novel coronavirus. Legal immigrants who have been in the U.S. less than 5 years and undocumented immigrants will not be able to receive SNAP in most states. People marginally above income cutoffs—approximately 130% of the federal poverty level, or $2838/month for a family of four—will, in general, not be eligible for SNAP (there are exceptions: California allows SNAP eligibility up to 200% of the poverty level). For these individuals, food banks generally become the food provider of last resort. Food banks report substantially increased demand over the past two months. In California, food bank demand has increased by 73% on average since the middle of March. Food banks are serving not only individuals who have lost income, but also those who may not be able to access food at stores because of stockouts.

Policy Suggestions

Participants in federal nutrition assistance programs face unprecedented economic hardship due to the COVID-19 pandemic. A consequence of the pandemic is that SNAP benefits simply don’t go as far as they used to—food prices are up 4.1% year-over-year in April. This is likely a lower bound on the true cost increases faced by SNAP households. In addition to higher retail prices, stockouts and lockdowns mean that the components of a cost-minimizing basket of foods may not be accessible, leading to higher costs to achieve the same nutritious diet. While policymakers have responded by allocating the maximum benefit amount to all households, this leaves out the 40% of households—those with the lowest incomes—who already receive the maximum.

The proposed HEROES Act, passed by the House of Representatives as of this writing, raises SNAP benefits for all participants, citing the rising cost of the Thrifty Food Plan. The Act would raise benefits by 15%, compared to the 13.6% increase mandated during the Great Recession. Evidence suggests the benefit increase during the Great Recession was an effective policy response and led to a decline in food insecurity, an increase in food spending, and an increase in calories consumed. Increasing benefits at least as much as during the Great Recession is warranted given the structural challenges facing food assistance programs and severe economic distress caused by the COVID-19 crisis. Benefit increases in WIC and P-EBT, which cover women and children experiencing the highest rates of food insecurity during the pandemic, would mitigate the shock to nutrition.

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For additional information, the authors recommend:


COVID-19, Traffic, Travel, and Pollution

Michael L. Anderson

This article explores the differential impacts of recent “stay-at-home” orders on mobility, economic activity, and pollution across the state. Data reveal decreases in travel, with evidence of recovery prior to the orders’ relaxation, but no compelling evidence of PM2.5 reductions.

COVID-19, and the associated public health response, has generated an economic slowdown of historical proportions. California was one of the first states to issue “stay-at-home” orders. On March 13, most schools in the state’s two largest metropolitan areas closed. On March 16, seven counties in the San Francisco Bay Area issued “shelter-in-place” orders, and on March 19 the governor issued a statewide “stay-at-home” order. The first loosening of the statewide order did not occur until May 8.

I explore the differential impacts of these orders on mobility, economic activity, and pollution across the state. An immediate impact of stay-at-home orders and social distancing guidelines is to reduce mobility and economic activity. California, however, contains almost 40 million residents and features an economy with rich variation that would qualify as the world’s fifth largest were it a standalone country. Thus, there is substantial heterogeneity in industry composition, occupation, demographic characteristics, and population density across the state, and we should not expect policies to have identical impacts across the state’s different regions.

In this article, I explore the impacts of stay-at-home orders across four broad areas of the state: the San Francisco Bay Area, the Los Angeles area, the Sacramento Valley, and the San Joaquin Valley. The former two areas are dense, urban areas with employment concentrations in trade, information technology, professional and business services, and leisure and hospitality. The latter two areas are geographically broader, contain some of the most productive agricultural land in the nation, and have major cities—Sacramento and Fresno—with employment concentrations in government, education, and health services.

Trends in Travel

I begin by examining the impact of stay-at-home orders on highway miles traveled. The California Department of Transportation (Caltrans) maintains a rich network of sensors on state highways. There are nearly 40,000 sensors installed to monitor traffic across the state’s 380,000 lane-miles of highways. These sensors register, in real time, the number of vehicles that cross the sensor and the speeds at which they travel.

Caltrans divides the state into twelve districts, so for convenience I analyze data by Caltrans district. In particular, I focus on four districts representing the majority of the state’s population: the San Francisco Bay Area (District 4); the Los Angeles area (Districts 7 and 12); the Sacramento Valley (District 3); and the San Joaquin Valley (Districts 6 and 10). Loosely speaking, the San Francisco Bay Area is bounded by Sonoma, Contra Costa, and Santa Clara counties; Los Angeles consists of Ventura, Los Angeles, and Orange counties; the Sacramento Valley stretches from Butte County to Sacramento County; and the San Joaquin Valley stretches from San Joaquin County to Kern County.

Figure 1 plots the weekly year-over-year percentage change in vehicle miles traveled (VMT), measured across all Caltrans sensors in a region. The figure begins at the week of March 1–7, 2020 and continues to the week of May 3–9, 2020 (10 weeks in total).

Initial highway travel in all four regions demonstrates annual growth vis-a-vis the same week in 2019—during March 1–7, VMT was 2% higher in Los Angeles (relative to the same week in 2019), 3% higher in San Francisco and the Sacramento Valley, and 5% higher in the San Joaquin Valley. By the week of March 8–14, however, all areas reported lower VMT than the same week in 2019, and by March 15–21 travel fell by double-digit percentages year-over-year. During the first several weeks, travel fell fastest in
the San Francisco Bay Area—consistent with the area’s “shelter-in-place” order on March 16 that predated the statewide order by three days.

Highway travel bottomed out in all four regions during the period from March 22 to April 12. The year-over-year drop approached or reached 40% in the San Francisco, Los Angeles, and Sacramento Valley regions. The San Joaquin Valley was slightly less affected, but nevertheless declined by 37% year-over-year at its nadir. These patterns suggest that the stay-at-home order had deep impacts regardless of an area’s population density or industry mix.

Although the first loosening of the statewide order did not occur until May 8, at the end of the figure’s time series, travel began to recover at least one month prior. This recovery suggests that households’ reactions to the stay-at-home order evolved over time. In some cases, household tasks or work that had been postponed during the first weeks may have eventually become necessary. In other cases, households may have learned over time about activities that were still allowed, or they may have determined that enforcement was lax. Regardless, highway travel in the San Joaquin Valley recovered quickest, down only 23% year-over-year by May 3–9. Highway travel in the San Francisco Bay Area recovered slowest, down 32% year over year by May 3–9.

While the Caltrans sensor network is impressive, it has limitations. First, approximately 30% of sensors are out of service at any given time, causing Caltrans to impute some data. The nature of these imputations is such that they understand changes in travel during unusual events, such as COVID-19. Second, the sensors only cover major highways, with no coverage of arterial roads. If short trips were differentially impacted relative to long trips, this lack of coverage may skew the observed pattern. Finally, since the sensors measure vehicles rather than travelers, they provide little insight to changes in transit ridership, and no insight to changes in walking.

Thus, I supplement the Caltrans data with data from Apple Maps Mobility Trends Reports. These data report changes in routing requests by region, relative to a baseline of February 2020. Routing requests are reported for driving, transit, and walking; for brevity, I combine the latter two categories to a single measure.

The Apple data provide an alternative perspective on mobility. Since they represent routing requests, they are weighted more heavily towards less routine trips; most drivers do not need routing requests when traveling to work, for example (though in some cases they may activate them for traffic information). If less routine trips are less essential, then they may exhibit larger declines when stay-at-home orders are in effect. Apple’s coverage areas are less comprehensive than Caltrans’, however, and coverage in the Sacramento Valley is limited to Sacramento, while coverage in the San Joaquin Valley is limited to Fresno and Bakersfield.

Figures 2 and 3 plot weekly percentage changes in driving and transit/walking routing requests respectively, relative to the average week in February 2020 (Apple has not released 2019 data, preventing year-over-year comparisons). The overall shape of the patterns is similar to that in Figure 1, with declines that predate the official order, and recoveries that begin during...
the first half of April. The depth of the declines, however, is deeper than in Figure 1, and the differential impacts across regions are starker.

The changes in driving routing requests, plotted in Figure 2, reveal a drop of up to 65% in the San Francisco Bay Area, and a drop of up to 64% in the Los Angeles area. Driving routing requests in the Sacramento Valley (Sacramento) dropped only 54%, and they dropped only 45% in the San Joaquin Valley (Fresno and Bakersfield). These trends suggest that non-routine trips were less affected in the Central Valley; by the week of May 3–9, routing requests in the San Joaquin Valley were down only 15% relative to February.

The changes in transit and walking requests, plotted in Figure 3, reveal differential impacts across the regions. San Francisco experienced the largest declines in transit and walking requests, followed by Los Angeles, Sacramento (Sacramento Valley), and Fresno and Bakersfield (San Joaquin Valley). This ordering mirrors the general perceived quality of the transit systems, as well as the walkability of the respective regions. When transit services are less comprehensive or lower quality, a higher proportion of riders are typically “transit dependent,” (i.e., not riders by choice). A logical explanation for the patterns in Figure 3 is that riders in the Central Valley are less likely to have alternative transportation choices and thus had less scope to substitute away from transit during the pandemic.

My final analysis examines changes in air pollution. Real-time air quality data come from the PurpleAir sensor network. PurpleAir sells inexpensive air quality sensors to consumers and businesses, and customers can share the data from these sensors online. I took a random sample of five outdoor sensors from each of the four regions (20 sensors in total) and downloaded data from March 1 to May 9 in 2019 and 2020.

Figure 4 plots the weekly year-over-year percentage change in average fine particulate concentrations (PM2.5), measured across five sensors per region. PM2.5 levels are higher in 2020 than in 2019 for the first two weeks of March and appear to fall across all four regions when the stay-at-home order begins (March 15–21). Nevertheless, PM2.5 levels fluctuate substantially from week to week, and then display a mixture of positive and negative growth (vis-a-vis the same week in 2019). Overall, there is no compelling evidence of PM2.5 reductions while the stay-at-home order is in effect.

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In conclusion, the stay-at-home order substantially reduced mobility across four major regions of California. The reductions were more pronounced in the urban coastal areas of San Francisco and Los Angeles than in the inland Sacramento and San Joaquin valleys. Mobility began increasing in all areas several weeks prior to the first relaxation of the stay-at-home orders, with the fastest increases appearing in the San Joaquin Valley. The stay-at-home order has not visibly reduced particulate pollution, suggesting that improvements in San Joaquin Valley air quality cannot come from vehicle restrictions and regulations alone.

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California Tree Nut Industries Set Up Well to Handle COVID-19 Pandemic

Brittney Goodrich

This article discusses the impacts of the COVID-19 pandemic on tree nut industries in California, specifically almonds, pistachios, and walnuts. Overall, impacts seem to be minimal due to the nature of tree nut marketing and mechanization along the supply chain.

Supply Chain
California tree nuts are mechanically harvested in the fall and much of the harvest is stored to be sold throughout the rest of the marketing year. Tree nut growers typically market their production through handlers who aggregate and sell the nuts or their processed products. USDA production numbers and December 2019 inventory reports for the 2019/2020 marketing year showed that California growers sold over 94% of each crop to handlers prior to the new year. Almond, walnut, and pistachio handlers had approximately 42%, 44%, and 63%, respectively, of their total inventory left to market beginning in January 2020.

The supply chains in California’s tree nut industries have been disrupted less than in some other crops. This is, in part, due to tree nuts being relatively non-perishable, which allows for long-term storage without spoiling. Additionally, logistical processes associated with tree nuts (harvest, shipping, processing, etc.) are done in bulk and are highly mechanized. This means social distancing measures are easy to implement throughout most of the tree nut supply chain, and labor shortages have not been an issue.

Domestic Consumption
California accounts for, virtually all almond, pistachio, and walnut production in the United States and is the primary supplier for domestic consumption. Figure 1 displays percentage changes of domestic shipments by month in comparison to the 2018/2019 marketing year for pistachios, almonds, and walnuts. Nuts shipped from December 2019 through February 2020, deviated slightly from the previous year. In March, when shelter-in-place orders were implemented throughout the U.S., all three markets saw significant increases in domestic shipments. It’s clear that in addition to other food staples, U.S. consumers stocked up on tree nut supplies.

Figure 1 shows weekly domestic wholesale prices for California tree nuts in comparison to 2019. Pistachio prices showed a noticeable response to the demand increase from the pandemic. Pistachio prices in 2020 had been below 2019 levels until the week of March 14, when prices increased by 21%. California walnut prices have been consistently above their 2019 levels, while almond prices have decreased over the time period and are now below 2019 levels. Almond prices decreased 11% between January and April. This is likely a response to the record almond crop anticipated for 2020, in addition to export demand disruptions.

In April, pistachios and walnuts saw significant decreases in domestic shipments from previous years (Figure 1), likely an adjustment due to consumers having bought large quantities of these items in the previous month, as well as to relatively high prices (Figure 2). Domestic shipments of almonds fell in April, but not by as much—likely due to low prices.

Exports
For 2016–2018, nearly half of pistachios and roughly two-thirds of walnuts and almonds were exported, so export markets play a considerable role in California tree nut markets. There have been no clear overall effects across all export markets due to the pandemic. It should be noted that

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**Figure 1.** Percentage Changes in Domestic Shipments between 2018/2019 and 2019/2020 Marketing Years, December 2019-April 2020

Sources: Author’s calculations using data from Almond Board of California Position Reports, Administrative Committee for Pistachios Shipment Reports, and California Walnut Board Shipment Reports
tree nut markets have been experiencing trade issues in a number of major markets, which make isolating effects of the pandemic difficult (Sumner et al., 2019).

One relatively large export market for California almonds and walnuts documented sizeable disruptions due to the pandemic. The Indian government issued a three-week lockdown beginning March 25, and confusion regarding which industries and workers were considered “essential,” caused a shortage of workers at Indian ports (Almond Board of California, Global Update, April 2020). As a result, California tree nut exports to India dropped off substantially in April. No pistachios were exported to India in April, while almond and walnut exports were down 52% and 12% from April 2019. Most of these shipments were likely postponed and will be shipped later, but it is unclear whether exports to India in the coming months will compensate for this sharp decline in shipments.

Looking Ahead

It seems probable that consumers will continue to eat more food at home than usual in the coming months, given the recession and continued social distancing measures associated with the pandemic. Tree nuts are considered a healthy snack by many consumers and frequently included in cereals, granola bars, and other processed foods that are consumed at home. With the shift to more food consumed at home, consumer demand could increase for California tree nuts in the coming months, though it is too early to tell.

If a second wave of COVID-19 occurs in the fall during harvest of tree nuts in California, growers are unlikely to see too much of an impact given the mechanization of harvest. There may be issues with nut processing plants, handling and shipping operations, and port facilities needing to implement social distancing measures, but given that many adjustments have already been made over the last couple of months, it is unlikely these disruptions will be major.

On May 19, USDA announced details of the Coronavirus Food Assistance Program (CFAP), which will provide direct payments to producers with losses due to the pandemic. Almonds, pecans, and walnuts are listed as eligible commodities. Growers can apply for this funding beginning May 26 through their local USDA Farm Service Agency. Applications will be done online or over the phone. Find more information about the program at the CFAP website: www.farmers.gov/cfap.

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For additional information, the author recommends:


Administrative Committee for Pistachios Shipment Reports, https://bit.ly/2ZAZfIk


Almond Board of California Position Reports, https://bit.ly/3g-dTWAn

The Milk Economics of the COVID-19 Pandemic

Daniel A. Sumner

Milk has been in the news over the past few months as much as any food or farm commodity. Empty shelves in the dairy case, milk dumped at the farms, and billion-dollar government programs illustrate the complexities of milk economics during the pandemic.

Four basic facts about milk demand and supply are crucial to understanding the recent news, the current situation, and the outlook. First, fluid milk products—whether gallons at supermarkets, cartons at schools, or with coffee in cafes—represent a small share of the use of farm milk. Almost 80% of California-produced milk is used to make butter, milk powder, or cheese, which is shipped across the country and around the world.

Second, about 20% of milk is typically processed and packaged for food away from home. Third, the quantity consumed is relatively insensitive to price. Fourth, cows produce milk every day, and even with low prices, a farm cannot turn off the milk one day and start back a month later when markets look better. Moreover, raw milk produced each day must be processed immediately.

In the immediate aftermath of the shutdown of restaurants, schools, and many places of employment, dairy processors and marketers scrambled to shift products into grocery stores, where demand had surged. Some products, such as milk already in school-size cartons, were not easy to adapt. Others, such as certain cheeses, which were designed for menu items, such as pizza, tacos, and cheese burgers, that were often purchased away from home, were moved into storage. The resulting mismatch left a few weeks of unfulfilled retail demand while processors worked overtime to prepare the right products for the larger retail market. As a result, the average retail prices of dairy products were almost 2% higher in April compared to February.

The domestic market disruption and a decline in exports, especially of milk powders to Mexico and Asia, caused storage capacity to fill, while about 10 million U.S. cows kept the milk flowing. Mexico and other importers have been hit by the same economic disruption and recession as experienced in the United States, and their imports of dairy products are responding to lower income and income prospects. By the middle of April, futures prices of milk used for products such as butter, milk powder, and cheese had fallen by more than one-third, reaching depths that were not economically sustainable, even for the most efficient California dairy farms.

In part because of the severity of the milk price collapse, Congress supplemented existing subsidy programs with new ad hoc payments. Nationally, direct payments to dairy farms are expected to add about $3 billion, or about 7%, to annual revenue. However, much California milk production may be ineligible for compensation because farms here are relatively large. Finally, USDA will begin purchasing dairy products that will be distributed through food banks and other programs to those in need, which may raise farm prices a little.

Dairy markets have risen since price lows in April. As of the middle of May, the futures price of milk for cheese has made up most of its losses. However, identical milk that is designated for butter and dry milk powder, remains down by about one-quarter. Prices of identical milk differ by use because of peculiarities of government milk marketing regulations. Table 1 shows the divergent pattern of milk product prices. Cheese and whey (and the milk used to produce those products) are near to or above the prices of a year ago. The prices of nonfat dry milk and butter (and of the raw milk used for those products), remain depressed by 15% and 36% below last year, despite rising in recent weeks.

Dairy farm prices and incomes are expected to crawl slowly back, but remain below normal for the rest of this year. Much depends on the depth of the global recession and when the demand for milk recovers. California and U.S. milk production is likely to fall and dairy farms will exit because they do not see profitability soon enough to make hanging on worthwhile. The full recovery seems many months away.

<table>
<thead>
<tr>
<th>Table 1. Dairy Product Price Patterns</th>
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<tr>
<td>May 15, 2020</td>
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<tr>
<td>$/Pound</td>
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<tr>
<td>Cheddar Cheese</td>
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<tr>
<td>Dry Whey</td>
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<tr>
<td>Nonfat Dry Milk</td>
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<td>Butter</td>
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Source: Chicago Mercantile Exchange.

Author’s Bio

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Smaller U.S. Wineries Especially Hard-Hit by COVID-19 Pandemic

Julian Alston

Even before the COVID-19 pandemic took hold, the global and U.S. wine industries were facing economic and market challenges. U.S. markets were adapting to new Chinese tariffs on American wine and U.S. tariffs on European wine. As we entered 2020, wine markets worldwide were already soft, wine consumers were enjoying a buyer’s market, and industry prognosticators presaged some industry adjustments to come (McMillan, 2020).

In just a few months, COVID-19 has made matters much worse, especially for those parts of the wine industry most dependent on direct sales to consumers—on-premise sales through hotels, restaurants, and winery tasting-rooms, and cellar-door sales at wineries. With social distancing and mandated closures, sales from these outlets are blocked for now and are projected to be well down for the year 2020.

The detailed outcomes will depend on many current unknowns. In one set of estimates, John Moramarco (Wine Institute, 2020) projects revenue losses for the U.S. wine industry in 2020 attributable to the pandemic totaling $5.9 billion, comprising decreases of 80% (or $2.5 billion) for on-premise sales, 80% (or $3.0 billion) for tasting-room sales, and 10% (or $323 million) for direct-to-consumer (DTC) shipments from wineries; he projects a 10% ($1.33 billion) increase in off-premise retail sales through grocery stores and other outlets.

In the immediate context, the effects are more pronounced and more mixed. Nielsen data indicate that DTC shipments and off-premise sales in March and April 2020 were up by 30% in value compared with 2019 (see, e.g., Adams, 2020). This reflects a rise in DTC and off-premise sales of alcohol, a shift toward larger package sizes, and a shift within alcohol toward wine.

These seismic shifts in marketing channels have complex implications for the total value and volume of sales, and the overall winery share of consumer wine expenditure. The consequences will be borne unevenly across the many thousands of American winegrape growers and wineries, as well as wine wholesalers and distributors, wine merchants, restaurants, and other retailers. Among the hardest-hit wineries will be those that emphasize sales on-premises and through their tasting rooms. Many of these are at the smaller end of the size distribution.

Looking forward to the 2020 vintage, winegrape growers can anticipate reduced demand for their grapes reflecting not only the immediate impact of the pandemic on wine markets, but also in view of the longer-run impacts of reduced incomes and consumer spending even after the world has returned to a more normal footing. Growers who do not have a well-established (contractual) relationship with a winery may struggle to find a buyer for their grapes and many are anticipating further price declines. Jon Moramarco (Wine Institute, 2020) projects a 25% ($1.4 billion) reduction in value of winegrape sales in 2020.

Among the complicating factors, as we try to make sense of the implications of the COVID-19 pandemic for California and U.S. wine producers, is uncertainty about impacts and adjustments in the rest of the world—both immediately and in the longer-run. Along with disruptions to domestic markets in all countries, the pandemic has disrupted production and distribution channels in ways that affect international trade. Some countries—such as France, Italy, Spain, and Australia—are heavily dependent on exports, including exports to the United States. In the short-run, U.S. producers may benefit from disruptions to those exports. Various early reports are anticipating major structural changes in the wine sector in the main producing countries, the consequences of which could ameliorate the longer-run effects of changes in U.S. markets on the U.S. wine and grape industry.

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Cattle Producers Struggle as COVID-19 Reduces Beef Processing Capacity

Tina L. Saitone

Outbreaks of COVID-19 in meat-processing facilities across the U.S. have created a significant bottleneck in the beef supply chain that has had substantial and widespread ramifications for cattle producers. Cattle producers are reliant upon a highly concentrated processing sector in order for cattle to reach consumers as cuts of beef. At the end of April, when beef packing plant shutdowns were most widespread, daily processing volumes fell 40% below 2019 levels. While every effort has been made to get these plants back online, recent statistics indicate that throughput remains 30% below last year, even though all but one plant had reopened as of May 13.

Meatpackers’ dependence on labor, coupled with protocols to reduce the risk of work-related COVID-19 infections, means that throughput at packing facilities will remain below normal levels for the foreseeable future. With the majority of restaurants still shuttered, or operating with severely limited dine-in options available, meatpackers continue to struggle to repurpose cuts of beef that are typically utilized by foodservice operations. This process is especially challenging because much of this repurposing is labor-intensive; butchers breaking down larger cuts to sizes and packages appropriate for retail. While foodservice sales are still severely compromised, retail sales of fresh beef have increased 59% relative to the same week last year.

While media headlines have warned of widespread meat shortages and Tyson, one of the largest three meat processors in the country, publicly declared that the “food supply chain is breaking,” only limited product-specific stockouts have been noted in specific geographic areas. But, this does not mean that the issues confronted by the processing sector have occurred without costs. With fewer cattle being processed and a reduction in the supply of beef, wholesale and retail beef prices have increased.

The consumer price index for beef indicates that in April 2020, consumers paid 7.5% more for beef, compared to 2019. In the early days of May, wholesale beef prices were up almost 50%, relative to the same time last year, and 67% year-to-date. At the same time wholesale and retail prices are rising, the processing bottleneck has limited the producers’ ability to sell their cattle, increasing supplies and driving down cattle prices. This reduction in cattle prices sent meatpackers’ margins (the difference between the wholesale beef price and the live cattle price) soaring, an increase of 150% year-to-date. Although this margin calculation fails to account for processors’ additional costs associated with operating during these unique circumstances (e.g., running plants at lower capacity, installing equipment to increase worker safety, increased cost of sick workers), cattle producers and policymakers have used these developments to petition the U.S. Department of Justice to investigate the competitiveness of the industry and formulate legislation to dictate the procurement mechanisms utilized by packers in the future.

California’s cattle producers are the backbone of the beef supply chain; primarily participating in the cow-calf and stocker segments of the industry that produce calves and feed young cattle before they are sold to large-scale feeding operations in the Midwest. Although California is the 5th largest cattle-producing state, some would like to believe that our geographic separation from the meat-processing sector would soften the blow. However, this is not the case.

With fed cattle ready for slaughter backed up in feedlots, many feed yards have stopped making purchases. This forces producers up the supply chain to make hard decisions; keep cattle longer hoping the market improves (adding costs as you continue to feed them) or sell immediately at a loss. Average feeder prices (cattle one year away from slaughter) are 12% below last year and 24% below the average price paid in May over the last five years. The drought-like conditions that occurred this winter throughout much of the state leaves less available forage and limits producers’ ability to hold cattle until prices improve.

The short-run situation is likely to remain unstable for the foreseeable future. While all processing plants are currently open, the possibility remains that worker health issues could shutter facilities again. Even if processing lines continue to run, cattle prices are unlikely to recover until meatpackers are able to process the backlog of fed cattle. At current throughput levels, this is predicted to be months away. However, producers selling younger animals are likely to see prices recover sooner, given those animals are more than a year away from being ready for processing.

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How is Fresh Produce Adjusting to the Public Health Crisis?

Kristin Kiesel

Over a third of the country’s vegetables and two-thirds of all fruits are grown in California. Lettuce, one of California’s top ten commodities, directly added $1.81 billion and millions of dollars in indirect business activities to the California economy in 2018. Moving towards the peak of the California growing season, the produce industry is one of few sectors of the economy currently hiring. Temporary labor supply is more plentiful than in previous seasons given the collapse of the non-farm economy and easing of restrictions on H2A visas. Yet, industry leaders worry that localized outbreaks could quickly shut down farms and packing facilities.

Responding to social distancing rules meant reducing employment by 18% in processing and 15% in harvesting, and resulted in efficiency losses. Washing and disinfecting stations have also been added and PPE is widely made available. However, a large share of the now essential workers—many of whom are undocumented immigrants—return to financially vulnerable homes without adequate access to health care. The industry repurposed empty California motels and hotels as isolation homes for agricultural workers, committed to offering financial support to their employees during quarantine, and set up charitable funds to augment the general provision of health care services. While these measures have increased production costs, community spread of COVID-19 has largely been avoided so far.

The impact of this public health crisis on the demand for fresh produce can be described in three distinct phases—panic buying, supply chain challenges, and emerging new consumer patterns. Although produce never quite experienced the kind of surge seen in meat, dairy, dried and canned goods during the first phase of the pandemic, fresh produce sales increased significantly. However, by March 29, fresh produce sold at only slightly elevated levels according to weekly total sales of fresh produce reported by IRI. Grower-shippers impeded from selling their produce through foodservice distributors were trying to pivot into retail. Yet, highly perishable items were pushed to the back of the priority list as retail partners were having a difficult time restocking their shelves. Taylor Farms, the nation’s largest producer of leafy greens, confirms that although they were able to ramp up retail operations by 25% during the first weeks of the pandemic; to date, volume is on par with pre-COVID-19 projections. Operating based on 60–90 day planting cycles, rapid volume reductions in foodservice sales and unexpected changes in product mix meant that Taylor Farms had to till under $11 million in produce.

Foodservice distributors were able to submit first bids to the USDA’s Agricultural Marketing Service new Farmers to Families Food Box program. The program puts $461 million towards the purchase of fresh fruit and vegetable kits delivered to food banks. California committed an additional $3.64 million in funding to ensure that excess produce will reach the families that need it the most. Still-operating fast food and casual dining restaurants, and schools dedicated to providing food to their communities, further allowed some categories like iceberg to recover to 80% of normal levels. Others, like romaine loose leaves, remain low at around 40% of pre-COVID-19 sales.

In retail, consumers are also moving away from value-added products and towards commodities, although salad kits continue to perform well. As consumers are minimizing shopping trips, shippers have seen an increase in the relative shares of sales through supercenters and national grocery chains. The rapid increase in e-commerce and demand for services like Instacart is one of the emerging consumer trends likely here to stay as well. In general, simplicity and straightforwardness are key to marketing fresh produce in this new environment. Many brands are sharing additional resources like downloadable shopping lists, limited-ingredient recipes, and cooking videos to help families during this public health crisis, and Driscoll’s reminds consumers to share a little joy in these challenging times when promoting one of very few new product introductions.

The California fresh produce industry is a tightly connected web of grower-shippers, packers, processors, transporters, and more. Vulnerabilities in our food supply have to be addressed more broadly in the aftermath of this pandemic. Despite facing astonishing disruptions caused by this public health crisis, the industry acted nimbly, moving as much fresh produce as possible and continuing to find ways to reach consumers.

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Kristin Kiesel is an assistant professor of teaching in agricultural and resource economics at UC Davis. Special thanks to Mark Borman, president of Taylor Farms California, and Frances Dillard, senior director of brand and product marketing at Driscoll’s, for their willingness to share their insights.
How is the Strawberry Industry Weathering the Pandemic?

Yujing Song, Mark Bolda, Oleg Daugovish, and Rachael Goodhue

In 2017, 38,200 acres of California strawberries generated $3.1 billion in production value, making it one of the state’s top ten crops. Strawberry production ramps up in March and is at its peak in April through June. At press time, much of this period has been impacted by COVID-19-related restrictions that have been in place nationally and internationally, making the potential impacts relatively large in terms of the share of annual production affected.

The shuttering of foodservice businesses has reduced a major marketing channel; foodservice accounts for about 20–25% of sales. Export demand has shrunk. Typically, California strawberries are shipped as cargo on passenger planes to Dubai, Hong Kong, and elsewhere. Now, shippers are using cargo planes, which increases transportation costs.

At press time, strawberry producers have access to three USDA initiatives designed to blunt the economic impact of COVID-19 on agriculture. First, under the Families First Coronavirus Response Act, the USDA is making additional commodity purchases, including $35 million allocated for strawberries, to distribute to communities nationwide. At slightly over 1% of 2017’s production value, the absolute value of this purchase is small. However, to the extent that it can facilitate moving volume at critical times during the coming months, it could have an outsized effect on the industry.

Second, strawberry growers and shippers are eligible to apply to the Farmers to Families Food Box program to supply produce to food banks and other non-profits. Finally, the USDA announced on April 19 that strawberries were one of 22 specialty crops eligible for direct payments to producers under the Coronavirus Farm Assistance Program.

Market impacts of the pandemic differ for fresh and frozen strawberries. Frozen berries can be stored so when stay-at-home restrictions began, consumers may have increased their purchases as part of the stockpiling strategy many undertook. As a highly perishable food, fresh strawberry availability should not be greatly affected by consumers stocking up and generating shortages, as has been observed for many non-perishables. On the other hand, because fresh strawberries are highly perishable, fresh sales may have declined initially as a result of people limiting their trips to grocery stores.

Recently, demand for fresh strawberries has strengthened, and people appear to be purchasing strawberries at a near-normal pace. The loosening of restrictions on mobility in many regions has likely played a role, as may have other factors. Mother’s Day is considered a driver of strawberry demand, as is spring more generally, and this traditional force may have influenced consumers to resume purchases. Additionally, major shippers are investing substantially in advertising and promotion of fresh berries this year.

COVID-19’s labor-related challenges are particularly significant for strawberries, which require about 1.5 workers per acre. The industry has instituted costly additional worker and food safety measures. Growers check workers for symptoms and monitor COVID-19 outcomes. The availability of protective face covers, sanitizer, and tissues for workers was an early challenge and continuing these measures increases costs. Social distancing drives up harvest costs because it requires increasing the space between workers, which slows picking. To some extent, growers can manage this increase by staggering the assignment of rows to create the necessary distance. Additional hand-washing stations are another response that increases costs.

Despite these marketing challenges and cost increases, to date, total farmgate strawberry volume has not shown a sustained reduction relative to previous years based on USDA data. In part, this is because growers have already planted their fields and slowing the harvest of strawberries reduces plant health and future yields. Impacts may appear over time. Higher harvesting costs may induce growers to transition from the fresh market to the processing (frozen) market earlier in the season or skip producing for the processing market entirely. If growers transition to the frozen market earlier, the availability of fresh strawberries will decline, increasing prices for fresh berries.

While the precise impact on prices and returns this year of these off-setting effects is unknown, the increase in costs may change future decisions. Strawberry acreage may decline in future seasons if the costly safety precautions continue, making less safety precautions more attractive.

Authors’ Bios

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Processing Tomatoes Benefit from Machine Harvesting and Storability

Ellen Bruno and Mark Evans

Tomatoes are a top 10 commodity for California that bring in over $1 billion in revenues annually. About 80% of that value is derived from processing tomatoes, that is, the tomatoes that are used in shelf-stable sauces and pastes. California is the leading producer, growing 95% of processing tomatoes nationwide and 28% of processing tomatoes worldwide.

The economic impacts of the pandemic on the processing tomato industry will depend largely on the degree to which producers and processors can respond to changes in demand. Tomato processors selling to the foodservice industry typically produce in gallon-size or larger containers. This production requires specialized equipment that is often shipped from abroad, meaning it is not feasible for processors to convert a major portion of their production to retail sizes this year if foodservice operations continue to be shuttered or operating under limited capacity. In the short run, some processors will struggle to adapt to the recent surge in retail demand due to the pandemic. As a result, we may see temporary scarcity for some retail products that could manifest in either higher prices or shortages at the retail level.

An important dynamic for understanding the longer-term implications of COVID-19 to the processing tomato industry is that of storability. The industry will benefit from the fact that canned product has a relatively long shelf-life. Bulk and canned products can maintain their full quality in warehouse storage for at least 2 years. This will help with managing the disruptions to demand for product that was processed for foodservice. Unlike some other fresh vegetables slotted for foodservice, this product will not go to waste. According to the April crop update by the World Processing Tomato Council, some California tomato processors have reduced their contracted acreage in response, which will either get picked up by other processors or lead to an overall reduction in acres planted.

Bulk product that was originally intended to be an ingredient in foodservice manufacturing can easily (at least physically) be shifted to use in retail production. For example, processors could repurpose a 300-gallon package of tomato paste intended as an ingredient in foodservice spaghetti sauce to make sauces in retail-size containers. Although the canneries may face logistical challenges as to the timing of the final-goods production, the lengthy shelf-life of the 300-gallon product should allow for these adjustments. While this may be great from a food waste and overall industry standpoint, some producers may face negative impacts. Excessive inventories may occur when the economy reopens, driving some prices down.

Commodities that involve labor-intensive activities, such as hand picking, are likely to be at higher risk for outbreaks and supply disruptions than mechanically harvested produce. Even though processing tomatoes are mechanically harvested, the industry and its workers still face some outbreak risk. For example, tomato plants are started in greenhouses that often require substantial hand labor. People also work in close proximity to each other during the field transplanting process. The industry has taken precautions to minimize risks and, to date, there has been no significant disruption in establishing the crop this season.

There is always some concern in the industry regarding how government regulations will impact the ability to produce food in a cost-effective manner. For example, (understandable) limitations in CA Department of Motor Vehicles licensing activities due to COVID-19 may lead to difficulties in obtaining licenses for truck drivers who are needed to deliver tomatoes from the fields to the canneries. Even if an abundance of people are motivated to get trained and licensed, backlogs due to the suspension of driver’s tests may prevent the agricultural industry from adapting quickly if and when licensed truckers get sick.

There is no doubt that the pandemic is causing disruptions on both the supply and demand sides that affect the processing tomato industry. The magnitude of the impacts from these disruptions remains uncertain. Further, policies and regulations intended to enable social distancing will challenge the production efficiency and quality of the products. The tomato industry, like the rest of the agricultural sector, is committed to maintaining a healthy workforce and a strong supply chain to continue supplying healthful food.

Authors’ Bios

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